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-20230507-CBA1-EN
Issue date	11.03.2024
Valid to	10.03.2029

VELUX lining LSB

VELUX A/S

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

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General Information

VELUX A/S

Programme holder

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

Declaration number

EPD-VEL-20230507-CBA1-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

11.03.2024

Valid to

10.03.2029

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

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

VELUX lining LSB

Owner of the declaration

VELUX Group
Ådalsvej 99
2970 Hørsholm
Denmark

Declared product / declared unit

1m² lining LSB.

The declared unit is based on the configuration of a standard size window measuring 0.78 m x 1.178 m.
The product LSB is manufactured in Germany.

(The declared representative product of the product group comprise the product with the highest mass.)

Scope:

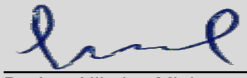
Productline LSB - lining; manufactured by VELUX in Germany for sale in Europe.

Declaration according to *ISO 14025* and *EN 15804* describing specific environmental performance 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



Dr.-Ing. Nikolay Minkov,
(Independent verifier)

Product

Product description/Product definition

VELUX linings ensure an easy and quick connection of the roof window to the interior ceiling finish. They and their facings are assembled before being clicked into the window rebate in one piece from the inside and there is no need for further framing.

The linings are made in white PVC, need no finishing treatment and are not sensitive to moisture. The white, semi-gloss surface and the white facings supplied ensure a harmonious connection from the roof window to most walls.

The linings are available in all window sizes and generations sold after 1991.

Installation angle: Linings can be installed in roof pitches from 15° to 90°.

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of performance taking into consideration *EN 13245-2:2008*, Plastics - Unplasticized poly(vinyl chloride) (PVC-U) profiles for building applications - Part 2: PVC-U profiles and PVC-UE profiles for internal and external wall and ceiling finishes and the CE-marking.

For the application and use the respective national provisions apply.

Application

Standard linings tobe used in roofs with a roof thickness of min 170 mm to max 530 mm.

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-marking.

Constructional data

Name	Value	Unit
Reaction to fire	E	class
Durability	No performance determined	

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN 13245-2:2008*, Plastics - Unplasticized poly(vinyl chloride) (PVC-U) profiles for building applications - Part 2: PVC-U profiles and PVC-UE profiles for internal and external wall and ceiling finishes.

Base materials/Ancillary materials

Name	Value	Unit
Plastics	97.7	%
Steel	2.3	%

REACH

This product contains substances listed in the *candidate list* (date: 09.08.2023) 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 a service life for the complete roof window dependent on the applied window frame material between 25 and ≥ 50 years. This includes linings as declared with this EPD.

LCA: Calculation rules

Declared Unit

The declared unit is one m² related to a reference window, that the lining is installed in connection with.
The declared unit is based on the representative product measuring 0.78m x 1.178m.

Declared unit and mass reference

Name	Value	Unit
Declared unit	1	m^2
Grammage	12.56	kg/m^2
Layer thickness	0	m
Weight per area	11.56	kg/representative product
Weight per area	12.56	kg/declared unit

The calculation is based mainly on BOM (Bill of Material) data, with only a few specific
information on processing. This may lead to a higher uncertainty for the result values and needs to be kept in mind for the application of this EPD.

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 (plastic profile and steel) and their processing (estimated energy data: electrical energy from the national residual mix and thermal energy from natural gas); transport of major materials 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 plastic in a waste incineration plant (WIP) is assumed; metals are assumed to be recycled.

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 *LCA FE 10.7* is used accompanied by the *MLC* database (version 2023.1, 2023).

LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The following declared values refer to the declared unit of 1 m².

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, PE, EPS 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	0.8	kg C

The value refers to the following packaging material (per 1m²):
Paper (manual): 0.08 kg,
Cardboard packaging: 1.429 kg,
Paper insert: 0.004 kg,
PE-LD: 0.057 kg,
EPS: 0.166 kg,
wood: 0.217 kg.

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)	25 - 50	a

End of life (C1-C4)

Name	Value	Unit
Collected separately waste type	12.56	kg
Recycling	0.29	kg
Energy recovery	12.27	kg

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

Name	Value	Unit
Steel (net-flow-calculation)	0.20	kg/1m² product
Stainless steel (net-flow-calculation)	0.07	kg/1m² product

LCA: Results

The LCIA assessment is performed applying the characterisation factors "EN 15804+A2, EF 3.0".

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 lining LSB

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Global Warming Potential total (GWP-total)	kg CO_2 eq	4.24E+01	0	4.84E-02	2.48E+01	0	-8.1E+00
Global Warming Potential fossil fuels (GWP-fossil)	kg CO_2 eq	4.23E+01	0	4.6E-02	2.48E+01	0	-8.06E+00
Global Warming Potential biogenic (GWP-biogenic)	kg CO_2 eq	8.02E-02	0	2.01E-03	3.91E-03	0	-3.95E-02
Global Warming Potential luluc (GWP-luluc)	kg CO_2 eq	3.54E-02	0	4.19E-04	1.71E-03	0	-1.52E-03
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11 eq	2.83E-10	0	5.88E-15	1.61E-11	0	-5.68E-11
Acidification potential of land and water (AP)	mol H^+ eq	6.77E-02	0	9.08E-05	5.21E-03	0	-1.22E-02
Eutrophication potential aquatic freshwater (EP-freshwater)	kg P eq	1.38E-04	0	1.65E-07	4.7E-06	0	-1.24E-05
Eutrophication potential aquatic marine (EP-marine)	kg N eq	2.06E-02	0	3.75E-05	1.67E-03	0	-3.12E-03
Eutrophication potential terrestrial (EP-terrestrial)	mol N eq	2.23E-01	0	4.27E-04	2.25E-02	0	-3.32E-02
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg NMVOC eq	9.71E-02	0	8.12E-05	4.76E-03	0	-8.95E-03
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb eq	2.38E-05	0	2.98E-09	1.42E-07	0	-1.96E-06
Abiotic depletion potential for fossil resources (ADPF)	MJ	9.54E+02	0	6.16E-01	3.59E+01	0	-1.42E+02
Water use (WDP)	m^3 world eq deprived	3.46E+00	0	5.46E-04	2.43E+00	0	-9.13E-01

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

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Renewable primary energy as energy carrier (PERE)	MJ	1.71E+02	0	4.48E-02	8.53E+00	0	-3.95E+01
Renewable primary energy resources as material utilization (PERM)	MJ	6.57E+00	0	0	-1.25E-01	0	0
Total use of renewable primary energy resources (PERT)	MJ	1.78E+02	0	4.48E-02	8.4E+00	0	-3.95E+01
Non renewable primary energy as energy carrier (PENRE)	MJ	7E+02	0	6.18E-01	2.81E+02	0	-1.42E+02
Non renewable primary energy as material utilization (PENRM)	MJ	2.54E+02	0	0	-2.45E+02	0	0
Total use of non renewable primary energy resources (PENRT)	MJ	9.54E+02	0	6.18E-01	3.59E+01	0	-1.42E+02
Use of secondary material (SM)	kg	1.47E+00	0	0	0	0	2.71E-01
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	2.15E-01	0	4.91E-05	6.07E-02	0	-3.94E-02

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

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed (HWD)	kg	1.62E-05	0	1.91E-12	1.29E-10	0	-4.37E-05
Non hazardous waste disposed (NHWD)	kg	1.91E+00	0	9.43E-05	9.51E+00	0	-1.3E-02
Radioactive waste disposed (RWD)	kg	3.28E-02	0	1.16E-06	1.01E-03	0	-1.03E-02
Components for re-use (CRU)	kg	0	0	0	0	0	0
Materials for recycling (MFR)	kg	0	0	0	2.9E-01	0	0
Materials for energy recovery (MER)	kg	0	0	0	0	0	0
Exported electrical energy (EEE)	MJ	4.89E+00	0	0	3.43E+01	0	0
Exported thermal energy (EET)	MJ	8.86E+00	0	0	6.2E+01	0	0

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

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Incidence of disease due to PM emissions (PM)	Disease incidence	6.9E-07	0	5.87E-10	1.13E-07	0	-1.39E-07
Human exposure efficiency relative to U235 (IR)	kBq U235 eq	4.88E+00	0	1.73E-04	1.23E-01	0	-1.71E+00
Comparative toxic unit for ecosystems (ETP-fw)	CTUe	4.63E+02	0	4.37E-01	2.34E+01	0	-3.23E+01
Comparative toxic unit for humans (carcinogenic) (HTP-c)	CTUh	2.51E-07	0	8.96E-12	9.92E-10	0	-7.44E-09

Comparative toxic unit for humans (noncarcinogenic) (HTP-nc)	CTUh	4.87E-07	0	5.05E-10	9.44E-08	0	-5.37E-08
Soil quality index (SQP)	SQP	2.76E+02	0	2.57E-01	7.7E+00	0	-2.61E+01

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.

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

Standards

EN 15804
EN 15804:2012+A2:2019+AC:2021, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

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

ISO 15686
ISO 15686-1:2011-05: Buildings and constructed assets - Service life planning

EN 13245
EN 13245-2:2008: Plastics - Unplasticized poly(vinyl chloride) (PVC-U) profiles for building applications - Part 2: PVC-U profiles and PVC-UE profiles for internal and external wall and ceiling finishes

Further References

BBSR
BBSR, 24.02.2017, Nutzungsdauer von Bauteilen nach BNB

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

LCA FE 10.7 / MLC DB
Sphera's LCA Software for Experts / Managed LCA Content database, Sphera Solutions GmbH, Leinfelden-Echterdingen, database version 2023.1, 2023

PCR part A
Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019, version 1.3, IBU, 2022

PCR part B
Requirements on the EPD for Windows and doors, version 01.08.2021, IBU

REACH/candidate list
Regulation (EC) No 1907/2006: 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 harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC Text with EEA relevance

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