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-20220114-CBB3-EN
Issue date	24/05/2022
Valid to	23/05/2027

VELUX flashings for flat roofing material

VELUX Group

Institut Bauen und Umwelt e.V.

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General Information

VELUX Group

Programme holder

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

Declaration number

EPD-VEL-20220114-CBB3-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

24/05/2022

Valid to

23/05/2027

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

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

VELUX flashings for flat roofing material

Owner of the declaration

VELUX Group
Ådalsvej 99
2970 Hørsholm
Denmark

Declared product / declared unit

1m² flashing for flat roofing material EDN

The declared unit is based on the configuration of a standard size window measuring 0.78m x 1.178m.

Scope:

Productline EDN - Flashing; manufactured by VELUX in France, Hungary, Poland, Denmark and China for sale in Europe.

Declaration according to *ISO 14025* and *EN 15804* describing specific environmental performances of the construction product.
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

Prof. Dr. Birgit Grahl,
(Independent verifier)

Product

Product description/Product definition
The VELUX flashings for flat roofing material are products for sale in the European market. This group of flashings cover a large range of different flashing types for profiled roofing material.

The different flashing types fit for installation with either a single window configuration or configurations of multiple windows installed adjacent to each other. All the flashings consist mainly of aluminium.

The calculations are based on the representative flashing for flat roofing material named EDN. In the LCA, the EDN was assessed to be a conservative choice for a representative flashing for profiled roofing material type. For the use and application of the product the respective national provisions at the place of use apply, in Germany for example the building codes of the federal states and the corresponding national specifications.

Application
VELUX flashings for flat roofing material are used in renovation and new build. Either installed as a single window or in a combination of multiple windows.

Technical Data

Constructional data

Name	Value	Unit
Reaction to fire EN 13501-1	E	class

Performance data of the product with respect to its characteristics in accordance with the relevant technical provision (no CE-marking).

Base materials/Ancillary materials

Name	Value	Unit
Aluminium	96	%
Galvanized steel	1	%
Stainless steel	0.4	%
Polybutadiene	1	%
Polyethylene LD	1	%

REACH

This product/article/at least one partial article contains substances listed in the candidate list (date: 17.01.2022) exceeding 0.1 percentage by mass: no.

Recycled content

Name	Value	Unit
Aluminum	30	%
Steel	10	%
Others	0	%

The values stated in the table relate to the recycled material streams in VELUX production.

Reference service life
A calculation of the reference service life according to *ISO 15686* is not possible.

The Bundesinstitut für Bau, Stadt und Raumforschung/Federal office for building and regional planning (*BBSR)*
table declares for the complete roof window a service life dependent on the applied window frame material between 25 and ≥ 50 years. This includes collars and flashings as declared with this EPD.

LCA: Calculation rules

Declared Unit
The declared unit is one m² related to a reference window, that the flashing is installed in connection with.

The declared unit is based on the representative product measuring 0.78m x 1.178m.

Declared unit

Name	Value	Unit
Declared unit	1	m^2
Weight per area	3.30	kg/representative product
Weight per area	3.59	kg/declared unit

System boundary
Type of EPD: Cradle to gate - with options. The following life cycle stages were considered:

Production stage A1-A3:
Consideration of the production of raw materials and their processing; transport of major material to the manufacturing site; assembly of semi-finished products to the final product; packaging material (including waste paper input for paper and cardboard).

End-of-Life stage C1, C2, C3:
C1: a manual demolition is assumed, resulting in indicator value "0".
C2: For the transport to EoL by truck a distance of 50 km is assumed.
C3: A scenario for the incineration of plastics in a waste incineration plant (WIP) is assumed.

The EoL-Scenario does not assume waste to be disposed of on a landfill site. Module C4 is declared as "0".

Benefits for the next product system D:
Resulting electrical and thermal energy from the WIP, avoiding the generation of electricity and heat via fossil fuels, is considered.
The amount of metals after the reduction due to the net-flow calculations is sent to a recycling process. The effort for recycling, as well as the benefit for the regained metals are declared in module D.

Contribution of waste flows is considered in the modules where they occur.

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

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. The *software GaBi* is used accompanied by the *GaBi background data base* (version 2021.2, 2021).

LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon
The following declared values refer to the declared unit of 1m².

Information on describing the biogenic Carbon Content at factory gate
The declared biogenic content comprises the paper manual and the packaging material consisting of cardboard, paper and wood. As module A5 is not declared, the information on packaging supports further EoL calculations.

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	0.735	kg C

The value refers to the following packaging material (per 1m²): Paper (manual): 0.020kg, Cardboard packaging: 1.684kg, Paper insert: 0.007kg, PE-LD: 0.013kg

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

Reference service life

Name	Value	Unit
Life Span (according to BBSR) depending on window frame material	25 - 50	a

End of life (C1-C4)

Name	Value	Unit
Collected separately waste type waste type	3.59	kg
Recycling	3.5	kg
Energy recovery	0.07	kg

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

Name	Value	Unit
Aluminium (net-flow calculation)	2.31	kg/1m² product
Steel (net-flow calculation)	0.04	kg/1m² product
Stainless steel (net-flow calculation)	8.18E-03	kg/1m² product

LCA: Results

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

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

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² EDN

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Global Warming Potential total (GWP-total)	kg CO_2 eq	2.3E+01	0	1.09E-02	7.29E-01	0	-1.72E+01
Global Warming Potential fossil fuels (GWP-fossil)	kg CO_2 eq	2.57E+01	0	1.08E-02	7.29E-01	0	-1.72E+01
Global Warming Potential biogenic (GWP-biogenic)	kg CO_2 eq	-2.69E+00	0	-1.29E-05	4.45E-05	0	-4.32E-02
Global Warming Potential luluc (GWP-luluc)	kg CO_2 eq	1.75E-02	0	8.85E-05	2.6E-05	0	-6.23E-03
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11 eq	2.7E-11	0	2.14E-18	2.11E-16	0	-1.9E-14
Acidification potential of land and water (AP)	mol H^+ eq	1.14E-01	0	2.14E-05	9.15E-05	0	-8.64E-02
Eutrophication potential aquatic freshwater (EP-freshwater)	kg P eq	7.7E-05	0	3.22E-08	3.26E-08	0	-6.85E-06
Eutrophication potential aquatic marine (EP-marine)	kg N eq	1.86E-02	0	8.86E-06	2.46E-05	0	-1.1E-02
Eutrophication potential terrestrial (EP-terrestrial)	mol N eq	1.98E-01	0	1E-04	4.17E-04	0	-1.2E-01
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg NMVOC eq	5.5E-02	0	1.91E-05	7.12E-05	0	-3.42E-02
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb eq	5.94E-06	0	9.6E-10	3.07E-09	0	-1.88E-06
Abiotic depletion potential for fossil resources (ADPF)	MJ	3.56E+02	0	1.44E-01	2.7E-01	0	-2.19E+02
Water use (WDP)	m^3 world eq deprived	3.6E+00	0	1.01E-04	7.49E-02	0	-2.82E+00

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² EDN

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Renewable primary energy as energy carrier (PERE)	MJ	1.27E+02	0	8.3E-03	5.84E-02	0	-1.01E+02
Renewable primary energy resources as material utilization (PERM)	MJ	2.73E+01	0	0	0	0	0
Total use of renewable primary energy resources (PERT)	MJ	1.55E+02	0	8.3E-03	5.84E-02	0	-1.01E+02
Non renewable primary energy as energy carrier (PENRE)	MJ	3.53E+02	0	1.45E-01	3.83E+00	0	-2.2E+02
Non renewable primary energy as material utilization (PENRM)	MJ	3.56E+00	0	0	-3.56E+00	0	0
Total use of non renewable primary energy resources (PENRT)	MJ	3.57E+02	0	1.45E-01	2.7E-01	0	-2.2E+02
Use of secondary material (SM)	kg	2.88E+00	0	0	0	0	2.22E+00
Use of renewable secondary fuels (RSF)	MJ	0	0	0	0	0	0
Use of non renewable secondary fuels (NRSF)	MJ	0	0	0	0	0	0
Use of net fresh water (FW)	m^3	3.31E-01	0	9.51E-06	1.78E-03	0	-2.61E-01

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m² EDN

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed (HWD)	kg	6.03E-07	0	7.63E-12	4.83E-11	0	-4.88E-06
Non hazardous waste disposed (NHWD)	kg	5.97E+00	0	2.27E-05	6.54E-02	0	-5.14E+00
Radioactive waste disposed (RWD)	kg	2.37E-02	0	2.63E-07	1.06E-05	0	-1.32E-02
Components for re-use (CRU)	kg	0	0	0	0	0	0
Materials for recycling (MFR)	kg	0	0	0	3.3E+00	0	0
Materials for energy recovery (MER)	kg	0	0	0	0	0	0
Exported electrical energy (EEE)	MJ	0	0	0	1.6E+00	0	0
Exported thermal energy (EET)	MJ	0	0	0	2.88E+00	0	0

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m² EDN

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Incidence of disease due to PM emissions (PM)	Disease incidence	1.2E-06	0	1.3E-10	1.25E-09	0	-9.09E-07
Human exposure efficiency relative to U235 (IR)	kBq U235 eq	4.59E+00	0	3.84E-05	1.4E-03	0	-2.76E+00
Comparative toxic unit for ecosystems (ETP-fw)	CTUe	1.25E+02	0	1.07E-01	1.91E-01	0	-7.94E+01
Comparative toxic unit for humans (carcinogenic) (HTP-c)	CTUh	4.06E-08	0	2.17E-12	1.06E-11	0	-1.08E-08

Comparative toxic unit for humans (noncarcinogenic) (HTP-nc)	CTUh	2.99E-07	0	1.18E-10	1.11E-09	0	-2.12E-07
Soil quality index (SQP)	SQP	1.74E+02	0	4.96E-02	6.59E-02	0	-7.21E+00

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 or as there is limited experience with the indicator.

Disclaimer 3 – for 'potential soil quality index'. Due to a data lack in the foreground data of VELUX, the result has a very high uncertainty and refers only to the background data, which contain respective information.

References

BBSR
BBSR, 24.02.2017, Nutzungsdauer von Bauteilen nach BNB

DIN EN 13501
DIN EN 13501-1:2019-05: Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests

DIN EN ISO 10077
DIN EN ISO 10077-1:2020-10: Thermal performance of windows, doors and shutters - Calculation of thermal transmittance

EN 15804
EN 15804:2012+A2:2019, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

GaBi
GaBi Software and GaBi Database by Sphera Solution GmbH, version: 2021.2, 2021

IBU 2021
Institut Bauen und Umwelt e.V.: General Instructions for the EPD programme of Institut Bauen und Umwelt e.V., Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021, www.ibu-epd.com

ISO 14025
EN ISO 14025:2011, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

ISO 15686
ISO 15686:2011-05: Buildings and constructed assets - Service life planning - Part 1: General principles and framework

PCR part A
Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019, version 1.2, Berlin: Institut Bauen und Umwelt e.V., 2021

PCR part B
Requirements on the EPDS for Windows and doors, version 01-2021, Berlin: Institut Bauen und Umwelt e.V.

REACH
Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Regulation (EU) No. 305/2011 (CPR)
Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonized conditions for the marketing of construction products and repealingCounsicl Directive 89/106/EEC

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