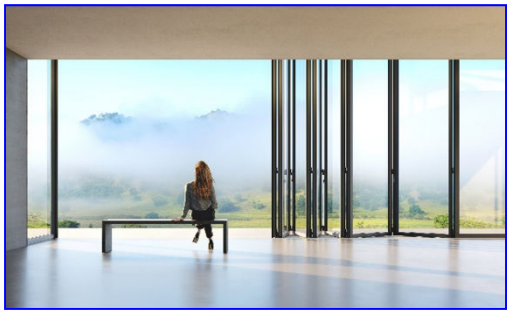
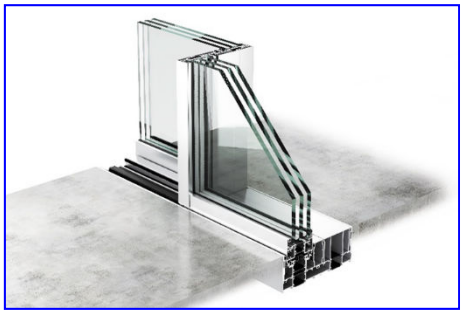
Environmental Product Declaration (EPD)

Declaration code EPD-SGS-GB-63.0





SOLARLUX®

Solarlux GmbH

Window

Folding glass walls, sliding doors and all-glass systems made of aluminum

Basis:

DIN EN ISO 14025
EN 15804 + A2

Company EPD
Environmental
Product **D**eclaration

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Environmental Product Declaration (EPD)

Declaration code EPD-SGS-GB-63.0

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	Solarlux GmbH Industriepark 1 49324 Melle, Germany www.solarlux.de		
Declaration code	EPD-SGS-GB-63.0		
Designation of declared product	Folding glass walls, sliding doors and all-glass systems made of aluminum		
Scope	Folding glass walls, sliding doors and minimal sliding doors for interior and exterior applications, as well as all-glass systems for closing terrace roofs and balcony glazing.		
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 EN 17213 “PCR for windows and doors”, “PCR Part A” PCR-A-1.0:2023 and “Doors and gates" PCR-TT-3.0:2023.”		
Validity	Publication date: 16.04.2024	Last revision: 29.04.2024	Valid until: 16.04.2029
	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 base data include both the data collected at the production site of Solarlux GmbH and the generic data derived from the database “LCA for Experts 10”. LCA calculations were carried out for the included “cradle to gate – with options” life cycle 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.		

Christian Kehrer Head of Certification and Surveillance Body	Dr. Torsten Mielecke Chairman of Expert Committee ift-EPD and PCR	Susanne Volz External verifier

1 General Product Information

Product definition

The EPD relates to the product group “Window” and applies to:

1 m² Folding glass walls, sliding doors and all-glass systems of company Solarlux GmbH

The declared unit is obtained by summing up:

Assessed product	Declared unit	Weight per unit area
Folding glass wall System (SL320) Highline	1 m²	29.04 kg/m²
Sliding door System (SL200a) Cero IIIa	1 m²	62.94 kg/m²
All-glass system System (SL23) Proline S mega	1 m²	34.54 kg/m²

Table 1 Product groups

The average unit is declared as follows:
Directly used material flows are determined by means of manufactured quantities (pieces) and allocated to the declared unit. All other inputs and outputs in the production were scaled to the declared unit in their entirety since there is no typical functional unit due to the high number of variants. The reference period is the year 2022.

The validity of the EPD is restricted to the following models/series/etc.:

- **Folding glass walls:**
  - (SL310) Ecoline
  - **(SL320) Highline**
  - (SL370) Megaline
- **Sliding doors:**
  - (SL220) Cero II
  - **(SL200a) Cero IIIa**
  - (SL310) Ecoliine S
  - (SL320) Highline S
- **All-glass systems:**
  - (SL20e) Proline S
  - (SL20Re) Proline S
  - **(SL23) Proline S mega**
  - SL25
  - SL25 R
  - SL25 XXL
  - (SL125) Proline T
  - (SL128) Proline T mega

Product description

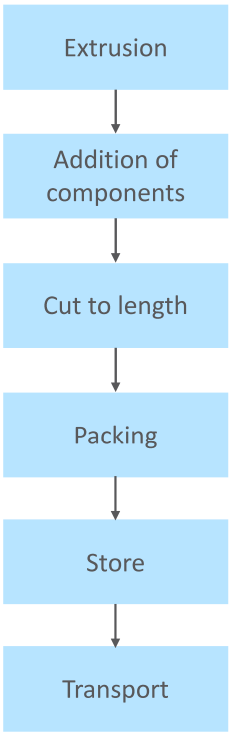
The folding glass wall (Ecoline, Highline and Megaline) enables a seamless transition from inside to outside. With generous glass fronts that can be opened almost 100%, the folding glass wall creates a special living experience. The elements of the folding glass wall can be folded to the side to form a narrow sash package - guaranteeing limitless views.
The sliding door (Ecoline S, Highline S) offers a sensible system extension to the folding walls with the same visible heights/widths.

cero opens up spaces with large glass surfaces: Impressive transparency dissolves the boundaries between inside and outside. In terms of construction and design, cero offers all the possibilities that architecturally sophisticated buildings require. Narrow frames and profiles support the maximum transparency of the elements. And very importantly: Extremely large glass surfaces of up to 15 m² place particular emphasis on quality and safety aspects. cero is tested and certified to the highest safety standards, and equipment as per burglar protection class RC2 and RC3 are optionally available.

With sliding-turning systems or sliding systems made of glass, you can protect your balcony or patio not only from harsh weather conditions such as wind, rain and cold, but also from noise. Depending on requirements, completely transparent or framed systems are available. The flexible, non-insulated glazing transforms your balcony or terrace into an airy outdoor seating area or a weather-protected room if you wish. The various system solutions can also be retrofitted to existing balustrades, for example.

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

Product manufacture



Application	Folding glass walls, sliding doors and minimal sliding doors for interior and exterior applications, as well as all-glass systems for closing patio and balcony glazing.
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 • RAL GZ 695
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 product contains no substances from the REACH candidate list (declaration dated 19.12.2023). All relevant safety data sheets are available from Solarlux GmbH.

3 Construction process stage

Processing recommendations, installation	Observe the instructions for assembly/installation, operation, maintenance and disassembly, provided by the manufacturer. For this, see www.solarlux.de

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", (A1-A3 and one or more modules from A4 and A5), the specification of a reference service life (RSL) is only possible if the reference service life conditions are specified.
The reference service life (RSL) of Folding glass walls, sliding doors and all-glass systems made of aluminum from Solarlux GmbH is not specified.

5 End-of-life stage

Possible end-of-life stages

The Folding glass walls, sliding doors and all-glass systems made of aluminum are taken 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.
Aluminum, glass and stainless steel are recycled to a certain extent. 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 Folding glass walls, sliding doors and all-glass systems made of aluminum. The 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 and EN ISO 14025 as well as based on ISO 21930.

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 plant located in Marklkofen 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 Folding glass walls, sliding doors and all-glass systems made of aluminum.
Additional data from pre-suppliers/subcontractors were taken into consideration. Furthermore, specific data for the glass structures used are taken from the ift model EPDs "Laminated safety glass and insulating glass unit (double and triple structure)" with the declaration number M-EPD-VMG-001000 and "Float glass and thermally toughened safety glass, heat soaked thermally toughened safety glass and heat strengthened glass" with the declaration number M-EPD-FEG-001000.

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.

A worst-case distance of 800 km is assumed for the transportation of pre-products for the German site in accordance with the ift standard scenario. As the pre-products are delivered exclusively by forwarding agents, a very high capacity utilization can be assumed. 85% is assumed.

The transportation of waste generated in A3 is mapped using the following standard scenario:

Means of transport, utilization, transport km
Transport to collection point using 34-40 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 Folding glass walls, sliding doors and all-glass systems made of aluminum is shown in the annex. The product stage "A1 – A3", construction process stage “A4 – A5", end-of-life stage "C1 – C4" and the benefits and loads beyond the system boundaries "D" are considered in the modeling.

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

The system boundaries were set following their disposal, reaching the end-of-waste status.

Allocations beyond life cycle boundaries

The system boundary set for the recycled material refers to collection.

Secondary material

The use of secondary material in Module A3 was considered for Solarlux GmbH. Secondary material is not used.

Inputs

The LCA includes the following production-relevant inputs per 1 m² Folding glass walls, sliding doors and all-glass systems:

Energy
For the input material natural gas, "Thermal energy from natural gas" was assumed. The electricity mix Germany is used for the electricity mix in the plant. The electricity from photovoltaics is based on "Electricity from photovoltaics". "Electricity from natural gas" is used for the input material electricity from CHP units. For the input material diesel, "Diesel mix ex filling station" is used.
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 34 l per m² folding glass walls and all-glass systems and 33 l per m² sliding door.
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 use of raw materials/pre-products per cent.

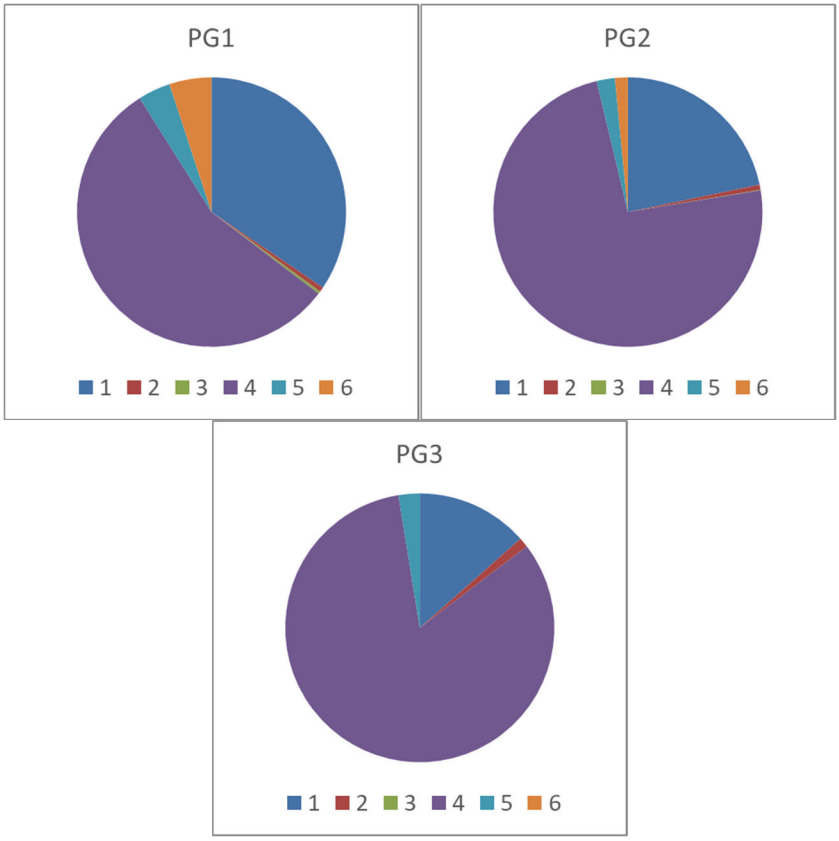


Illustration 1 Percentage of individual materials per declared unit

No.	Material	Mass in % per m²		
		PG 3	PG 2	PG 3
1	Aluminium	34%	21%	13%
2	Stainless steel	<1%	<1%	1 %
3	Cast products	<1%	<1%	-
4	Glass	56%	74%	83%
5	EPDM	4%	2%	3%
6	PA 66 GF25	5%	2%	-

Table 2 Percentage of individual materials per declared unit

Ancillary materials and consumables
0.95 kg ancillary materials and consumables are used for folding glass walls.
0.94 kg ancillary materials and consumables are used for sliding doors.
0.97 kg ancillary materials and consumables are used for all-glass systems.

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

No.	Material	Mass in kg per m² and PG		
		PG 1	PG 2	PG 3
1	PE film	0.21	0.21	0.21
2	Wood	0.10	0.10	0.10
3	Cardboard	0.68	0.67	0.70

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.	Component	Content in kg C per m²		
		PG 1	PG 2	PG 3
1	In the corresponding packaging	0.29	0.29	0.29

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 Folding glass walls, sliding doors and all-glass systems:

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

Waste water
Manufacture produces 24 l waste water folding glass walls and 25 l for sliding doors.

6.3 Impact assessment

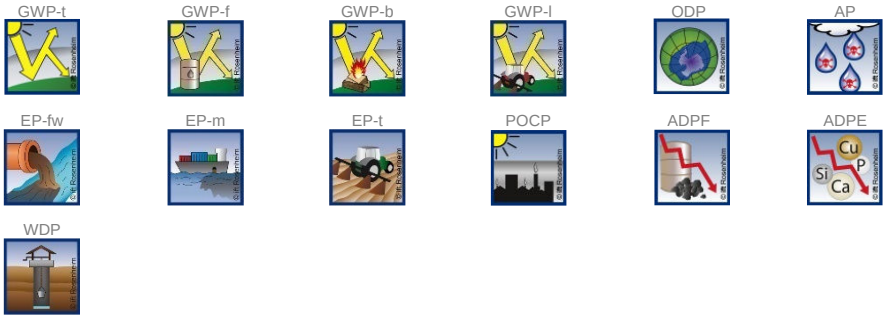
Aim

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:

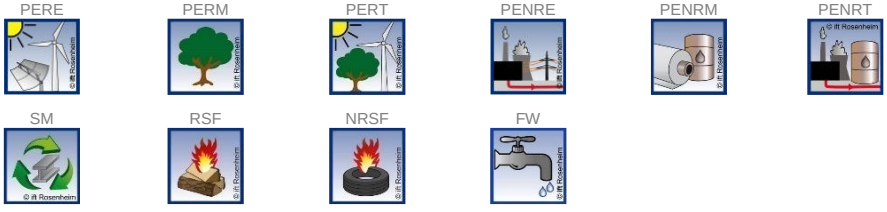
- Climate change - total (GWP-t)
- Climate change - fossil (GWP-f)
- Climate change - biogenic (GWP-b)
- Climate change - land use & land use change (GWP-l)
- Ozone depletion (ODP)
- Acidification (AP)
- Eutrophication freshwater (EP-fw)
- Eutrophication salt water (EP-m)
- Eutrophication land (EP-t)
- 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)

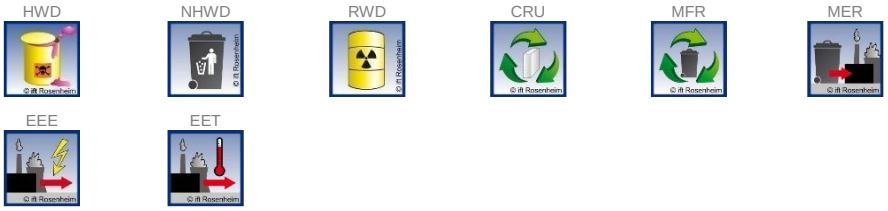


Waste

The waste generated during the production of 1 m² Folding glass walls, sliding doors and all-glass systems 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 m² Folding glass wall System (SL320) Highline															
	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	142.23	5.69	1.65	ND	ND	ND	ND	ND	ND	ND	0.00	5.34E-02	4.53	0.19	-84.40
GWP-f	kg CO_2 equivalent	142.73	5.71	0.55	ND	ND	ND	ND	ND	ND	ND	0.00	5.37E-02	4.52	0.19	-84.40
GWP-b	kg CO_2 equivalent	0.11	-7.91E-02	1.10	ND	ND	ND	ND	ND	ND	ND	0.00	-7.43E-04	8.77E-03	-6.43E-03	-2.18E-02
GWP-l	kg CO_2 equivalent	5.93E-02	5.21E-02	1.47E-05	ND	ND	ND	ND	ND	ND	ND	0.00	4.90E-04	1.05E-04	6.01E-04	-1.18E-02
ODP	kg CFC-11-eq.	6.07E-07	7.32E-13	2.37E-13	ND	ND	ND	ND	ND	ND	ND	0.00	6.88E-15	1.47E-11	4.92E-13	-1.23E-10
AP	mol H^+-eq.	0.37	1.66E-02	3.57E-04	ND	ND	ND	ND	ND	ND	ND	0.00	6.23E-05	2.73E-03	1.37E-03	-0.30
EP-fw	kg P-eq.	2.03E-04	2.06E-05	6.89E-08	ND	ND	ND	ND	ND	ND	ND	0.00	1.93E-07	3.02E-06	3.90E-07	-4.31E-05
EP-m	kg N-eq.	7.88E-02	7.41E-03	1.22E-04	ND	ND	ND	ND	ND	ND	ND	0.00	2.10E-05	7.31E-04	3.55E-04	-5.79E-02
EP-t	mol N-eq.	0.92	8.34E-02	1.62E-03	ND	ND	ND	ND	ND	ND	ND	0.00	2.47E-04	9.34E-03	3.90E-03	-0.63
POCP	kg NMVOC-eq.	0.23	1.54E-02	3.28E-04	ND	ND	ND	ND	ND	ND	ND	0.00	5.43E-05	1.93E-03	1.07E-03	-0.17
ADPF*²	MJ	2111.10	76.70	0.58	ND	ND	ND	ND	ND	ND	ND	0.00	0.72	17.10	2.58	-1160.00
ADPE*²	kg Sb equivalent	4.90E-05	3.71E-07	2.14E-09	ND	ND	ND	ND	ND	ND	ND	0.00	3.48E-09	1.23E-07	8.92E-09	-1.49E-05
WDP*²	m^3 world-eq. deprived	5.11	6.80E-02	0.19	ND	ND	ND	ND	ND	ND	ND	0.00	6.39E-04	0.55	2.13E-02	-5.01
Resource management																
PERE	MJ	683.90	5.58	12.59	ND	ND	ND	ND	ND	ND	ND	0.00	5.24E-02	9.91	0.42	-375.00
PERM	MJ	12.45	0.00	-12.45	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
PERT	MJ	696.35	5.58	0.14	ND	ND	ND	ND	ND	ND	ND	0.00	5.24E-02	9.91	0.42	-375.00
PENRE	MJ	2052.95	77.00	58.13	ND	ND	ND	ND	ND	ND	ND	0.00	0.72	17.10	2.58	-1160.00
PENRM	MJ	57.55	0.00	-57.55	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	2110.50	77.00	0.58	ND	ND	ND	ND	ND	ND	ND	0.00	0.72	17.10	2.58	-1160.00
SM	kg	4.27	0.00	0.00	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
RSF	MJ	0.00	0.00	0.00	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
NRSF	MJ	0.00	0.00	0.00	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
FW	m^3	0.71	6.11E-03	4.41E-03	ND	ND	ND	ND	ND	ND	ND	0.00	5.74E-05	1.68E-02	6.51E-04	-0.73
Categories of waste																
HWD	kg	1.34E-06	2.38E-10	1.24E-11	ND	ND	ND	ND	ND	ND	ND	0.00	2.24E-12	-1.24E-09	5.61E-11	-4.71E-08
NHWD	kg	21.90	1.17E-02	8.11E-02	ND	ND	ND	ND	ND	ND	ND	0.00	1.10E-04	9.17E-02	12.90	-18.10
RWD	kg	9.17E-02	1.44E-04	2.68E-05	ND	ND	ND	ND	ND	ND	ND	0.00	1.35E-06	2.59E-03	2.94E-05	-8.55E-02
Output material flows																
CRU	kg	0.00	0.00	0.00	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
MFR	kg	8.17	0.00	0.00	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	14.50	0.00	0.00
MER	kg	0.00	0.00	0.00	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
EEE	MJ	5.25	0.00	2.64	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	6.28	0.00	0.00
EET	MJ	11.78	0.00	4.76	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	14.40	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 Folding glass wall System (SL320) Highline															
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Additional environmental impact indicators																
PM	Disease incidence	4.58E-06	1.23E-07	2.43E-09	ND	ND	ND	ND	ND	ND	ND	0.00	4.51E-10	1.98E-08	1.69E-08	-3.09E-06
IRP*[1]	kBq U235-eq.	17.92	2.15E-02	4.08E-03	ND	ND	ND	ND	ND	ND	ND	0.00	2.02E-04	0.43	3.40E-03	-18.40
ETP-fw*[2]	CTUe	2247.60	54.50	0.30	ND	ND	ND	ND	ND	ND	ND	0.00	0.51	7.45	1.41	-441.00
HTP-c*[2]	CTUh	3.29E-06	1.12E-09	1.77E-11	ND	ND	ND	ND	ND	ND	ND	0.00	1.05E-11	2.77E-10	2.16E-10	-3.35E-08
HTP-nc*[2]	CTUh	3.44E-04	6.49E-08	1.21E-09	ND	ND	ND	ND	ND	ND	ND	0.00	5.58E-10	8.20E-09	2.38E-08	-7.95E-07
SQP*[2]	dimensionless	467.38	32.00	0.16	ND	ND	ND	ND	ND	ND	ND	0.00	0.30	6.61	0.63	-82.00

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 sliding door System (SL200a) Cero IIIa															
	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	250.88	12.10	1.64	ND	ND	ND	ND	ND	ND	ND	0.00	9.26E-02	4.74	0.50	-118.00
GWP-f	kg CO_2 equivalent	250.39	12.20	0.55	ND	ND	ND	ND	ND	ND	ND	0.00	9.30E-02	4.72	0.51	-118.00
GWP-b	kg CO_2 equivalent	0.36	-0.17	1.09	ND	ND	ND	ND	ND	ND	ND	0.00	-1.29E-03	1.49E-02	-1.70E-02	-3.12E-02
GWP-l	kg CO_2 equivalent	0.13	0.11	1.46E-05	ND	ND	ND	ND	ND	ND	ND	0.00	8.49E-04	1.63E-04	1.59E-03	-1.70E-02
ODP	kg CFC-11-eq.	6.11E-07	1.56E-12	2.35E-13	ND	ND	ND	ND	ND	ND	ND	0.00	1.19E-14	2.50E-11	1.30E-12	-1.71E-10
AP	mol H^+-eq.	0.69	3.53E-02	3.53E-04	ND	ND	ND	ND	ND	ND	ND	0.00	1.08E-04	3.82E-03	3.64E-03	-0.44
EP-fw	kg P-eq.	4.35E-04	4.38E-05	6.84E-08	ND	ND	ND	ND	ND	ND	ND	0.00	3.35E-07	5.09E-06	1.03E-06	-6.01E-05
EP-m	kg N-eq.	0.14	1.58E-02	1.21E-04	ND	ND	ND	ND	ND	ND	ND	0.00	3.63E-05	9.84E-04	9.40E-04	-8.59E-02
EP-t	mol N-eq.	1.71	0.18	1.60E-03	ND	ND	ND	ND	ND	ND	ND	0.00	4.28E-04	1.18E-02	1.03E-02	-0.94
POCP	kg NMVOC-eq.	0.40	3.27E-02	3.24E-04	ND	ND	ND	ND	ND	ND	ND	0.00	9.41E-05	2.61E-03	2.84E-03	-0.24
ADPF*²	MJ	3633.20	163.00	0.57	ND	ND	ND	ND	ND	ND	ND	0.00	1.25	28.80	6.83	-1620.00
ADPE*²	kg Sb equivalent	9.92E-05	7.89E-07	2.12E-09	ND	ND	ND	ND	ND	ND	ND	0.00	6.03E-09	2.09E-07	2.36E-08	-3.13E-05
WDP*²	m^3 world-eq. deprived	6.99	0.15	0.19	ND	ND	ND	ND	ND	ND	ND	0.00	1.11E-03	0.64	5.63E-02	-7.12
Resource management																
PERE	MJ	1191.47	11.90	12.50	ND	ND	ND	ND	ND	ND	ND	0.00	9.08E-02	16.90	1.11	-515.00
PERM	MJ	12.36	0.00	-12.36	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
PERT	MJ	1203.83	11.90	0.14	ND	ND	ND	ND	ND	ND	ND	0.00	9.08E-02	16.90	1.11	-515.00
PENRE	MJ	3580.54	164.00	52.83	ND	ND	ND	ND	ND	ND	ND	0.00	1.25	28.80	6.84	-1630.00
PENRM	MJ	52.26	0.00	-52.26	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	3632.80	164.00	0.57	ND	ND	ND	ND	ND	ND	ND	0.00	1.25	28.80	6.84	-1630.00
SM	kg	12.60	0.00	0.00	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
RSF	MJ	0.00	0.00	0.00	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
NRSF	MJ	0.00	0.00	0.00	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
FW	m^3	1.01	1.30E-02	4.37E-03	ND	ND	ND	ND	ND	ND	ND	0.00	9.95E-05	2.16E-02	1.73E-03	-1.00
Categories of waste																
HWD	kg	3.09E-06	5.07E-10	1.22E-11	ND	ND	ND	ND	ND	ND	ND	0.00	3.88E-12	-2.17E-09	1.49E-10	-6.97E-08
NHWD	kg	34.75	2.50E-02	8.06E-02	ND	ND	ND	ND	ND	ND	ND	0.00	1.91E-04	9.25E-02	34.20	-25.20
RWD	kg	0.21	3.07E-04	2.66E-05	ND	ND	ND	ND	ND	ND	ND	0.00	2.34E-06	4.46E-03	7.79E-05	-0.12
Output material flows																
CRU	kg	0.00	0.00	0.00	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
MFR	kg	19.84	0.00	0.00	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	27.30	0.00	0.00
MER	kg	0.00	0.00	0.00	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
EEE	MJ	10.42	0.00	2.62	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	5.66	0.00	0.00
EET	MJ	21.50	0.00	4.72	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	13.00	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 sliding door System (SL200a) Cero IIIa														
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Additional environmental impact indicators																
PM	Disease incidence	9.44E-06	2.63E-07	2.41E-09	ND	ND	ND	ND	ND	ND	ND	0.00	7.82E-10	2.92E-08	4.47E-08	-4.40E-06
IRP*[1]	kBq U235-eq.	38.97	4.57E-02	4.04E-03	ND	ND	ND	ND	ND	ND	ND	0.00	3.50E-04	0.74	9.01E-03	-25.20
ETP-fw*[2]	CTUe	4964.20	116.00	0.30	ND	ND	ND	ND	ND	ND	ND	0.00	0.89	12.60	3.73	-669.00
HTP-c*[2]	CTUh	9.37E-06	2.38E-09	1.76E-11	ND	ND	ND	ND	ND	ND	ND	0.00	1.81E-11	4.46E-10	5.74E-10	-4.68E-08
HTP-nc*[2]	CTUh	1.01E-03	1.38E-07	1.21E-09	ND	ND	ND	ND	ND	ND	ND	0.00	9.67E-10	1.22E-08	6.31E-08	-1.12E-06
SQP*[2]	dimensionless	1085.10	68.20	0.16	ND	ND	ND	ND	ND	ND	ND	0.00	0.52	11.20	1.66	-114.00

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 all-glass system (SL23) Proline s mega															
	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	106.45	6.73	1.68	ND	ND	ND	ND	ND	ND	ND	0.00	4.45E-02	1.92	0.30	-43.20
GWP-f	kg CO_2 equivalent	105.92	6.76	0.55	ND	ND	ND	ND	ND	ND	ND	0.00	4.47E-02	1.91	0.31	-43.20
GWP-b	kg CO_2 equivalent	0.35	-9.36E-02	1.13	ND	ND	ND	ND	ND	ND	ND	0.00	-6.19E-04	7.11E-03	-1.03E-02	-1.39E-02
GWP-l	kg CO_2 equivalent	4.82E-02	6.17E-02	1.48E-05	ND	ND	ND	ND	ND	ND	ND	0.00	4.08E-04	7.65E-05	9.62E-04	-6.80E-03
ODP	kg CFC-11-eq.	1.91E-09	8.67E-13	2.40E-13	ND	ND	ND	ND	ND	ND	ND	0.00	5.73E-15	1.20E-11	7.87E-13	-6.63E-11
AP	mol H^+-eq.	0.26	1.96E-02	3.65E-04	ND	ND	ND	ND	ND	ND	ND	0.00	5.19E-05	1.73E-03	2.20E-03	-0.17
EP-fw	kg P-eq.	2.27E-04	2.44E-05	7.00E-08	ND	ND	ND	ND	ND	ND	ND	0.00	1.61E-07	2.43E-06	6.23E-07	-2.26E-05
EP-m	kg N-eq.	5.82E-02	8.77E-03	1.25E-04	ND	ND	ND	ND	ND	ND	ND	0.00	1.75E-05	4.40E-04	5.67E-04	-3.34E-02
EP-t	mol N-eq.	0.74	9.88E-02	1.65E-03	ND	ND	ND	ND	ND	ND	ND	0.00	2.06E-04	5.17E-03	6.24E-03	-0.37
POCP	kg NMVOC-eq.	0.16	1.82E-02	3.35E-04	ND	ND	ND	ND	ND	ND	ND	0.00	4.52E-05	1.17E-03	1.71E-03	-9.10E-02
ADPF*²	MJ	1544.00	90.80	0.59	ND	ND	ND	ND	ND	ND	ND	0.00	0.60	13.70	4.12	-596.00
ADPE*²	kg Sb equivalent	6.27E-05	4.39E-07	2.17E-09	ND	ND	ND	ND	ND	ND	ND	0.00	2.90E-09	1.00E-07	1.43E-08	-2.90E-05
WDP*²	m^3 world-eq. deprived	2.48	8.05E-02	0.19	ND	ND	ND	ND	ND	ND	ND	0.00	5.32E-04	0.27	3.40E-02	-2.81
Resource management																
PERE	MJ	583.84	6.61	12.89	ND	ND	ND	ND	ND	ND	ND	0.00	4.37E-02	8.11	0.67	-181.00
PERM	MJ	12.75	0.00	-12.75	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
PERT	MJ	596.59	6.61	0.14	ND	ND	ND	ND	ND	ND	ND	0.00	4.37E-02	8.11	0.67	-181.00
PENRE	MJ	1531.07	91.10	22.92	ND	ND	ND	ND	ND	ND	ND	0.00	0.60	13.70	4.12	-597.00
PENRM	MJ	22.33	0.00	-22.33	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	1553.40	91.10	0.59	ND	ND	ND	ND	ND	ND	ND	0.00	0.60	13.70	4.12	-597.00
SM	kg	7.09	0.00	0.00	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
RSF	MJ	0.00	0.00	0.00	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
NRSF	MJ	0.00	0.00	0.00	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
FW	m^3	0.24	7.24E-03	4.50E-03	ND	ND	ND	ND	ND	ND	ND	0.00	4.78E-05	9.51E-03	1.04E-03	-0.35
Categories of waste																
HWD	kg	1.78E-06	2.82E-10	1.27E-11	ND	ND	ND	ND	ND	ND	ND	0.00	1.87E-12	-1.04E-09	8.98E-11	-2.77E-08
NHWD	kg	12.11	1.39E-02	8.20E-02	ND	ND	ND	ND	ND	ND	ND	0.00	9.18E-05	3.68E-02	20.60	-8.86
RWD	kg	7.78E-02	1.71E-04	2.73E-05	ND	ND	ND	ND	ND	ND	ND	0.00	1.13E-06	2.14E-03	4.70E-05	-4.11E-02
Output material flows																
CRU	kg	0.00	0.00	0.00	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
MFR	kg	8.86	0.00	0.00	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	13.40	0.00	0.00
MER	kg	0.00	0.00	0.00	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	0.00	0.00	0.00
EEE	MJ	8.03	0.00	2.68	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	2.12	0.00	0.00
EET	MJ	17.05	0.00	4.83	ND	ND	ND	ND	ND	ND	ND	0.00	0.00	4.86	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 all-glass system (SL23) Proline s mega															
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Additional environmental impact indicators																
PM	Disease incidence	3.95E-06	1.46E-07	2.47E-09	ND	ND	ND	ND	ND	ND	ND	0.00	3.76E-10	1.35E-08	2.70E-08	-1.64E-06
IRP*[1]	kBq U235-eq.	13.20	2.54E-02	4.15E-03	ND	ND	ND	ND	ND	ND	ND	0.00	1.68E-04	0.36	5.43E-03	-8.78
ETP-fw*[2]	CTUe	2297.90	64.50	0.31	ND	ND	ND	ND	ND	ND	ND	0.00	0.43	6.03	2.25	-270.00
HTP-c*[2]	CTUh	5.44E-06	1.32E-09	1.80E-11	ND	ND	ND	ND	ND	ND	ND	0.00	8.72E-12	2.11E-10	3.46E-10	-1.74E-08
HTP-nc*[2]	CTUh	5.71E-04	7.69E-08	1.22E-09	ND	ND	ND	ND	ND	ND	ND	0.00	4.65E-10	5.65E-09	3.81E-08	-4.05E-07
SQP*[2]	dimensionless	623.87	37.90	0.16	ND	ND	ND	ND	ND	ND	ND	0.00	0.25	5.36	1.00	-42.90

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

- Folding glass walls
- Sliding doors
- All-glass systems

differ considerably from each other. The differences lie in the different mass proportions of the pre-products and raw materials used and the different surface densities.

In the area of production, the environmental impact of folding glass walls is mainly caused by the use of aluminium and double insulation glazing or its upstream chains. In the case of sliding doors, the environmental impacts come primarily from the use of aluminium and triple insulation glazing and their respective upstream chains. In the case of all-glass systems, the environmental impacts come primarily from the use of aluminium and 12 mm TSG and their respective upstream chains.
Furthermore, the transport in module A4 and the stainless steel used play an important role in terms of environmental impact for all 3 product groups.

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.
When recycling the products, around 35.4% of the environmental impacts of the core indicators (excluding WDP, as not supported by the software) occurring during the life cycle can be credited in scenario D for aluminium in product group 1, around 28.6% in product group 2 and around 20.1% in product group 3.

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

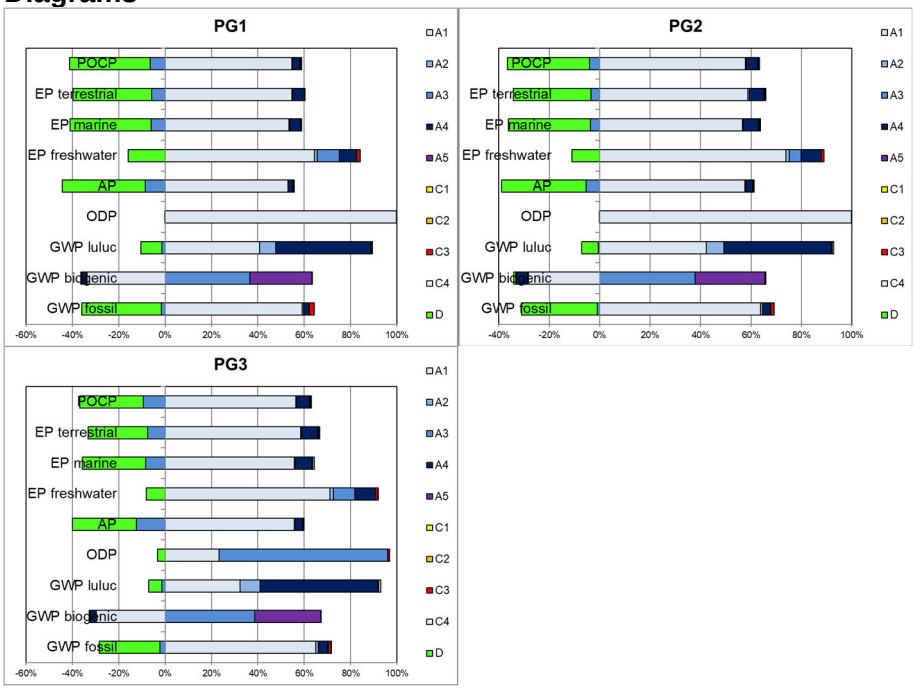


Illustration 2 Percentage of the modules in selected environmental impact indicators

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 the report took place in the course of verification of the EPD by the external verifier Susanne Volz.

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.

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.

The declaration is based on the PCR documents EN 17213 “PCR for windows and doors”, “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)] [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	Testing personnel
1	16.04.2024	External verification	Dumproff	Volz
2	29.04.2024	Extension product groups	Dumproff	Volz

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9 Annex

Description of life cycle scenarios for Folding glass walls, sliding doors and all-glass systems made of aluminum

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 calculated taking into account the defined RSL (see Point 4 Use stage).

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

A4 Transport

No.	Scenario	Description
A4	Small series via distributors	Small series via distributors: 34 - 40 t truck (Euro 0-6 mix), 27 t payload, full capacity, approx. 150 km to site and empty return trip as well as 7.5 t truck (Euro 0-6 mix), 2.7 t payload, 20% capacity used, approx. 50 km to site and empty return trip

A4 Transport to construction site	Transport weight [kg/m²]	Capacity load factor[2]
PG1	30.02 kg/m²	<1
PG2	63.91 kg/m²	<1
PG3	35.55 kg/m²	<1

[2] Capacity load factor:
= 1 Product completely fills the packaging (without air inclusion)
< 1 Packaging contains unused volume (e.g.: air, filling material)
> 1 Product is packed in compressed form

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

A5 Construction/installation process

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 energy and water, other resource use, material losses, direct emissions as well as waste 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. Wood on landfill. Benefits from A5 are specified in module D. Benefits from waste incineration: Benefits from waste incineration: electricity replaces electricity mix (EU 28); thermal energy replaces thermal energy from natural gas (EU 28).
Transport to the recycling plants is not taken into account./Transport is taken into account (30 km, 85% capacity utilization)

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

C1 Deconstruction, demolition

No.	Scenario	Description
C1	Deconstruction	**Deconstruction of glass-free materials 95%;** **Deconstruction of glass 30%;** **Remainder to landfill/disposal,**

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 with 40 t truck (Euro 0-6 Mix), diesel, 27 t payload, 80 % 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	Current market situation	**Share for recirculation of materials:** • **Metals 100% recycled according to Sphera data set "Recycling potential..."** • **Plastics 66 % thermal recycling in incineration plants** (Zukunft Bauen, 2017) • **Plastics 34 % recycled** (Zukunft Bauen, 2017) • **100% glass in melt** (EN 17074) • **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.

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		
		PG 1	PG 2	PG 3
Collection process, collected separately	kg	17.08	29.57	14.22
Collection process, collected as mixed construction waste	kg	11.96	33.37	20.32
Recovery system, for re-use	kg	0.00	0.00	0.00
Recovery system, for recycling	kg	14.52	27.32	13.39
Recovery system, for energy recovery	kg	1.63	1.47	0.55
Disposal	kg	12.89	34.15	20.60

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

C4 Disposal

No.	Scenario	Description
C4	**Market situation**	**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[1]
D	**Recycling potential (current market situation)**	**Stainless steel scrap from C3 excluding the scrap used in A3 replaces 70.2% of stainless steel; Aluminium scrap from C3 excluding the scrap used in A3 replaces 70.2% of aluminium; Glass recyclate from C3 excluding the cullet used in A3 replace 60% of glass; Plastic recyclate from C3 excluding the plastics used in A3 replaces 60% of polyamide; Benefits from incineration plant: Benefits from waste incineration: electricity replaces electricity mix (RER); thermal energy replaces thermal energy from European natural gas (RER).**

[1] Applied value correction factor over 70.2% according to metal-specific data set, 60% according to standard data set for other materials.

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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