Environmental Product Declaration (EPD)

Declaration code: EPD-LK-GB-11.1.3

LAMILUX Heinrich Strunz GmbH

Rooflight domes

Rooflight F100

Basis:

DIN EN ISO 14025
EN 15804 + A2

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

Publication date:
24.03.2025

Valid until:
24.03.2030

www.ift-rosenheim.de/created-epds

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

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

Environmental Product Declaration (EPD)

Declaration code: EPD-LK-GB-11.1.3

Programme operator	ift Rosenheim GmbH Theodor-Gietl-Straße 7-9 83026 Rosenheim, Germany		
Practitioner of LCA	LAMILUX Heinrich Strunz GmbH Zehstraße 2 95111 Rehau, Germany		
Declaration holder	LAMILUX Heinrich Strunz GmbH Zehstraße 2 95111 Rehau, Germany www.lamilux.de		
Declaration code	EPD-LK-GB-11.1.3		
Designation of declared product	Rooflight F100		
Scope	Daylight systems to increase the incidence of daylight and for natural ventilation.		
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 II Umweltproduktdeklarationen” (Guidance on preparing Type III Environmental Product Declarations) applies. The Declaration is based on the PCR documents “PCR Part A” PCR-A-1.0:2013 and "Windows, flat roof windows, rooflights and light bands" PCR-FE-3.0:2023.		
Validity	Publication date: 24.03.2025	Last revision: 27.03.2025	Valid until: 24.03.2030
	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 production plant of the company LAMILUX Heinrich Strunz GmbH were used as a data basis, as well as generic data from the database “ecoinvent v3.10". LCA calculations were carried out for the “cradle to gate” life cycle with options (cradle to gate with options) including all upstream chains (e.g. raw material extraction, etc.).		
Notes	The ift-Guidance Sheet “Conditions and Guidance for the Use of ift-Test Documents” applies. The declaration holder assumes full liability for the underlying data, certificates and verifications.		

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

1 General Product Information

Product definition

The EPD belongs to the product group Rooflight domes and applies to

1 m² Rooflight F100
of company LAMILUX Heinrich Strunz GmbH

The declared unit is obtained by summing up:

Product group	Assessed product	Declared unit	Product weight
PG1	F100 SAN	1 m²	25.21 kg/m²
PG2	F100 PC	1 m²	28.49 kg/m²
PG3	F100 PETG	1 m²	28.86 kg/m²

Table 1 Product groups

The products included in the balance sheet are specific products, so no product groups were formed. The term product group (PG) is nevertheless used below for the individual products.

The average unit is declared as follows:
Directly used material flows are determined using average sizes (1.20 m x 1.20 m) 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 2023.

The validity of the EPD is restricted to the following models:
- Rooflight F100 SAN (styrene-acrylonitrile copolymers)
- Rooflight F100 PC (polycarbonate)
- Rooflight F100 PETG (polyethylene terephthalate with glycol modification)

Product description

LAMILUX rooflight F100 SAN:
The LAMILUX rooflight F100 is a rooflight for flat and industrial roofs. It is available in a variety of sizes and is characterized by quality, energy efficiency and ease of use.
- Double-skin to quadruple-skin plastic glazing made of SAN
- PVC profile with glass fiber reinforcement
- Thermally insulated curb made of fiber-reinforced plastic

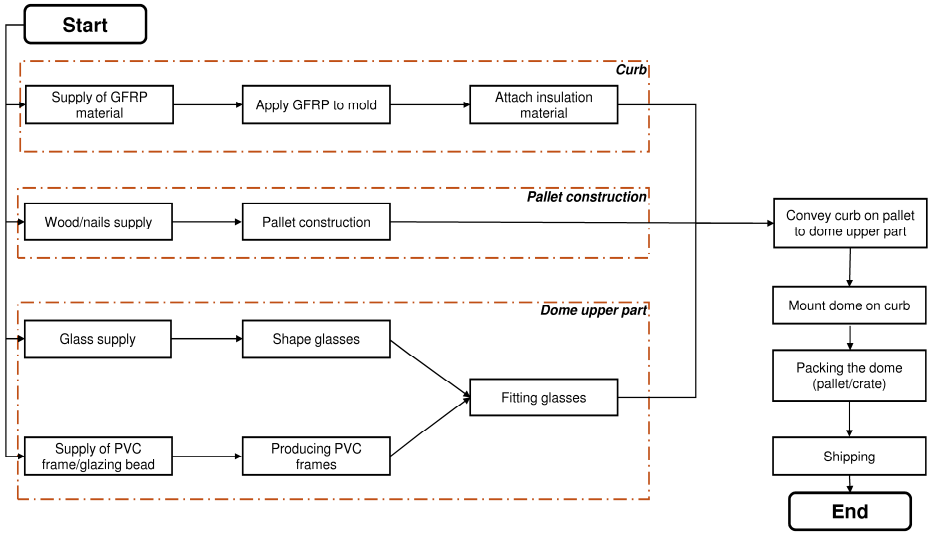
LAMILUX rooflight F100 PC:
The LAMILUX rooflight F100 is a rooflight for flat and industrial roofs. It is available in a variety of sizes and is characterized by quality, energy efficiency and ease of use.
- Double-skin to quadruple-skin plastic glazing PC
- PVC profile with glass fiber reinforcement
- Thermally insulated curb made of fiber-reinforced plastic

LAMILUX rooflight F100 PETG:
The LAMILUX rooflight F100 is a rooflight for flat and industrial roofs. It is available in a variety of sizes and is characterized by quality, energy efficiency and ease of use.

- Double-skin to quadruple-skin plastic glazing made of PETG
- PVC profile with glass fiber reinforcement
- Thermally insulated curb made of fiber-reinforced plastic

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

Product manufacture



Scope

Multifunctional daylight systems and glass roof constructions are used in e.g.
- Office and administration buildings,
- Industrial buildings,
- Public buildings,
- Private buildings.

Test evidence / reports

The following verifications are held:

- Product quality as per DIN EN 1873

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

Management systems

The following management systems are held:

- Quality management system as per DIN EN ISO 9001:2015

Additional information

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

2 Materials used

Primary materials

The raw materials used can be found in Section 6.2 Life cycle inventory (Inputs).

Declarable substances	No substances according to REACH candidate list are included (declaration of 25.07.2024). All relevant safety data sheets can be obtained from company LAMILUX Heinrich Strunz GmbH.

3 Construction process stage

Processing recommendations, installation	Observe the instructions for mounting/installation, operation, maintenance and disassembly, provided by the manufacturer. For this, see www.lamilux.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", with modules C1-C4 and module D (A1-A3 + C + D and one or more additional modules from A4 to B7), the specification of a reference service life (RSL) is only possible if the reference service life conditions are specified. The service life of rooflights from company Lamilux Heinrich Strunz GmbH is optionally specified as 25 years according to the BBSR table (code no. 362.211, version 2017.) The service life depends on the characteristics of the product and the terms of use. The conditions and characteristics described in the EPD are applicable, in particular the characteristics listed below: • Outdoor environment: Weather conditions can have a negative effect on the service life. • Indoor environment: No impacts (e.g. humidity, temperature) known that have a negative effect on the service life. The reference service life is for the features, which are reported in this EPD or the relevant references for this purpose.

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

5 End-of-life stage

Possible end-of-life stages

Rooflight F100 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 current market situation and according to DIN EN 17213.
Steel, glass and plastic are recycled to certain parts. Residual fractions are sent to landfill or, in part, thermally recycled.

Disposal routes

The average disposal routes were taken into account in the LCA.

All life cycle scenarios are detailed in the Annex.

6 Life Cycle Assessment (LCA)

Environmental product declarations are based on life cycle analyses (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 Rooflight F100. 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 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

Goal

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. Apart from these, no other environmental impacts have been specified.

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

The specific data originate exclusively from the 2023 fiscal year. They were collected at the plant located in DE-95111 Rehau and originate in parts from company records and partly from values directly obtained by measurement. Primary data was collected through specific measurements and from the company's own data management system for energy and packaging costs as well as for ancillary materials, consumables and waste/offcuts.

Generic data comes from the databases of the software "ecoinvent" (v3.10) and "EN15804 add-on to ecoinvent v3.10" (GreenDelta GmbH). 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 “openLCA” 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/production, use and end-of-life stage of the Rooflight F100.
No additional data from pre-suppliers/subcontractors or other sites were taken into consideration.

Cut-off criteria

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

The 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 transportation route of the pre-products/raw materials and packaging was taken into account.

Transport routes for waste were not taken into account.

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. Negligible processes (less than 1 mass % or energy %) were cut off if no adequate generic data sets were available for them.

6.2 Life cycle inventory

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 complete life cycle of Rooflight F100 is shown in the annex. The product stage "A1 – A3", construction process stage "A4 – A5", use stage "B2 – B4", 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

Allocations occur during production.
The allocation was based on the masses of products produced.

Allocations for re-use, recycling and recovery

If the products are re-used/recycled and recovered during the product stage (rejects), the components are shredded/broken, if necessary and then sorted into their single 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 LAMILUX Heinrich Strunz GmbH was considered in Module A3. Secondary materials are used.
The materials with secondary material and the corresponding proportion are shown in Table 2.

Material	Secondary material share* in % per material
	Product
Polyvinyl chloride	25.3 (PG1), 22.7 (PG2) and 22.4 (PG3)

* The secondary material share corresponds to the recyclate content according to EN ISO 14021
Note: The closed-loop portion (waste before use from the same process) is by definition not included in this figure.

Table 2 Secondary material share

Inputs

The LCA includes the following production-relevant inputs per 1 m² Rooflight F100:

Energy
For the electricity mix, the "Electricity Mix Germany" was assumed.

Water
There is no water consumption in the individual process steps for production.

Raw material/pre-products
The chart below shows the share of raw materials/pre-products in %.

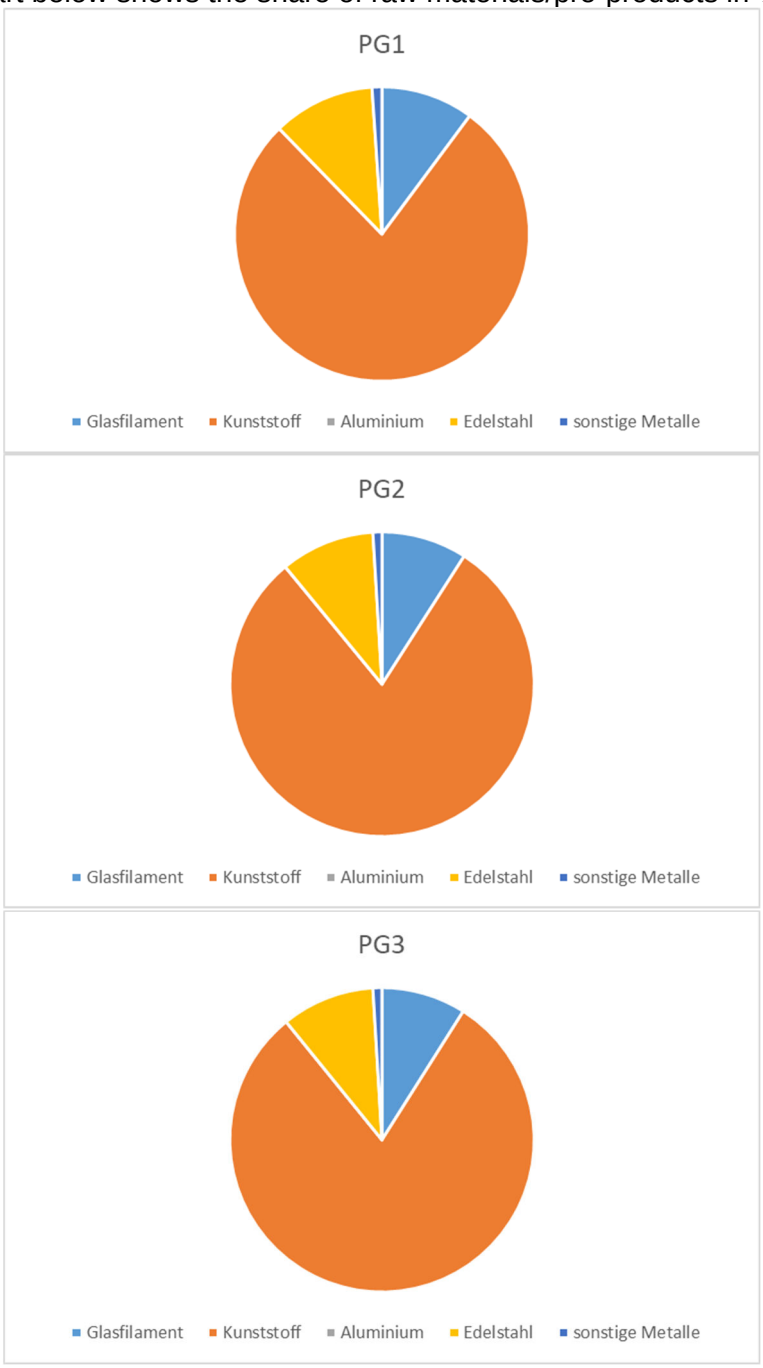


Illustration 1 Percentage of individual materials per declared unit

No.	Material	Mass in %		
		PG1	PG2	PG3
1	Glass filament	10.16	9.08	8.97
2	Plastic	77.56	79.93	80.17
3	Aluminium	<1	<1	<1
4	Stainless steel	11.20	10.01	9.90
5	Other metals	1.08	0.97	0.96

Table 3 Percentage of individual materials per declared unit

Ancillary materials and consumables
0 g of ancillary materials and consumables are used.

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

No.	Material	Mass in kg per product group (PG)		
		PG 1	PG 2	PG 3
1	Paper	1.71	1.71	1.71
2	wood	8.70	8.70	8.70
3	Film/foil	<1	<1	<1
4	Metal (nails)	<1	<1	<1

Table 4 Weight in kg of packaging per declared unit

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

No.	Part	Content in kg C per m²		
		PG1	PG2	PG3
1	In the associated packaging	6.26	6.26	6.26

Table 5 Biogenic carbon content of the packaging at the factory gate

Outputs

The LCA includes the following production-relevant outputs per 1 m² rooflight:

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

Waste water
The manufacture does not produce any waste water.

6.3 Impact assessment

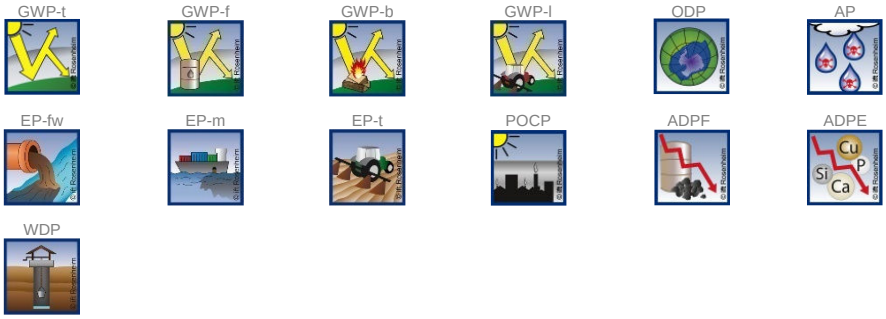
Aim

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

Core indicators

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

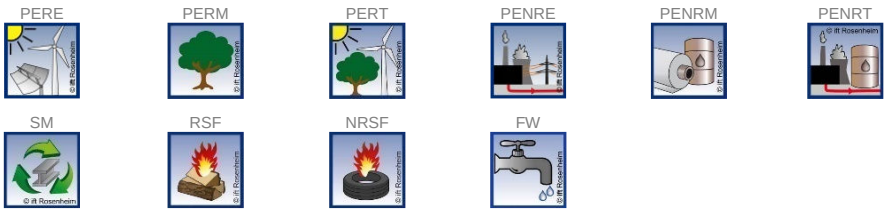
- Climate change - total (GWP-t)
- Climate change - fossil (GWP-f)
- Climate change - biogenic (GWP-b)
- Climate change - land use & land use change (GWP-l)
- Ozone depletion (ODP)
- Acidification (AP)
- Eutrophication freshwater (EP-fw)
- Eutrophication salt water (EP-m)
- Eutrophication land (EP-t)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



Use of resources

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)

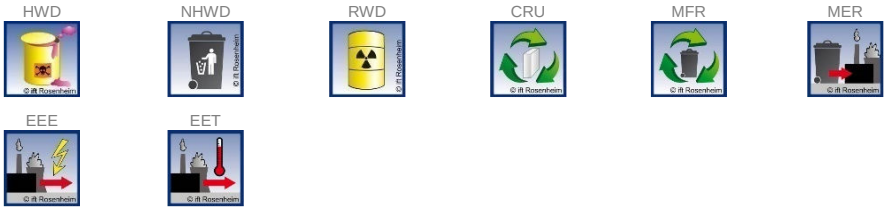


Waste

The waste generated during the production of 1 m² Rooflight F100 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 Rooflight F100 SAN (PG1)

	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Core indicators																
GWP-t	kg CO_2 eq.	8.56E+01	1.46E+00	1.36E+01	ND	4.43E-02	2.05E-01	1.34E+02	ND	ND	ND	0	1.30E-01	2.96E+01	4.12E-01	-3.06E+01
GWP-f	kg CO_2 eq.	1.32E+02	1.46E+00	2.15E+00	ND	4.95E-02	1.98E-01	1.69E+02	ND	ND	ND	0	1.30E-01	2.95E+01	4.11E-01	-3.05E+01
GWP-b	kg CO_2 eq.	-4.67E+01	9.00E-04	1.15E+01	ND	-7.84E-03	6.91E-03	-3.52E+01	ND	ND	ND	0	6.96E-05	9.19E-02	5.82E-04	-1.07E-01
GWP-l	kg CO_2 eq.	1.34E-01	5.45E-04	7.12E-04	ND	2.56E-03	2.55E-04	1.41E-01	ND	ND	ND	0	4.61E-05	1.91E-03	1.28E-05	-1.22E-02
ODP	kg CFC-11 eq.	2.51E-06	2.95E-08	1.63E-08	ND	1.71E-09	2.09E-09	2.66E-06	ND	ND	ND	0	2.71E-09	3.41E-08	1.91E-09	-3.83E-07
AP	mol H^+ eq.	5.51E-01	3.13E-03	6.98E-03	ND	2.95E-04	1.79E-03	5.86E-01	ND	ND	ND	0	3.07E-04	1.52E-02	3.96E-04	-1.18E-01
EP-fw	kg P eq.	3.80E-02	1.12E-04	7.62E-04	ND	1.54E-05	1.45E-04	4.00E-02	ND	ND	ND	0	9.16E-06	7.91E-04	5.08E-06	-1.15E-02
EP-m	kg N eq.	1.11E-01	7.40E-04	1.90E-03	ND	8.43E-05	2.53E-04	1.34E-01	ND	ND	ND	0	8.06E-05	6.27E-03	1.24E-02	-2.26E-02
EP-t	mol N eq.	1.11E+00	8.00E-03	1.90E-02	ND	6.01E-04	2.72E-03	1.22E+00	ND	ND	ND	0	8.72E-04	5.32E-02	1.74E-03	-2.35E-01
POCP	kg NMVOC-eq.	4.87E-01	5.15E-03	5.40E-03	ND	4.61E-04	8.26E-04	5.28E-01	ND	ND	ND	0	5.33E-04	1.47E-02	7.51E-04	-7.66E-02
ADPF*²	MJ	2.30E+03	2.09E+01	2.34E+01	ND	1.18E+00	2.52E+00	2.42E+03	ND	ND	ND	0	1.95E+00	2.64E+01	1.35E+00	-3.96E+02
ADPE*²	kg Sb eq.	2.66E-03	5.70E-06	9.97E-06	ND	5.81E-07	2.73E-05	2.73E-03	ND	ND	ND	0	3.72E-07	1.84E-05	1.27E-07	-7.73E-04
WDP*²	m^3 world eq. deprived	4.41E+01	1.13E-01	4.69E-01	ND	4.68E-02	9.20E-02	5.38E+01	ND	ND	ND	0	9.80E-03	8.67E+00	9.14E-03	-5.24E+00
Use of resources																
PERE	MJ	1.16E+03	4.39E-01	8.91E-01	ND	2.03E-01	5.29E-01	1.17E+03	ND	ND	ND	0	3.10E-02	3.19E+00	4.03E-02	-3.33E+01
PERM	MJ	0.00E+00	0.00E+00	2.28E+01	ND	1.10E+00	2.43E+00	2.30E+03	ND	ND	ND	0	1.77E+00	2.53E+01	1.23E+00	-3.84E+02
PERT	MJ	1.16E+03	4.39E-01	5.73E-01	ND	8.09E-02	8.87E-02	1.21E+02	ND	ND	ND	0	1.82E-01	1.15E+00	1.26E-01	-1.23E+01
PENRE	MJ	2.19E+03	1.90E+01	2.34E+01	ND	1.18E+00	2.52E+00	2.42E+03	ND	ND	ND	0	1.95E+00	2.64E+01	1.35E+00	-3.96E+02
PENRM	MJ	1.12E+02	1.92E+00	1.00E-01	ND	3.12E-03	4.13E-02	1.35E+01	ND	ND	ND	0	2.03E-03	2.30E+00	2.09E-03	-1.67E+00
PENRT	MJ	2.30E+03	2.09E+01	8.77E-03	ND	8.26E-04	5.26E-03	3.24E+00	ND	ND	ND	0	5.16E-04	5.92E-02	8.18E-04	-2.11E-01
SM	kg	1.10E+01	2.90E-02	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	3.15E+00	9.12E-03	1.67E-02	ND	1.13E-03	2.54E-03	1.46E+00	ND	ND	ND	0	2.84E-04	1.95E-01	-2.15E-02	-2.75E-01
NRSF	MJ	0.00E+00	0.00E+00	8.91E-01	ND	2.03E-01	5.29E-01	1.17E+03	ND	ND	ND	0	3.10E-02	3.19E+00	4.03E-02	-3.33E+01
FW	m^3	1.25E+00	3.19E-03	2.28E+01	ND	1.10E+00	2.43E+00	2.30E+03	ND	ND	ND	0	1.77E+00	2.53E+01	1.23E+00	-3.84E+02
Waste categories																
HWD	kg	1.99E+01	2.15E-02	5.83E-02	ND	2.48E-03	1.28E-01	2.13E+01	ND	ND	ND	0	1.94E-03	1.12E+00	1.48E-03	-1.07E+01
NHWD	kg	1.35E+02	2.62E-01	8.56E+00	ND	2.90E-01	4.73E-01	1.98E+02	ND	ND	ND	0	1.88E-02	2.44E+01	2.80E+01	-9.14E+00
RWD	kg	3.29E-03	8.53E-06	4.95E-05	ND	9.38E-07	6.51E-06	3.43E-03	ND	ND	ND	0	5.87E-07	5.39E-05	5.07E-07	-6.96E-04
Output material flows																
CRU	kg	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	6.56E+00	2.59E-02	2.51E-02	ND	2.86E-03	1.53E-02	7.00E+00	ND	ND	ND	0	1.75E-03	3.29E-01	1.77E-03	-4.48E-01
MER	kg	1.41E-03	4.10E-06	3.94E-06	ND	3.71E-07	2.36E-06	1.46E-03	ND	ND	ND	0	2.32E-07	2.66E-05	3.67E-07	-9.46E-05
EEE	MJ	5.98E+00	4.72E-03	3.29E-01	ND	4.75E-04	2.86E-03	6.47E+00	ND	ND	ND	0	2.89E-04	1.45E-01	3.74E-04	-4.07E+00
EET	MJ	4.28E+00	2.36E-02	1.30E-02	ND	1.59E-03	4.21E-03	4.35E+00	ND	ND	ND	0	3.46E-04	1.17E-02	6.92E-03	-3.58E-01

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
ND - not considered

Results per 1 m² Rooflight F100 SAN (PG1)															
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Additional environmental impact indicators																
PM	Disease incidence	7.09E-06	1.00E-07	4.99E-08	ND	3.12E-09	1.45E-08	7.69E-06	ND	ND	ND	0	1.27E-08	1.10E-07	9.22E-09	-1.06E-06
IRP*[1]	kBq U235 eq.	1.24E+01	3.42E-02	1.74E-01	ND	3.70E-03	2.55E-02	1.29E+01	ND	ND	ND	0	2.37E-03	2.17E-01	2.17E-03	-2.46E+00
ETP-fw*[2]	CTUe	1.56E+03	6.18E+00	6.34E+00	ND	5.74E-01	6.54E+00	1.98E+03	ND	ND	ND	0	4.62E-01	3.75E+02	1.10E+01	-2.42E+02
HTP-c*[2]	CTUh	9.05E-07	1.05E-08	4.74E-09	ND	2.62E-10	4.12E-09	9.56E-07	ND	ND	ND	0	8.32E-10	1.09E-08	3.39E-10	-3.09E-07
HTP-nc*[2]	CTUh	1.99E-06	1.33E-08	4.21E-08	ND	5.95E-10	1.37E-08	2.20E-06	ND	ND	ND	0	1.29E-09	1.06E-07	2.14E-09	-6.06E-07
SQP*[2]	dimensionless	5.85E+03	1.33E+01	4.24E+00	ND	5.93E-01	1.35E+00	5.93E+03	ND	ND	ND	0	1.96E+00	1.09E+01	3.17E+00	-8.38E+01
GWP-GHG	kg CO2 eq.	1.33E+02	1.46E+00	2.15E+00	ND	5.22E-02	2.00E-01	1.70E+02	ND	ND	ND	0	1.30E-01	2.95E+01	4.11E-01	-3.05E+01

Key:
PM – particulate matter emissions potential **IRP*[1]** – ionizing radiation potential – human health **ETP-fw*[2]** - Ecotoxicity potential – freshwater **HTP-c*[2]** - Human toxicity potential – cancer effects **HTP-nc*[2]** - Human toxicity potential – non-cancer effects **SQP*[2]** – soil quality potential
ND - not considered

Disclaimers:
*1 This impact category deals mainly with the eventual impact of low-dose ionising 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 Rooflight F100 PC (PG2)														
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Core indicators																
GWP-t	kg CO_2 eq.	1.12E+02	1.59E+00	1.36E+01	ND	4.43E-02	2.05E-01	1.67E+02	ND	ND	ND	0	1.58E-01	3.51E+01	4.89E-01	-3.33E+01
GWP-f	kg CO_2 eq.	1.59E+02	1.59E+00	2.17E+00	ND	4.95E-02	1.98E-01	2.02E+02	ND	ND	ND	0	1.58E-01	3.50E+01	4.88E-01	-3.32E+01
GWP-b	kg CO_2 eq.	-4.66E+01	9.78E-04	1.15E+01	ND	-7.84E-03	6.91E-03	-3.51E+01	ND	ND	ND	0	8.44E-05	9.25E-02	6.77E-04	-1.03E-01
GWP-l	kg CO_2 eq.	1.60E-01	5.93E-04	7.21E-04	ND	2.56E-03	2.55E-04	1.68E-01	ND	ND	ND	0	5.59E-05	2.08E-03	1.45E-05	-1.24E-02
ODP	kg CFC-11 eq.	3.65E-06	3.20E-08	1.66E-08	ND	1.71E-09	2.09E-09	3.81E-06	ND	ND	ND	0	3.29E-09	3.67E-08	2.18E-09	-4.24E-07
AP	mol H^+ eq.	6.74E-01	3.41E-03	7.03E-03	ND	2.95E-04	1.79E-03	7.12E-01	ND	ND	ND	0	3.73E-04	1.70E-02	4.52E-04	-1.24E-01
EP-fw	kg P eq.	4.88E-02	1.22E-04	7.65E-04	ND	1.54E-05	1.45E-04	5.10E-02	ND	ND	ND	0	1.11E-05	8.57E-04	5.65E-06	-1.24E-02
EP-m	kg N eq.	1.33E-01	8.05E-04	1.91E-03	ND	8.43E-05	2.53E-04	1.60E-01	ND	ND	ND	0	9.77E-05	7.07E-03	1.41E-02	-2.40E-02
EP-t	mol N eq.	1.34E+00	8.70E-03	1.91E-02	ND	6.01E-04	2.72E-03	1.46E+00	ND	ND	ND	0	1.06E-03	6.02E-02	1.99E-03	-2.50E-01
POCP	kg NMVOC-eq.	6.20E-01	5.60E-03	5.46E-03	ND	4.61E-04	8.26E-04	6.64E-01	ND	ND	ND	0	6.47E-04	1.65E-02	8.64E-04	-8.17E-02
ADPF*²	MJ	2.84E+03	2.28E+01	2.36E+01	ND	1.18E+00	2.52E+00	2.97E+03	ND	ND	ND	0	2.37E+00	2.87E+01	1.55E+00	-4.33E+02
ADPE*²	kg Sb eq.	3.09E-03	6.19E-06	1.00E-05	ND	5.81E-07	2.73E-05	3.17E-03	ND	ND	ND	0	4.52E-07	1.98E-05	1.46E-07	-7.83E-04
WDP*²	m^3 world eq. deprived	4.62E+01	1.23E-01	4.70E-01	ND	4.68E-02	9.20E-02	5.63E+01	ND	ND	ND	0	1.19E-02	9.09E+00	1.05E-02	-5.47E+00
Use of resources																
PERE	MJ	1.20E+03	4.77E-01	8.99E-01	ND	2.03E-01	5.29E-01	1.21E+03	ND	ND	ND	0	3.76E-02	3.43E+00	4.63E-02	-3.35E+01
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.20E+03	4.77E-01	8.99E-01	ND	2.03E-01	5.29E-01	1.21E+03	ND	ND	ND	0	3.76E-02	3.43E+00	4.63E-02	-3.35E+01
PENRE	MJ	2.67E+03	2.07E+01	2.30E+01	ND	1.10E+00	2.43E+00	2.80E+03	ND	ND	ND	0	2.15E+00	2.75E+01	1.40E+00	-4.19E+02
PENRM	MJ	1.67E+02	2.09E+00	5.91E-01	ND	8.09E-02	8.87E-02	1.76E+02	ND	ND	ND	0	2.20E-01	1.24E+00	1.44E-01	-1.35E+01
PENRT	MJ	2.84E+03	2.28E+01	2.36E+01	ND	1.18E+00	2.52E+00	2.97E+03	ND	ND	ND	0	2.37E+00	2.87E+01	1.55E+00	-4.33E+02
SM	kg	1.33E+01	3.15E-02	1.00E-01	ND	3.12E-03	4.13E-02	1.59E+01	ND	ND	ND	0	2.46E-03	2.31E+00	2.40E-03	-1.68E+00
RSF	MJ	4.38E+00	9.92E-03	8.87E-03	ND	8.26E-04	5.26E-03	4.48E+00	ND	ND	ND	0	6.26E-04	6.27E-02	9.40E-04	-2.13E-01
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	1.34E+00	3.47E-03	1.68E-02	ND	1.13E-03	2.54E-03	1.55E+00	ND	ND	ND	0	3.44E-04	2.02E-01	-2.52E-02	-2.97E-01
Waste categories																
HWD	kg	2.11E+01	2.34E-02	5.86E-02	ND	2.48E-03	1.28E-01	2.26E+01	ND	ND	ND	0	2.35E-03	1.18E+00	1.70E-03	-1.07E+01
NHWD	kg	1.83E+02	2.85E-01	8.56E+00	ND	2.90E-01	4.73E-01	2.53E+02	ND	ND	ND	0	2.28E-02	2.70E+01	3.27E+01	-9.46E+00
RWD	kg	4.46E-03	9.28E-06	4.97E-05	ND	9.38E-07	6.51E-06	4.60E-03	ND	ND	ND	0	7.12E-07	5.83E-05	5.82E-07	-7.56E-04
Output material flows																
CRU	kg	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	8.77E+00	2.82E-02	2.54E-02	ND	2.86E-03	1.53E-02	9.24E+00	ND	ND	ND	0	2.13E-03	3.47E-01	2.04E-03	-4.58E-01
MER	kg	1.97E-03	4.46E-06	3.98E-06	ND	3.71E-07	2.36E-06	2.01E-03	ND	ND	ND	0	2.81E-07	2.82E-05	4.22E-07	-9.59E-05
EEE	MJ	6.62E+00	5.14E-03	3.29E-01	ND	4.75E-04	2.86E-03	7.12E+00	ND	ND	ND	0	3.51E-04	1.47E-01	4.17E-04	-4.61E+00
EET	MJ	4.58E+00	2.57E-02	1.31E-02	ND	1.59E-03	4.21E-03	4.65E+00	ND	ND	ND	0	4.20E-04	1.26E-02	8.10E-03	-3.78E-01

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
ND - not considered

Results per 1 m² Rooflight F100 PC (PG2)																
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Additional environmental impact indicators																
PM	Disease incidence	8.18E-06	1.09E-07	5.13E-08	ND	3.12E-09	1.45E-08	8.83E-06	ND	ND	ND	0	1.54E-08	1.21E-07	1.05E-08	-1.08E-06
IRP*[1]	kBq U235 eq.	1.68E+01	3.72E-02	1.75E-01	ND	3.70E-03	2.55E-02	1.74E+01	ND	ND	ND	0	2.88E-03	2.34E-01	2.49E-03	-2.66E+00
ETP-fw*[2]	CTUe	3.47E+03	6.72E+00	6.40E+00	ND	5.74E-01	6.54E+00	3.90E+03	ND	ND	ND	0	5.61E-01	3.89E+02	1.13E+01	-2.48E+02
HTP-c*[2]	CTUh	1.50E-06	1.15E-08	4.83E-09	ND	2.62E-10	4.12E-09	1.55E-06	ND	ND	ND	0	1.01E-09	1.21E-08	3.90E-10	-3.13E-07
HTP-nc*[2]	CTUh	2.40E-06	1.44E-08	4.23E-08	ND	5.95E-10	1.37E-08	2.63E-06	ND	ND	ND	0	1.56E-09	1.22E-07	2.65E-09	-6.34E-07
SQP*[2]	dimensionless	5.97E+03	1.45E+01	4.44E+00	ND	5.93E-01	1.35E+00	6.06E+03	ND	ND	ND	0	2.38E+00	1.15E+01	3.64E+00	-8.68E+01
GWP-GHG	kg CO2 eq.	1.59E+02	1.59E+00	2.17E+00	ND	5.22E-02	2.00E-01	2.02E+02	ND	ND	ND	0	1.58E-01	3.50E+01	4.88E-01	-3.32E+01

Key:
PM – particulate matter emissions potential **IRP*[1]** – ionizing radiation potential – human health **ETP-fw*[2]** - Ecotoxicity potential – freshwater **HTP-c*[2]** - Human toxicity potential – cancer effects **HTP-nc*[2]** - Human toxicity potential – non-cancer effects **SQP*[2]** – soil quality potential
ND - not considered

Disclaimers:

*1 This impact category deals mainly with the eventual impact of low-dose ionising 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 Rooflight F100 PETG (PG3)														
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Core indicators																
GWP-t	kg CO_2 eq.	9.43E+01	1.61E+00	1.36E+01	ND	4.43E-02	2.05E-01	1.48E+02	ND	ND	ND	0	1.62E-01	3.42E+01	4.80E-01	-3.22E+01
GWP-f	kg CO_2 eq.	1.41E+02	1.61E+00	2.17E+00	ND	4.95E-02	1.98E-01	1.83E+02	ND	ND	ND	0	1.62E-01	3.41E+01	4.79E-01	-3.20E+01
GWP-b	kg CO_2 eq.	-4.67E+01	9.88E-04	1.15E+01	ND	-7.84E-03	6.91E-03	-3.52E+01	ND	ND	ND	0	8.65E-05	9.13E-02	6.88E-04	-1.05E-01
GWP-l	kg CO_2 eq.	1.49E-01	5.99E-04	7.21E-04	ND	2.56E-03	2.55E-04	1.56E-01	ND	ND	ND	0	5.73E-05	2.07E-03	1.46E-05	-1.23E-02
ODP	kg CFC-11 eq.	1.07E-04	3.24E-08	1.66E-08	ND	1.71E-09	2.09E-09	1.07E-04	ND	ND	ND	0	3.37E-09	3.53E-08	2.21E-09	-4.07E-07
AP	mol H^+ eq.	6.10E-01	3.44E-03	7.03E-03	ND	2.95E-04	1.79E-03	6.48E-01	ND	ND	ND	0	3.82E-04	1.66E-02	4.55E-04	-1.21E-01
EP-fw	kg P eq.	4.28E-02	1.23E-04	7.65E-04	ND	1.54E-05	1.45E-04	4.50E-02	ND	ND	ND	0	1.14E-05	8.48E-04	5.71E-06	-1.21E-02
EP-m	kg N eq.	1.20E-01	8.14E-04	1.91E-03	ND	8.43E-05	2.53E-04	1.47E-01	ND	ND	ND	0	1.00E-04	6.96E-03	1.45E-02	-2.34E-02
EP-t	mol N eq.	1.21E+00	8.79E-03	1.91E-02	ND	6.01E-04	2.72E-03	1.33E+00	ND	ND	ND	0	1.08E-03	5.88E-02	2.02E-03	-2.44E-01
POCP	kg NMVOC-eq.	5.52E-01	5.66E-03	5.47E-03	ND	4.61E-04	8.26E-04	5.96E-01	ND	ND	ND	0	6.63E-04	1.61E-02	8.73E-04	-7.95E-02
ADPF*²	MJ	2.53E+03	2.30E+01	2.37E+01	ND	1.18E+00	2.52E+00	2.67E+03	ND	ND	ND	0	2.43E+00	2.83E+01	1.57E+00	-4.17E+02
ADPE*²	kg Sb eq.	5.27E-03	6.26E-06	1.00E-05	ND	5.81E-07	2.73E-05	5.34E-03	ND	ND	ND	0	4.63E-07	1.94E-05	1.48E-07	-7.79E-04
WDP*²	m^3 world eq. deprived	4.31E+01	1.25E-01	4.70E-01	ND	4.68E-02	9.20E-02	5.26E+01	ND	ND	ND	0	1.22E-02	8.54E+00	1.06E-02	-5.37E+00
Use of resources																
PERE	MJ	1.18E+03	4.82E-01	9.00E-01	ND	2.03E-01	5.29E-01	1.19E+03	ND	ND	ND	0	3.85E-02	3.38E+00	4.69E-02	-3.34E+01
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.18E+03	4.82E-01	9.00E-01	ND	2.03E-01	5.29E-01	1.19E+03	ND	ND	ND	0	3.85E-02	3.38E+00	4.69E-02	-3.34E+01
PENRE	MJ	2.38E+03	2.09E+01	2.31E+01	ND	1.10E+00	2.43E+00	2.51E+03	ND	ND	ND	0	2.20E+00	2.71E+01	1.42E+00	-4.04E+02
PENRM	MJ	1.52E+02	2.12E+00	5.94E-01	ND	8.09E-02	8.87E-02	1.61E+02	ND	ND	ND	0	2.26E-01	1.20E+00	1.46E-01	-1.30E+01
PENRT	MJ	2.53E+03	2.30E+01	2.37E+01	ND	1.18E+00	2.52E+00	2.67E+03	ND	ND	ND	0	2.43E+00	2.83E+01	1.57E+00	-4.17E+02
SM	kg	1.20E+01	3.18E-02	1.00E-01	ND	3.12E-03	4.13E-02	1.45E+01	ND	ND	ND	0	2.52E-03	2.31E+00	2.44E-03	-1.68E+00
RSF	MJ	3.62E+00	1.00E-02	8.87E-03	ND	8.26E-04	5.26E-03	3.72E+00	ND	ND	ND	0	6.41E-04	6.03E-02	9.53E-04	-2.12E-01
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	1.22E+00	3.51E-03	1.68E-02	ND	1.13E-03	2.54E-03	1.42E+00	ND	ND	ND	0	3.53E-04	1.92E-01	-2.56E-02	-2.87E-01
Waste categories																
HWD	kg	2.04E+01	2.37E-02	5.87E-02	ND	2.48E-03	1.28E-01	2.18E+01	ND	ND	ND	0	2.41E-03	1.12E+00	1.73E-03	-1.07E+01
NHWD	kg	1.72E+02	2.88E-01	8.56E+00	ND	2.90E-01	4.73E-01	2.42E+02	ND	ND	ND	0	2.34E-02	2.68E+01	3.33E+01	-9.32E+00
RWD	kg	4.11E-03	9.38E-06	4.97E-05	ND	9.38E-07	6.51E-06	4.25E-03	ND	ND	ND	0	7.29E-07	5.77E-05	5.90E-07	-7.30E-04
Output material flows																
CRU	kg	0.00E+00	0.00E+00	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	7.45E+00	2.85E-02	2.54E-02	ND	2.86E-03	1.53E-02	7.90E+00	ND	ND	ND	0	2.18E-03	3.26E-01	2.06E-03	-4.54E-01
MER	kg	1.63E-03	4.50E-06	3.99E-06	ND	3.71E-07	2.36E-06	1.67E-03	ND	ND	ND	0	2.88E-07	2.71E-05	4.28E-07	-9.53E-05
EEE	MJ	6.24E+00	5.19E-03	3.29E-01	ND	4.75E-04	2.86E-03	6.73E+00	ND	ND	ND	0	3.60E-04	1.46E-01	4.21E-04	-4.38E+00
EET	MJ	4.39E+00	2.60E-02	1.31E-02	ND	1.59E-03	4.21E-03	4.47E+00	ND	ND	ND	0	4.31E-04	1.21E-02	8.24E-03	-3.69E-01

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
ND - not considered

Results per 1 m² Rooflight F100 PETG (PG3)															
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Additional environmental impact indicators																
PM	Disease incidence	7.45E-06	1.10E-07	5.15E-08	ND	3.12E-09	1.45E-08	8.11E-06	ND	ND	ND	0	1.57E-08	1.21E-07	1.07E-08	-1.08E-06
IRP*[1]	kBq U235 eq.	1.55E+01	3.75E-02	1.75E-01	ND	3.70E-03	2.55E-02	1.60E+01	ND	ND	ND	0	2.95E-03	2.32E-01	2.53E-03	-2.58E+00
ETP-fw*[2]	CTUe	1.62E+03	6.79E+00	6.41E+00	ND	5.74E-01	6.54E+00	2.03E+03	ND	ND	ND	0	5.75E-01	3.69E+02	1.09E+01	-2.45E+02
HTP-c*[2]	CTUh	9.77E-07	1.16E-08	4.84E-09	ND	2.62E-10	4.12E-09	1.03E-06	ND	ND	ND	0	1.03E-09	1.17E-08	3.93E-10	-3.11E-07
HTP-nc*[2]	CTUh	2.24E-06	1.46E-08	4.23E-08	ND	5.95E-10	1.37E-08	2.47E-06	ND	ND	ND	0	1.60E-09	1.16E-07	2.03E-09	-6.22E-07
SQP*[2]	dimensionless	5.92E+03	1.46E+01	4.47E+00	ND	5.93E-01	1.35E+00	6.01E+03	ND	ND	ND	0	2.44E+00	1.14E+01	3.69E+00	-8.55E+01
GWP-GHG	kg CO2 eq.	1.41E+02	1.61E+00	2.17E+00	ND	5.22E-02	2.00E-01	1.84E+02	ND	ND	ND	0	1.62E-01	3.41E+01	4.79E-01	-3.21E+01

Key:
PM – particulate matter emissions potential **IRP*[1]** – ionizing radiation potential – human health **ETP-fw*[2]** - Ecotoxicity potential – freshwater **HTP-c*[2]** - Human toxicity potential – cancer effects **HTP-nc*[2]** - Human toxicity potential – non-cancer effects **SQP*[2]** – soil quality potential
ND - not considered

Disclaimers:
*1 This impact category deals mainly with the eventual impact of low-dose ionising 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

- Rooflight F100 SAN
- Rooflight F100 PC
- Rooflight F100 PETG

differ considerably from each other. The differences lie in the different pre-products and raw materials used and in the mass of the pre-products and raw materials used in each case. Overall, PG2 has a higher environmental impact in most impact categories. This is mainly due to the use of PC as opposed to SAN and PETG. As the upstream chain of the raw material PVC is eliminated through the use of recycled material, the environmental impact is lower than when using primary material.

In the area of production, the environmental impact of the two product groups essentially results from the use of polyester resin, steel and styrene or their upstream chains.
Electricity consumption in production also plays an important role in terms of environmental impact. At approx. 18%, this has a relatively high share of the GWP total.
The simple replacement in the building's useful life of 50 years (module B4) is also relevant in terms of environmental impact.

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.

Some LCA results differ considerably from the results presented in the EPD prepared five years ago. The reasons for this are that the life cycle assessments were prepared on the basis of different background data, the weights of the products have increased and a new data collection was carried out by the life cycle assessor.

The breakdown of the major environmental impacts is shown in the diagram below.

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

Diagrams

The diagrams below show the environmental impact of the products in relation to the life cycle modules.

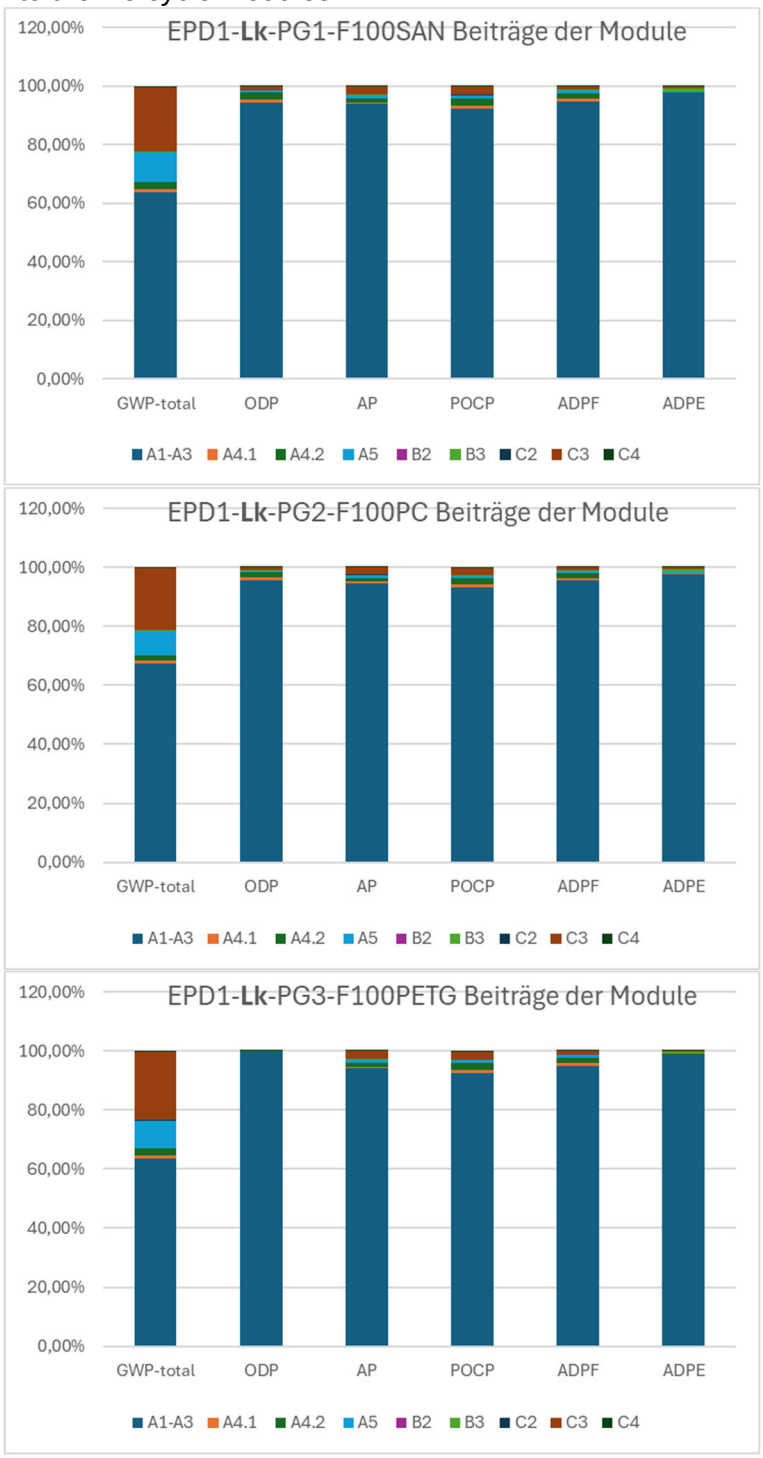


Illustration 2 Percentage of the modules in selected environmental impact indicators

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 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 products included in the balance sheet are specific products, so no product groups were formed.

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 “PCR Part A” PCR-A-1.0:2013 and "Windows, flat roof windows, rooflights and light bands" PCR-FE-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	Verifier
1	24.03.2025	External Verification	L. Ludwig	S. Volz
2	27.03.2025	Editorial revision	L. Ludwig	-

8 Bibliography

1. **Research project.** *"EPDs für transparente Bauelemente" (EPDs for transparent building components) - Final report.* Rosenheim: ift Rosenheim GmbH, 2011. SF-10.08.18.7-09.21/II 3-F20-09-1-067.
2. **PCR Part A.** *Product category rules for environmental product declarations as per EN ISO 14025 and EN 15804.* Rosenheim: ift Rosenheim, 2018.
3. **ift-Guideline NA-01/4.** *Allgemeiner Leitfaden zur Erstellung von Typ III Umweltproduktdeklarationen (Guidance on preparing Type III Environmental Product Declarations).* Rosenheim: ift Rosenheim GmbH, 2023.
4. **ift Rosenheim GmbH.** *Conditions and Guidance for the Use of ift-Test Documents.* Rosenheim: s.n., 2016.
5. **DIN EN ISO 12457- Parts 1-4.** *Characterization of waste - Leaching; Compliance test for leaching of granular waste materials and sludges - Part 1-4.* Berlin: Beuth Verlag GmbH, 2003.
6. **IKP Universität Stuttgart and PE Europe GmbH.** *GaBi 10: Software and database for LCA.* Leinfelden-Echterdingen: s.n., 2020.
7. **Chemikaliengesetz – ChemG (Chemicals Act).** *Gesetz zum Schutz vor gefährlichen Stoffen - Unterteilt sich in Chemikaliengesetz und eine Reihe von Verordnungen; hier relevant (Law on protection against hazardous substances - Subdivided into Chemicals Law and a series of regulations; of relevance here): Gesetz zum Schutz vor gefährlichen Stoffen (Law on protection against hazardous substances).* Berlin: BGBI. (Federal Gazette) I S. 1146, 2017.
8. **Bundesimmissionsschutzgesetz – BImSchG (Federal Immission Law).** *Gesetz zum Schutz vor schädlichen Umwelteinwirkungen durch Luftverunreinigungen, Geräusche, Erschütterungen und ähnlichen Vorgängen (Law on harmful environmental impacts by air contamination, noise, vibrations and similar processes).* Berlin: BGBI. (Federal Gazette) I S. 3830, 2017.
9. **ISO 21930:2017-07.** *Sustainability in building construction - Environmental declaration of building products.* Berlin: Beuth Verlag, 2017.
10. **ISO 15686-1:2011-05.** *Buildings and constructed assets - Service life planning - Part 1: General principles and framework.* s.l. : Beuth Verlag GmbH, 2011.
11. **ISO 15686-2:2012-05.** *Buildings and constructed assets - Service life planning - Part 2: Service life prediction procedures.* s.l. : Beuth Verlag GmbH, 2012.
12. **ISO 15686-7:2017-04.** *Buildings and constructed assets - Service life planning - Part 7: Performance evaluation for feedback of service life data from practice.* s.l. : Beuth Verlag GmbH, 2017.
13. **ISO 15686-8:2008-06.** *Buildings and constructed assets - Service life planning - Part 8: Reference service life and service-life estimation.* s.l. : Beuth Verlag GmbH, 2008.
14. **DIN EN ISO 16000 Parts 6, 9, 11.** *Determination of the emission of volatile organic compounds from building products and furnishing.* Berlin: Beuth Verlag GmbH, 2012, 2008, 2006.
15. **DIN EN 13501-1:2010-01.** *Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests.* Berlin: Beuth Verlag GmbH, 2010.
16. **Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety).** *Leitfaden Nachhaltiges Bauen (Guidance on Sustainable Building).* Berlin: s.n., 2016.
17. **DIN EN 15804:2012+A2:2019+AC:2021.** *Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.* Berlin: Beuth Verlag GmbH, 2022.
18. **EN 17672:2022.** *Sustainability of construction works - Environmental product declarations - Horizontal rules for business-to-consumer communication.* Berlin: Beuth Verlag GmbH, 2022.
19. **EN 15942:2012-01.** *Sustainability of construction works - Environmental product declarations - Communication format business-to-business.* Berlin: Beuth Verlag GmbH, 2012.
20. **OENORM S 5200:2009-04-01.** *Radioactivity in construction materials.* Berlin: Beuth Verlag GmbH, 2009.
21. **EN ISO 14025:2011-10.** *Environmental labels and declarations - Type III environmental declarations - Principles and procedures.* Berlin: Beuth Verlag GmbH, 2011.
22. **DIN EN ISO 14044:2006-10.** *Environmental management - Life cycle assessment - Requirements and guidelines.* Berlin: Beuth Verlag GmbH, 2006.
23. **DIN EN ISO 14040:2018-05.** *Environmental management - Life cycle assessment - Principles and framework.* Berlin: Beuth Verlag GmbH, 2018.
24. **Chemikalien-Verbotsverordnung - ChemVerbotsV. (Chemicals Prohibition Regulation).** *Verordnung über Verbote und Beschränkungen des Inverkehrbringens gefährlicher Stoffe, Zubereitungen und Erzeugnisse Chemikaliengesetz (Regulation on bans and restrictions of the placing on the market of hazardous substances, formulations and products covered by the Chemicals Law).* Berlin: BGBI. (Federal Gazette) I S. 1328, 2017.
25. **Gefahrstoffverordnung – GefStoffV (Hazardous substances regulation).** *Verordnung zum Schutz vor Gefahrstoffen (Regulation on protection against hazardous substances).* Berlin: BGBI. (Federal Gazette) I S. 3758, 2017.
26. **Eyerer, P. und Reinhardt, H.-W.** *Ökologische Bilanzierung von Baustoffen und Gebäuden - Wege zu einer ganzheitlichen Bilanzierung.* Basel: Birkhäuser Verlag, 2000.
27. **Klöpffer, W und Grahl, B.** *Ökobilanzen (LCA).* Weinheim: Wiley-VCH-Verlag, 2009.
28. **PCR Part B - Windows, flat roof windows, rooflights and light bands.** *Product category rules for environmental product declarations as per EN ISO 14025 and EN 15804.* Rosenheim: ift Rosenheim, 2018.

9 Annex

Description of life cycle scenarios for Rooflight F100

Product stage			Con-struction process stage		Use stage*							End-of-life stage				Benefits and loads beyond the system boundaries
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material supply	Transport	Manufacture	Transport	Construction/installation process	Use	Maintenance	Repair	Replacement	Modification/refurbishment	Operational energy use	Operational water use	Deconstruction/demolition	Transport	Waste processing	Disposal	Re-use 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 6 Overview of applied life cycle stages

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

The scenarios were based on information provided by the manufacturer.

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

✓ Included in the LCA
— Not included in the LCA

A4 Transport

No.	Scenario	Description
A4.1	**Small series via distributors**	**40 t truck (Euro 6), 100% capacity used[1], approx. 150 km there and empty back 7.5 t truck (Euro 6), 100% capacity used[1], approx. 50 km there and empty back A total of 400 km.**
A4.2	Direct delivery to construction site/branch	40 t truck (Euro 6), 100% capacity used[1], approx. 900 km to construction site abroad and back empty A total of 1,800 km.

[1] Capacity used: utilized loading capacity of the truck

A4 Transport to construction site	Transport weight [kg/m²]	Density [kg/m³]	Capacity load factor[2]
PG1	33.91	15.19	<1
PG2	37.19	16.66	<1
PG3	37.56	16.83	<1

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

PG1			
A4 Transport to the construction site	**Unit**	**A4.1**	A4.2
Core indicators			
GWP-t	kg CO_2 eq.	**1.46E+00**	3.10E+00
GWP-f	kg CO_2 eq.	**1.46E+00**	3.10E+00
GWP-b	kg CO_2 eq.	**9.00E-04**	1.66E-03
GWP-l	kg CO_2 eq.	**5.45E-04**	1.10E-03
ODP	kg CFC-11 eq.	**2.95E-08**	6.45E-08
AP	mol H^+ eq.	**3.13E-03**	7.31E-03
EP-fw	kg P eq.	**1.12E-04**	2.18E-04
EP-m	kg N eq.	**7.40E-04**	1.92E-03
EP-t	mol N eq.	**8.00E-03**	2.07E-02
POCP	kg NMVOC-eq.	**5.15E-03**	1.27E-02
ADPF	MJ	**2.09E+01**	4.65E+01
ADPE	kg Sb eq.	**5.70E-06**	8.87E-06
WDP	m^3 world eq. deprived	**1.13E-01**	2.33E-01
Use of resources			
PERE	MJ	**4.39E-01**	7.38E-01
PERM	MJ	**0.00E+00**	0.00E+00
PERT	MJ	**4.39E-01**	7.38E-01
PENRE	MJ	**1.90E+01**	4.21E+01
PENRM	MJ	**1.92E+00**	4.33E+00
PENRT	MJ	**2.09E+01**	4.65E+01
SM	kg	**2.90E-02**	4.83E-02
RSF	MJ	**9.12E-03**	1.23E-02
NRSF	MJ	**0.00E+00**	0.00E+00
FW	m^3	**3.19E-03**	6.76E-03
Waste categories			
HWD	kg	**2.15E-02**	4.61E-02
NHWD	kg	**2.62E-01**	4.47E-01
RWD	kg	**8.53E-06**	1.40E-05

Output material flows			
CRU	kg	**0.00E+00**	0.00E+00
MFR	kg	**2.59E-02**	4.18E-02
MER	kg	**4.10E-06**	5.52E-06
EEE	MJ	**4.72E-03**	6.89E-03
EET	MJ	**2.36E-02**	8.25E-03
Additional environmental impact indicators			
PM	Disease incidence	**1.00E-07**	3.02E-07
IRP	kBq U235 eq.	**3.42E-02**	5.65E-02
ETP-fw	CTUe	**6.18E+00**	1.10E+01
HTP-c	CTUh	**1.05E-08**	1.98E-08
HTP-nc	CTUh	**1.33E-08**	3.07E-08
SQP	dimensionless	**1.33E+01**	4.67E+01
GWP-GHG	kg CO2 eq.	**1.46E+00**	3.10E+00
PG2			
A4 Transport to the construction site	**Unit**	**A4.1**	A4.2
Core indicators			
GWP-t	kg CO_2 eq.	**1.59E+00**	3.37E+00
GWP-f	kg CO_2 eq.	**1.59E+00**	3.37E+00
GWP-b	kg CO_2 eq.	**9.78E-04**	1.80E-03
GWP-l	kg CO_2 eq.	**5.93E-04**	1.19E-03
ODP	kg CFC-11 eq.	**3.20E-08**	7.02E-08
AP	mol H^+ eq.	**3.41E-03**	7.95E-03
EP-fw	kg P eq.	**1.22E-04**	2.37E-04
EP-m	kg N eq.	**8.05E-04**	2.09E-03
EP-t	mol N eq.	**8.70E-03**	2.26E-02
POCP	kg NMVOC-eq.	**5.60E-03**	1.38E-02
ADPF	MJ	**2.28E+01**	5.05E+01
ADPE	kg Sb eq.	**6.19E-06**	9.64E-06
WDP	m^3 world eq. deprived	**1.23E-01**	2.54E-01
Use of resources			
PERE	MJ	**4.77E-01**	8.02E-01
PERM	MJ	**0.00E+00**	0.00E+00
PERT	MJ	**4.77E-01**	8.02E-01
PENRE	MJ	**2.07E+01**	4.58E+01
PENRM	MJ	**2.09E+00**	4.71E+00
PENRT	MJ	**2.28E+01**	5.05E+01
SM	kg	**3.15E-02**	5.26E-02
RSF	MJ	**9.92E-03**	1.34E-02
NRSF	MJ	**0.00E+00**	0.00E+00
FW	m^3	**3.47E-03**	7.35E-03
Waste categories			
HWD	kg	**2.34E-02**	5.02E-02
NHWD	kg	**2.85E-01**	4.86E-01
RWD	kg	**9.28E-06**	1.52E-05
Output material flows			
CRU	kg	**0.00E+00**	0.00E+00
MFR	kg	**2.82E-02**	4.54E-02
MER	kg	**4.46E-06**	6.00E-06
EEE	MJ	**5.14E-03**	7.49E-03
EET	MJ	**2.57E-02**	8.97E-03
Additional environmental impact indicators			
PM	Disease incidence	**1.09E-07**	3.28E-07
IRP	kBq U235 eq.	**3.72E-02**	6.14E-02
ETP-fw	CTUe	**6.72E+00**	1.20E+01

HTP-c	CTUh	**1.15E-08**	2.15E-08
HTP-nc	CTUh	**1.44E-08**	3.33E-08
SQP	dimensionless	**1.45E+01**	5.08E+01
GWP-GHG	kg CO2 eq.	**1.59E+00**	3.37E+00
PG3			
A4 Transport to the construction site	**Unit**	**A4.1**	A4.2
Core indicators			
GWP-t	kg CO_2 eq.	**1.61E+00**	3.40E+00
GWP-f	kg CO_2 eq.	**1.61E+00**	3.40E+00
GWP-b	kg CO_2 eq.	**9.88E-04**	1.82E-03
GWP-l	kg CO_2 eq.	**5.99E-04**	1.21E-03
ODP	kg CFC-11 eq.	**3.24E-08**	7.09E-08
AP	mol H^+ eq.	**3.44E-03**	8.04E-03
EP-fw	kg P eq.	**1.23E-04**	2.40E-04
EP-m	kg N eq.	**8.14E-04**	2.11E-03
EP-t	mol N eq.	**8.79E-03**	2.28E-02
POCP	kg NMVOC-eq.	**5.66E-03**	1.39E-02
ADPF	MJ	**2.30E+01**	5.11E+01
ADPE	kg Sb eq.	**6.26E-06**	9.74E-06
WDP	m^3 world eq. deprived	**1.25E-01**	2.56E-01
Use of resources			
PERE	MJ	**4.82E-01**	8.11E-01
PERM	MJ	**0.00E+00**	0.00E+00
PERT	MJ	**4.82E-01**	8.11E-01
PENRE	MJ	**2.09E+01**	4.63E+01
PENRM	MJ	**2.12E+00**	4.75E+00
PENRT	MJ	**2.30E+01**	5.11E+01
SM	kg	**3.18E-02**	5.31E-02
RSF	MJ	**1.00E-02**	1.35E-02
NRSF	MJ	**0.00E+00**	0.00E+00
FW	m^3	**3.51E-03**	7.42E-03
Waste categories			
HWD	kg	**2.37E-02**	5.07E-02
NHWD	kg	**2.88E-01**	4.91E-01
RWD	kg	**9.38E-06**	1.53E-05
Output material flows			
CRU	kg	**0.00E+00**	0.00E+00
MFR	kg	**2.85E-02**	4.59E-02
MER	kg	**4.50E-06**	6.06E-06
EEE	MJ	**5.19E-03**	7.57E-03
EET	MJ	**2.60E-02**	9.06E-03
Additional environmental impact indicators			
PM	Disease incidence	**1.10E-07**	3.31E-07
IRP	kBq U235 eq.	**3.75E-02**	6.20E-02
ETP-fw	CTUe	**6.79E+00**	1.21E+01
HTP-c	CTUh	**1.16E-08**	2.18E-08
HTP-nc	CTUh	**1.46E-08**	3.37E-08
SQP	dimensionless	**1.46E+01**	5.14E+01
GWP-GHG	kg CO2 eq.	**1.61E+00**	3.40E+00

A5 Construction/installation process

No.	Scenario	Description
A5.1	**Installation with crane**	**A crane is required to install the products; A power consumption of 1.5 kW/h per 1 m² of installed area was assumed.**

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 thermally recovered, recycled or landfilled: 95% of films/protective covers and 100% of wood in incineration plants. Steel is 95% recycled and 5% landfilled. The rest of the film goes to landfill. Benefits from A5 are specified in module D.

Transport to the recycling plants is not taken into account.

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

B2 Cleaning, maintenance and repair

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

B2.1 Cleaning

No.	Scenario	Description
B2.1.1	**Rarely, manual**	**manual using suitable cleaning agents as specified by the manufacturer, yearly. (based on EN 17213: 0.2 l water and 0.01 l cleaner per 1 m² surface per year)**

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

Since only one scenario is used, the results are shown in the relevant summary table.

The results were based on one year, taking into account the RSL.

B2.2 Maintenance and repair

No.	Scenario	Description
B2.2.1	Normal use	**According to the manufacturer:** **Annual functional check, visual inspection, lubrication/greasing and, if necessary, repair.** **0.01 kg lubricant per year and per 1 m²**

* Assumptions for evaluation of possible environmental impacts; statements made do not constitute any guaranty or warranty of performance.

For updated information refer to the respective instructions for assembly/installation, operation and maintenance of company LAMILUX Heinrich Strunz GmbH.

The service life of the Rooflight F100 of company LAMILUX Heinrich Strunz GmbH is specified as 25 years. For scenario B2, the respective components of the building elements whose useful life is less than the specified RSL are accounted for.
Ancillary materials, consumables, use of energy and water, waste, material losses and transport distances during repair are negligible.

Since only one scenario is used, the results are shown in the relevant summary table.

The results were based on one year, taking into account the RSL.

B3 Repair

No.	Scenario	Description
B3	Normal use and heavy use	**According to EN 15804:** **The "Repair" module covers the combination of all planned technical and related administrative activities [...].** **Repair parts in 50 a:** **Steel 0.51 kg, zinc 0.24 kg, aluminum 1.4E-03 kg, brass 3.4E-02 kg (PG1-3)**

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

Since only one scenario is used, the results are shown in the relevant summary table.

B4 Replacement

No.	Scenario	Description
B4.1	**Normal use and heavy use**	**one-time replacement***

*Assumptions for evaluation of possible environmental impacts; statements made do not constitute any guaranty or warranty of performance.

The statements made in this EPD are only informative to allow evaluation at the building level.

It is assumed that a one-time replacement will be necessary during the 25-year reference service life and the 50-year building service life. The results were based on one year, taking into account the RSL.

For updated information refer to the respective instructions for assembly/installation, operation and maintenance of company LAMILUX Heinrich Strunz GmbH.

The environmental impacts of the selected scenario originate from the product, construction and disposal phases.

Since only one scenario is used, the results are shown in the relevant summary table.

C1 Deconstruction, demolition

No.	Scenario	Description
C1	**Deconstruction**	**According to the manufacturer: 100% deconstruction**

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 the 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 6), 100% capacity, used, 50 km (according to manufacturer).**

Since only one scenario is used, the results are shown in the relevant summary table.

C3 Waste management

No.	Scenario	Description
C3	Manufacturer scenario	**Share for recirculation of materials:** • **75% metals in melt** • **Plastics 75% thermal recycling in incineration plant** • **30% glass in melt** • **PVC 33.75% in melt; 41.25% thermal recycling in incineration plant** • **Wood and paper 100% thermal recycling in incineration plant** • **Remainder to landfill**

The table below describes 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	PG1	PG2	PG3
Collection process, collected separately	kg	0	0	0
Collection process, collected as mixed construction waste	kg	39.5	42.6	42.9
Recovery system, for re-use	kg	0	0	0
Recovery system, for recycling	kg	4.5	4.5	4.5
Recovery system, for energy recovery	kg	27.8	30.1	30.3
Disposal	kg	7.2	8.0	8.1

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”.**

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 only one scenario is used, the results are shown in the relevant summary table.

D Benefits and loads from beyond the system boundaries

No.	Scenario	Description[1]
D	Recycling potential	**Steel scrap from C3 excluding the scrap used in A3 replaces steel; Aluminum scrap from C3 excluding the scrap used in A3 replaces aluminum; Container glass from C3 excluding the cullet used in A3 replaces glass; Die cast scrap from C3 excluding the scrap used in A3 replaces zinc; Brass scrap from C3 excluding the scrap used in A3 replaces brass; Benefits from incineration plant: Electricity replaces electricity mix (DE); thermal energy replaces thermal energy from natural gas (DE).**

[1] Applied value correction factor of 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.

Imprint

Practitioner of LCA
LAMILUX Heinrich Strunz GmbH
Zehstraße 2
95111 Rehau, Germany

Programme operator
ift Rosenheim GmbH
Theodor-Gietl-Str. 7-9
83026 Rosenheim, Germany
Phone: +49 80 31/261-0
Fax: +49 80 31/261 290
E-Mail: info@ift-rosenheim.de
www.ift-rosenheim.de

Declaration holder
LAMILUX Heinrich Strunz GmbH
Zehstraße 2
95111 Rehau, Germany

Notes
This EPD is mainly based on the work and findings of the Institut für Fenstertechnik e.V., Rosenheim (ift Rosenheim) and specifically on the ift-Guideline NA.01/3 - Guidance on preparing Type III Environmental Product Declarations.

Layout
ift Rosenheim GmbH – 2021

Photographs (front page)
LAMILUX Heinrich Strunz GmbH

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