ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	VELUX Group
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-VEL-20230278-IBA1-EN
Issue date	21.08.2023
Valid to	20.08.2028

VELUX sun tunnel TWF for pitched roof, flexible, profiled roofing materials

VELUX A/S

Institut Bauen und Umwelt e.V.

www.ibu-epd.com | https://epd-online.com

ECO PLATFORM EPD VERIFIED

1. General Information

VELUX A/S

Programme holder

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

Declaration number

EPD-VEL-20230278-IBA1-EN

This declaration is based on the product category rules:

Windows and doors , 01.08.2021
(PCR checked and approved by the SVR)

Issue date

21.08.2023

Valid to

20.08.2028

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

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

VELUX sun tunnel TWF for pitched roof, flexible, profiled roofing materials

Owner of the declaration

VELUX Group
Ådalsvej 99
2970 Hørsholm
Denmark

Declared product / declared unit

The declaration represents 1 piece of VELUX sun tunnel TWF for pitched roof, flexible, for profiled roofing materials

Scope:

The declaration covers 100% of VELUX sun tunnel TWF for pitched roof, flexible, for profiled roofing materials by Partizánske Building Components SK, Slovakia.

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

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

Verification

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

Dr. Matthew Fishwick,
(Independent verifier)

2. Product

2.1 Product description/Product definition

Flexible sun tunnel TWF is used for installation in pitched roofs and profiled roofing materials (tiles). It brings natural light into areas of the house where a VELUX roof window installation is either not possible or not appropriate. The black frame with integrated flashing is made of polyurethane. Sash and diffuser unit are made of plastic. The tunnel is made of flexible reflective material.

For the placing of the product on the market in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) the *Regulation (EU) No. 305/2011/(CPR)* applies. The product needs a declaration of performance in accordance with the CPR taking into the European Technical Assessment: *ETA -13/0764 of 14/10/2015*. The CE-marking for the product takes into account the Declaration of Performance in accordance with the CPR. For the application and use the respective national provisions apply.

2.2 Application

The sun tunnel is applicable to profiled roofing materials. It can be integrated into profiled roofing material (tiles).

2.3 Technical Data

The Declaration of Performance including relevant technical specifications and test methods/test standards can be downloaded from the website www.velux.com/ce.

Constructional data for TWF 0K14 2010

For other variants, see velux.com/ce

Name	Value	Unit
Reaction to fire	E	class
Resistance to upward load EN 1875	C3	-
Resistance to downward load EN 1873	C3	-
Resistance to fire EN 13501-2	NPD	-
External fire performance EN 13501-5	NPD	-
Water tightness EN 1873	9A	-
Impact resistance - small hard body passed EN 1873	NPD	-
Impact resistance - large soft body EN 1873	NPD	-
Direct airborne sound insulation EN ISO 410-3	54 (-5;-8)	dB
Thermal transmittance EN 1873	2.5	W/(m2K)
Luminous transmittance EN 410	NPD	-
Air permeability EN 1026	4	Class
Durability EN 1873	passed	-

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *ETA -13/0764 of 14/10/2015*. Performance data of the product, based on the harmonised standards, in accordance with the other provisions for harmonization.

2.4 Delivery status

The product is available with a diameter of 350 mm.

2.5 Base materials/Ancillary materials

Composition of the sun tunnel TWF 0K14 2010:
Acrylonitrile Butadiene Styrene (ABS) 11%
Polycarbonate 9%
Polyurethane (PUR) foam 25%
Butyl 18%
Polyethylene 3%
Stainless steel 2%
Aluminium 5%
Acrylic adhesive 1%
Glass 18%
Steel 4%
Others 4%

1) 'This product/article/at least one partial article contains substances listed in the *ECHA candidate list* (date: 02.03.2022) exceeding 0.1 percentage by mass:

- no

2) 'This product/article/at least one partial article contains other carcinogenic, mutagenic, or toxic for reproduction (CMR) substances in categories 1A or 1B which are not on the *ECHA candidate list*, exceeding 0.1 percentage by mass:

- not investigated with suppliers

3) 'Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the *(EU) Regulation on Biocidal Products No. 528/2012*):

- no

2.6 Manufacture

A few components are produced/processed internally. The majority of products are bought from external suppliers and assembled into the final product.

The factory is *ISO 9001* certified.

2.7 Environment and health during manufacturing

The factory is *ISO14001* and *ISO 45001* certified.

2.8 Product processing/Installation

The sun tunnel is fitted directly to the roof with the screws supplied.
It is important that frame and roofing material are fitted according to the installation instructions. Distance from interior ceiling finish to the upper edge of battens (measured in the centre of the tunnel): 0.2 - 0.9 m
Installation of a sun tunnel requires access to the attic and the roof.

2.9 Packaging

The packaging usually consists of:
- cardboard
- paper
- polyethylene film
- polystyrene foam parts
- steel

The use of other packaging materials is possible, but insignificant in terms of quantity.

The plastic packaging (polyethylene (PE) film, polystyrene foam parts), paper and cardboard as well as steel can be recycled if separated by type; alternatively, they - except steel - can be incinerated.

2.10 Condition of use

The material composition of VELUX sun tunnels does not change over their service life.

2.11 Environment and health during use

VELUX sun tunnels do not contain any pollutants that could be released during use.

Environmental protection: According to current knowledge, hazards to water, air and soil cannot arise when the products are used as intended.

Health protection: According to current knowledge, no health hazards or impairments are to be expected.

2.12 Reference service life

It is not possible to calculate the reference service life according to *ISO 15686*. The service life based on a manufacturer's declaration is 30 years. The corresponding utilization scenario is declared in 4.

2.13 Extraordinary effects

Fire

Fire performance according to EN 13501-1

Name	Value
Building material class	B
Burning droplets	s1
Smoke gas development	d0

Water

In the event of unforeseen exposure to water (flood), no adverse effects on human health or the environment are to be expected.

Mechanical destruction

In the event of unforeseen mechanical destruction, VELUX sun tunnels have to be replaced; apart from potential injuries from sharp edges, no adverse effects on human health or the environment are to be expected.

2.14 Re-use phase

VELUX sun tunnels can be dismantled manually without any problems. The metal parts are usually recycled, and the plastic parts are sent for thermal recycling for energy recovery. Tempered glass can be recycled.

2.15 Disposal

VELUX sun tunnels are mostly inert and can be disposed of in an appropriate landfill. However, due to the value of the materials or the carbon content of the plastic parts, recycling or energy recovery is preferable and common.

Waste code according to the *European Waste List* (Regulation on the European Waste List):
17 02 02 glass
17 02 03 plastics
17 04 14 mixed metals

2.16 Further information

Further documentation on the products, technical data sheets, BIM files, etc. can be found at:
www.velux.com

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit is 1 piece of VELUX sun tunnel TWF for piched roof, flexible, for profiled roofing material (TWF 0K14 2010) for a diameter of 350 mm.

Declared unit

Name	Value	Unit
Declared unit	1	piece
Area	0.1225	m²
Mass reference	9.22	kg/pce

3.2 System boundary

Type of EPD: Cradle to gate with options, with modules C1 – C4, and module D (A1-A3, C, D and additional modules)

The production of VELUX sun tunnels (**modules A1-A3**) includes raw material extraction, energy generation, waste treatment and all transports up to the factory gate. In accordance with *COUNCIL REGULATION (EU) No 333/2011*, secondary metals are modelled as part of the product system from the moment they are available as unmixed scrap. Waste or secondary fuels are not used for production.

Module A4 is not declared due to large variances in transport distances between the production site and the construction site, where the product is installed.

Module A5: The products are delivered to the construction site ready to be installed. Manual installation is assumed; electricity consumption related to electric drilling machines, screwdrivers, etc. is considered to be negligible. The combustible packaging material (plastics) is assumed to be thermally treated in a municipal waste incineration plant with an efficiency R1 < 0.6 (according to the *ecoinvent v3.8 (cut-off)* dataset used); the recovered energy is declared as exported energy. Metals, paper and cardboard are recycled; it is assumed that these fractions reach the end-of-waste state after having been sorted and transported (as a conservative choice) to a recycler. No packaging waste is landfilled.

Modules B1 to B7 are not relevant for the product under consideration or no significant environmental impacts occur.

Module C1 includes manual dismantling, with no significant environmental impact.

Module C2 comprises the transport of the dismantled VELUX sun tunnel to a sorting plant and then to a waste incineration plant for the thermally treated plastic fraction.

Modules C3/C4: given the complexity of the inventoried products, a mixed end-of-life scenario is modelled, allowing the different materials to follow their most likely path.
As a rule of thumb, metals are recycled and plastics are incinerated (also due to the very limited data available on plastics recycling and its benefits); tempered glass is assumed to be recycled; it is assumed that these fractions reach the end-of-waste state after having been sorted and transported to a recycler. The combustible material (plastics, etc.) is assumed to be thermally treated in a municipal waste incineration plant.

Module D includes the benefits and burdens associated with recycling metals beyond the system boundary, resulting from the treatment of recycled materials from the point of end-of-waste to the point of substitution (as loads) and substitution of primary resources (as benefits).
It also includes the benefits and burdens associated with energy recovery from plastic waste in a municipal waste incineration plant, as modelled in Module C3.
In Module D, only net flows of metals leaving the product system are considered.

3.3 Estimates and assumptions

No further assumptions and estimates relevant to the result had to be made beyond the points made in this chapter 3 and chapter 4.

3.4 Cut-off criteria

No data available from the company survey was neglected. These include, among other things, material use, energy demand (heat, electricity), packaging materials of raw materials (in so far as they are generated as waste) and product packaging, consumables in production, waste treatment and the transport of all inputs and outputs.
With this approach, mass and energy flows below 1% were also accounted for, up to a total of 5%. No processes were neglected that would have been known to the project managers and would have contributed significantly to the indicators of the impact assessment.

3.5 Background data

Ecoinvent v3.8 (cut-off) (2021) is used as the background database.

3.6 Data quality

The foreground data are based on extensive and detailed data collection at the production site. The foreground data could be fully linked with corresponding data records from the background database *ecoinvent v3.8 (cut-off)*.
The background data was updated in 2021. Thus, the quality of the foreground and background data can be rated as very good.

3.7 Period under review

The LCA data represents the production conditions for the year 2021.

3.8 Geographic Representativeness

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

3.9 Allocation

No co-products are generated during the production of the VELUX products. Sorted production scrap of the different metals, notably aluminium, is considered a secondary material with no economic value (so no burdens allocated) and considered in the quantification of net flows leaving the product system. This approach is chosen to ensure a coherent quantification of net flows entering module D.

No processes were modelled as part of the foreground model that would have required an allocation of multi-input processes. Background datasets on municipal waste incineration plants were taken from *ecoinvent v3.8 (cut-off)* without any modification.

Allocation of reuse, recycling and recovery was avoided by the cut-off approach in the foreground model in line with *DIN EN 15804*.

3.10 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account.
Ecoinvent v3.8 (cut-off) has been used as the background database.

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

Information on describing the biogenic carbon content at factory gate

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	< 5%	kg C

Module A5

The products are delivered to the construction site ready to be installed. Manual installation is assumed, and electricity consumption related to electric drilling machines, screwdrivers, etc. is considered to be negligible.
The combustible packaging material (plastics) is assumed to be transported 50 km with a lorry with a payload of 16-32 metric tons, EURO6 to an incineration plant with an efficiency R1 < 0.6 (according to the *ecoinvent v3.8 (cut-off)* dataset used); the recovered energy is declared as exported energy; for its quantification, an efficiency of 25.6% is assumed for the production of heat and 13.0% for the production of electricity (always referring to the lower heating value of the waste).
Metals and cardboard are recycled; it is assumed that these fractions reach the end-of-waste state after having been sorted and transported (as a conservative choice) to a recycler over 150 km with a lorry with a payload 16-32 metric tons, EURO6.
No packaging waste is landfilled.
The use of multi-way pallets is not taken into account as packaging material.

Reference service life

Name	Value	Unit
Reference service life according to manufacturer's declaration	30	a
Declared product properties (at the gate) and finishes	The product has passed internal quality controls and complies with EN 1873 for CE marking	-
An assumed quality of work, when installed in accordance with the manufacturer's instructions	Carried out in accordance with the manufacturer's instructions.	-
Design application parameters (if instructed by the manufacturer), including the references to the appropriate practices and application codes	Installation according to assembly instructions and state of the art.	-
Outdoor environment, (for outdoor applications), e.g. weathering, pollutants, UV and wind exposure, building orientation, shading, temperature	The declared products are intended for installation outside the building: They are therefore designed to withstand outdoor conditions throughout their service life.	-
Indoor environment (for indoor applications), e.g. temperature, moisture, chemical exposure	The declared products are not intended for installation inside a building.	-
Usage conditions, e.g. frequency of use, mechanical exposure	Standard use in any type of building, i.e. opening/closing as often as necessary.	-
Maintenance e.g. required frequency, type and quality and replacement of components	The declared products are designed for a reference life of 30 years. They are maintained by cleaning water at the discretion of the building occupants.	-

Module C1
Manual de-installation is assumed, electricity consumption related to electric screw drivers, etc. is considered to be negligible. Thus, no environmental impacts are declared in module C1.

Module C2
Given the complexity of the inventoried products, a mixed end-of-life scenario is modelled, allowing the different materials to follow their most likely path.
It should also be noted that the deconstruction and waste treatment scenario can vary a lot, depending on the actual situation. Thus, a generic end-of-life scenario is assumed.
As a rule of thumb, metals are recycled, plastics are incinerated (also due to the very limited availability on plastics recycling and its benefits); tempered glass is assumed to be recycled.
The combustible material (mainly plastics) is assumed to be transported 50 km with a lorry with a payload of 16-32 metric tons, EURO6 to an incineration plant.
Metals and tempered glass are recycled; it is assumed that these fractions reach the end-of-waste state after having been sorted and transported to a recycler over 150 km with a lorry with a payload of 16-32 metric tons, EURO6.

Module C3
A consumption of 0.03 kWh/kg of electricity for shredding and sorting and 0.437 MJ/kg of diesel fuel for internal logistics are taken into account to disassemble the product. The recovered material leaves the product system as 'materials for recycling'. The net amounts of the metals leaving the product system are considered as 'use of secondary material' in Module D.

Module C4
As stated above, it is assumed that 100% of the plastic parts are treated in a waste incineration plant with an efficiency R1 < 0.6 (according to the *ecoinvent v3.8 (cut-off)* dataset used); 25.57% of the lower heating value of the plastic parts are recovered as heat and 13.0% as electricity. Recovered energy is reported as 'exported energy' and considered in Module D.

Module D
Module D contains the benefits and loads beyond the system boundary related to the recycling of metals, which result from the treatment of recycled materials from the point of end-of-waste status to the point of substitution (as loads) and the substitution of primary resources (as benefits).
Furthermore, it includes the benefits of raw material substitution of the recycling of tempered glass. Recovered tempered glass is assumed to have reached the end-of-waste state as sorted glass cullet; glass cullet is assumed to replace virgin raw material for glass production – impacts on the energy required to remelt recycled glass as compared to virgin glass production are neglected due to a lack of data.
It also includes the benefits and loads related to the energy recovery from plastic wastes in a MWIP as modelled in Modules A3, A5 and C3.
Due to a lack of data for plastics from de-construction activities, the substitution potential of recycled plastics is not taken into account.
Only net flows leaving the product system are considered in module D.

5. LCA: Results

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

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

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece VELUX sun tunnel TWF 0K14 2010 for pitched roof, flexible, profiled roofing materials

Parameter	Unit	A1-A3	A5	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	5.55E+01	4.4E+00	0	7.9E-02	2.72E-01	1.73E+01	-1.86E+01
GWP-fossil	kg CO_2 eq	5.96E+01	2.65E-01	0	7.9E-02	2.13E-01	1.73E+01	-1.86E+01
GWP-biogenic	kg CO_2 eq	-4.2E+00	4.14E+00	0	0	5.91E-02	0	0
GWP-luluc	kg CO_2 eq	1.12E-01	4.6E-05	0	3.21E-05	2.37E-04	2.71E-04	-3.96E-02
ODP	kg CFC11 eq	5.42E-06	2.64E-08	0	1.85E-08	1.31E-08	1.01E-07	-1.03E-06
AP	mol H^+ eq	3.08E-01	6.53E-04	0	4.48E-04	8.13E-04	7.09E-03	-7.85E-02
EP-freshwater	kg P eq	2.35E-03	8.39E-07	0	5.81E-07	2.76E-05	8.61E-06	-1.11E-03
EP-marine	kg N eq	6.55E-02	2.36E-04	0	1.61E-04	2.6E-04	3.48E-03	-1.24E-02
EP-terrestrial	mol N eq	5.96E-01	2.61E-03	0	1.77E-03	2.96E-03	3.52E-02	-1.41E-01
POCP	kg NMVOC eq	2.41E-01	7.43E-04	0	5.07E-04	7.89E-04	8.28E-03	-4.21E-02
ADPE	kg Sb eq	1.4E+01	3.79E-07	0	2.65E-07	3.71E-07	2.37E-06	1.82E-05
ADPF	MJ	9.66E+02	1.73E+00	0	1.22E+00	2.94E+00	3.85E+00	-2.21E+02
WDP	m^3 world eq deprived	2.77E+01	5.91E-03	0	3.99E-03	7.33E-03	2.19E-01	-1.85E+00

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

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece VELUX sun tunnel TWF 0K14 2010 for pitched roof, flexible, profiled roofing materials

Parameter	Unit	A1-A3	A5	C1	C2	C3	C4	D
PERE	MJ	3.85E+01	4.75E+01	0	1.72E-02	3.72E-01	2.59E-01	-2.41E+01
PERM	MJ	4.83E+01	-4.75E+01	0	0	-7.61E-01	0	0
PERT	MJ	8.42E+01	2.48E-02	0	1.72E-02	-3.89E-01	2.59E-01	-2.41E+01
PENRE	MJ	7.91E+02	4.08E+00	0	1.22E+00	2.35E-06	2.23E+02	-2.23E+02
PENRM	MJ	2.22E+02	-2.35E+00	0	0	0	-2.2E+02	0
PENRT	MJ	9.66E+02	1.73E+00	0	1.22E+00	2.35E-06	3.85E+00	-2.23E+02
SM	kg	1.33E+00	0	0	0	0	0	7.01E-01
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	7.37E-01	2.15E-04	0	1.33E-04	7.03E-04	9.66E-03	-8.46E-02

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece VELUX sun tunnel TWF 0K14 2010 for pitched roof, flexible, profiled roofing materials

Parameter	Unit	A1-A3	A5	C1	C2	C3	C4	D
HWD	kg	2.65E-03	4.45E-06	0	3.1E-06	2.35E-06	1.42E-05	9.91E-04
NHWD	kg	1.43E+01	1.17E-01	0	8.15E-02	1.2E-02	2.14E+00	-4.46E+00
RWD	kg	5.69E-03	2.5E-05	0	1.76E-05	2.66E-05	2.38E-05	-8.42E-04
CRU	kg	0	0	0	0	0	0	0
MFR	kg	1.52E+00	2.83E+00	0	0	1.49E+00	0	0
MER	kg	0	0	0	0	0	0	0
EEE	MJ	6.52E-01	3.06E-01	0	0	0	2.86E+01	0

EET	MJ	1.27E+00	6.01E-01	0	0	0	5.62E+01	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:
1 piece VELUX sun tunnel TWF 0K14 2010 for pitched roof, flexible, profiled roofing materials

Parameter	Unit	A1-A3	A5	C1	C2	C3	C4	D
PM	Disease incidence	4.24E-06	1.25E-08	0	8.73E-09	1.28E-08	3.3E-08	-9.2E-07
IR	kBq U235 eq	2.36E+00	7.52E-03	0	5.28E-03	1.02E-02	1.15E-02	-3.45E-01
ETP-fw	CTUe	1.92E+03	1.4E+00	0	9.63E-01	1.73E+00	4.25E+01	-2.78E+02
HTP-c	CTUh	2.9E-07	7.31E-11	0	3.84E-11	4.68E-11	2.27E-09	-3.4E-08
HTP-nc	CTUh	2.39E-06	1.71E-09	0	1.11E-09	1.52E-09	2.57E-08	-2.18E-07
SQP	SQP	2.98E+02	1.48E+00	0	1.04E+00	3.98E-01	1.53E+00	-3.07E+01

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

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”.This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

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

6. LCA: Interpretation

Figure 1 illustrates the relative contributions of the different modules along the life cycle of the declared products (Modules A1-A3 = 100%).

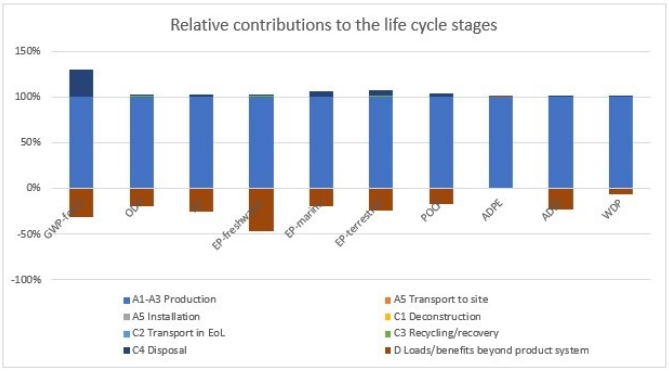

Figure 1: Relative environmental impacts of the different life cycle stages for the VELUX sun tunnel TWF 0K14 2010 (Modules A1-A3 = 100%)

The LCA is dominated by the manufacture of the product (modules A1-A3); further relevant contributions come only from the incineration of the plastic waste in module C4.
The benefits and burdens outside the product system vary in significance depending on the indicator and fluctuate between -5% and -60%.
The net positive impact ('load') of the ADPelements is related to copper input as the copper cathode for the remelting of recycled aluminium.
The use of renewable primary energy is mainly caused by the share of renewable energy in the electricity mix, thus the production stage is the main driver of this impact category; the same holds also for the use of non-renewable primary energy.
Material use of primary energy is negligible and related to plastic parts of the product and packaging material. The material use of primary energy is transferred to its energy use when the materials containing primary energy are incinerated with energy recovery.
Non-hazardous waste as the quantitatively most relevant waste flows is mainly caused during mining andprocessing of metal ores and related to the disposal of road infrastructure; hazardous and radioactive waste are mainly caused by the nuclear power in the electricity mix.

7. Requisite evidence

8.1 Formaldehyde
Not tested based on applicable product standard.

7.2 MDI
Not tested based on applicable product standard.

7.3 Checking of pre-treatment of substances used according to AltholzVO
Not applicable; not tested based on applicable product standard.

7.4. Fire gas toxicity
Not tested based on applicable product standard.

7.5 VOC emissions
Not tested based on applicable product standard.

8. References

Product category rules of IBU

IBU (2021)
IBU (2021): General Instructions for the EPD Programme of the Institut Bauen und Umwelt e.V.. Version 2.0, Institut Bauen und Umwelt e.V., Berlin

IBU (2022)
IBU (2022): Product category rules for building-related products and service, PCR Part A: Calculation rules for the life cycle assessment and requirements for the project report. Version 2.2., Institut Bauen und Umwelt e.V., Berlin.

IBU (2023)
IBU (2023): PCR Guidance-Texts for Building-Related Products and Services, PCR Part B: Requirements on the EPD for windows and doors. Version 2023/04, Institut Bauen und Umwelt e.V., Berlin.

Standards and legal documents

EN 15804
DIN EN 15804+A2:2022-3, Sustainability of construction works - Environmental product declarations - Core rules for the product category construction products. German version EN 15804:2012+A2:2019 + AC:2021

ISO 14025
DIN EN ISO 14025:2006-07, Environmental labels and declarations - Type III Environmental declarations - Principles and procedures.

ISO 14044
DIN EN ISO 14044:2006-07, Environmental management - Life cycle assessment - Requirements and guidance (ISO 14044:2006); German and English versions EN ISO 14044:2006.

ISO 9001
DIN EN ISO 9001:2015, Quality management systems - Requirements.

ISO 14001
DIN EN ISO 14001:2015: Environmental management systems - Requirements with guidance for use.

ISO 45001
ISO 45001:2018-03, Occupational health and safety management systems - Requirements with guidance for use.

EN 1873
DIN EN 1873:2005, Prefabricated accessories for roofing - Individual rooflights of plastics - product specification and test methods.

ECHA candidate list
The Candidate List of Substances of Very High Concern for Authorisation, European Chemicals Agency, Helsinki.

Regulation on biocidal products
REGULATION (EU) No 528/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 22 May 2012 concerning the making available on the market and use of biocidal products.

Regulation (EU) Nr. 305/2011(CPR)
REGULATION (EU) No 305/2011 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC.

COUNCIL REGULATION (EU) No 333/2011
COUNCIL REGULATION (EU) No 333/2011 of 31 March 2011 establishing criteria determining when certain types of scrap metal cease to be waste under Directive 2008/98/EC of the European Parliament and of the Council.

European Waste List (Waste index)
http://www.gesetze-im-internet.de/avv/anlage.htm

Additional references

ecoinvent 3.8
ecoinvent 3.8, LCA database, 12/2021. Ecoinvent centre, Zürich.

Publisher

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

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Programme holder

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

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Author of the Life Cycle Assessment

Dr. Frank Werner - Umwelt & Entwicklung
Kammelenbergstrasse 30
9011 St. Gallen
Switzerland

+ 41 (0)44 241 39 06
frank@frankwerner.ch
http://www.frankwerner.ch/

Owner of the Declaration

VELUX Group
Ådalsvej 99
2970 Hørsholm
Denmark

+4545164726
jakob.roerbech@velux.com
www.velux.com