

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

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|--------------------------|--------------------------------------|
| Owner of the Declaration | VELUX Group |
| Programme holder | Institut Bauen und Umwelt e.V. (IBU) |
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VELUX flashings for flat roofing material
VELUX Group

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General Information

VELUX Group

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
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Declaration number

EPD-VEL-20220114-CBB1-EN

This declaration is based on the product category rules:

Windows and doors, 01.2021
(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.)



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

EDN flashing 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.

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.

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

Information on 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 | 0 | 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

**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 | 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/1m ² product |
| Steel (net-flow calculation) | 0.04 | kg/1m ² product |
| Stainless steel (net-flow calculation) | 8.18E-03 | kg/1m ² product |

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 | ND | ND | ND | ND | MNR | MNR | MNR | ND | ND | X | X | X | X | X |

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

| Core Indicator | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|--|------------------------------------|----------|---------|----------|----------|---------|-----------|
| Global warming potential - total | [kg CO ₂ -Eq.] | 2.30E+1 | 0.00E+0 | 1.09E-2 | 7.29E-1 | 0.00E+0 | -1.72E+1 |
| Global warming potential - fossil fuels | [kg CO ₂ -Eq.] | 2.57E+1 | 0.00E+0 | 1.08E-2 | 7.29E-1 | 0.00E+0 | -1.72E+1 |
| Global warming potential - biogenic | [kg CO ₂ -Eq.] | -2.69E+0 | 0.00E+0 | -1.29E-5 | 4.45E-5 | 0.00E+0 | -4.32E-2 |
| GWP from land use and land use change | [kg CO ₂ -Eq.] | 1.75E-2 | 0.00E+0 | 8.85E-5 | 2.60E-5 | 0.00E+0 | -6.23E-3 |
| Depletion potential of the stratospheric ozone layer | [kg CFC11-Eq.] | 2.70E-11 | 0.00E+0 | 2.14E-18 | 2.11E-16 | 0.00E+0 | -1.90E-14 |
| Acidification potential, accumulated exceedance | [mol H ⁺ -Eq.] | 1.14E-1 | 0.00E+0 | 2.14E-5 | 9.15E-5 | 0.00E+0 | -8.64E-2 |
| Eutrophication, fraction of nutrients reaching freshwater end compartment | [kg P-Eq.] | 7.70E-5 | 0.00E+0 | 3.22E-8 | 3.26E-8 | 0.00E+0 | -6.85E-6 |
| Eutrophication, fraction of nutrients reaching marine end compartment | [kg N-Eq.] | 1.86E-2 | 0.00E+0 | 8.86E-6 | 2.46E-5 | 0.00E+0 | -1.10E-2 |
| Eutrophication, accumulated exceedance | [mol N-Eq.] | 1.98E-1 | 0.00E+0 | 1.00E-4 | 4.17E-4 | 0.00E+0 | -1.20E-1 |
| Formation potential of tropospheric ozone photochemical oxidants | [kg NMVOC-Eq.] | 5.50E-2 | 0.00E+0 | 1.91E-5 | 7.12E-5 | 0.00E+0 | -3.42E-2 |
| Abiotic depletion potential for non-fossil resources | [kg Sb-Eq.] | 5.94E-6 | 0.00E+0 | 9.60E-10 | 3.07E-9 | 0.00E+0 | -1.88E-6 |
| Abiotic depletion potential for fossil resources | [MJ] | 3.56E+2 | 0.00E+0 | 1.44E-1 | 2.70E-1 | 0.00E+0 | -2.19E+2 |
| Water (user) deprivation potential, deprivation-weighted water consumption (WDP) | [m ³ world-Eq deprived] | 3.60E+0 | 0.00E+0 | 1.01E-4 | 7.49E-2 | 0.00E+0 | -2.82E+0 |

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

| Indicator | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|--|-------------------|---------|---------|---------|----------|---------|----------|
| Renewable primary energy as energy carrier | [MJ] | 1.27E+2 | 0.00E+0 | 8.30E-3 | 5.84E-2 | 0.00E+0 | -1.01E+2 |
| Renewable primary energy resources as material utilization | [MJ] | 2.73E+1 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| Total use of renewable primary energy resources | [MJ] | 1.55E+2 | 0.00E+0 | 8.30E-3 | 5.84E-2 | 0.00E+0 | -1.01E+2 |
| Non-renewable primary energy as energy carrier | [MJ] | 3.53E+2 | 0.00E+0 | 1.45E-1 | 3.83E+0 | 0.00E+0 | -2.20E+2 |
| Non-renewable primary energy as material utilization | [MJ] | 3.56E+0 | 0.00E+0 | 0.00E+0 | -3.56E+0 | 0.00E+0 | 0.00E+0 |
| Total use of non-renewable primary energy resources | [MJ] | 3.57E+2 | 0.00E+0 | 1.45E-1 | 2.70E-1 | 0.00E+0 | -2.20E+2 |
| Use of secondary material | [kg] | 2.88E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 2.22E+0 |
| Use of renewable secondary fuels | [MJ] | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| Use of non-renewable secondary fuels | [MJ] | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| Use of net fresh water | [m ³] | 3.31E-1 | 0.00E+0 | 9.51E-6 | 1.78E-3 | 0.00E+0 | -2.61E-1 |

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

| Indicator | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|-------------------------------|------|---------|---------|----------|----------|---------|----------|
| Hazardous waste disposed | [kg] | 6.03E-7 | 0.00E+0 | 7.63E-12 | 4.83E-11 | 0.00E+0 | -4.88E-6 |
| Non-hazardous waste disposed | [kg] | 5.97E+0 | 0.00E+0 | 2.27E-5 | 6.54E-2 | 0.00E+0 | -5.14E+0 |
| Radioactive waste disposed | [kg] | 2.37E-2 | 0.00E+0 | 2.63E-7 | 1.06E-5 | 0.00E+0 | -1.32E-2 |
| Components for re-use | [kg] | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| Materials for recycling | [kg] | 0.00E+0 | 0.00E+0 | 0.00E+0 | 3.30E+0 | 0.00E+0 | 0.00E+0 |
| Materials for energy recovery | [kg] | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| Exported electrical energy | [MJ] | 0.00E+0 | 0.00E+0 | 0.00E+0 | 1.60E+0 | 0.00E+0 | 0.00E+0 |
| Exported thermal energy | [MJ] | 0.00E+0 | 0.00E+0 | 0.00E+0 | 2.88E+0 | 0.00E+0 | 0.00E+0 |

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

| Indicator | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|--|---------------------|---------|---------|----------|----------|---------|----------|
| Potential incidence of disease due to PM emissions | [Disease Incidence] | 1.20E-6 | 0.00E+0 | 1.30E-10 | 1.25E-9 | 0.00E+0 | -9.09E-7 |
| Potential Human exposure efficiency relative to U235 | [kBq U235-Eq.] | 4.59E+0 | 0.00E+0 | 3.84E-5 | 1.40E-3 | 0.00E+0 | -2.76E+0 |
| Potential comparative toxic unit for ecosystems | [CTUe] | 1.25E+2 | 0.00E+0 | 1.07E-1 | 1.91E-1 | 0.00E+0 | -7.94E+1 |
| Potential comparative toxic unit for humans - cancerogenic | [CTUh] | 4.06E-8 | 0.00E+0 | 2.17E-12 | 1.06E-11 | 0.00E+0 | -1.08E-8 |
| Potential comparative toxic unit for humans - not cancerogenic | [CTUh] | 2.99E-7 | 0.00E+0 | 1.18E-10 | 1.11E-9 | 0.00E+0 | -2.12E-7 |
| Potential soil quality index | [-] | 1.74E+2 | 0.00E+0 | 4.96E-2 | 6.59E-2 | 0.00E+0 | -7.21E+0 |

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

ISO 14025

EN ISO 14025:2011, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.
e.V., 2021, www.ibu-epd.com

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 repealing Council Directive 89/106/EEC

**Publisher**

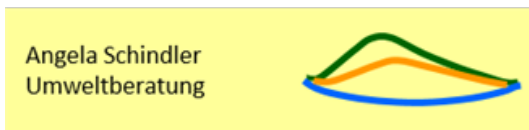
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