SENTINEL HOLDING
INSTITUT

SHI PRODUCT PASSPORT

Find products. Certify buildings.

SHI Product Passport No.:

15305-10-1004

VELUX Modular rooflights UVL, UFL, UVM, UFM

Product group: Skylight - Window - Flat roofing

VELUX®

VELUX A/S
Aadalsvej 99
2970 Hørsholm

Product qualities:

- QNG Qualitätssiegel Nachhaltiges Gebäude ✓
- DGNB NEW CONSTRUCTION 2023 ✓
- DGNB NEW CONSTRUCTION 2018 ✓
- BNB-BN NEUBAU V2015 ✓
- BREEAM DE NEUBAU 2018 ✓

CERTIFIED SUSTAINABLE PRODUCT
SHI PRODUCT PASSPORT
SENTINEL HOLDING INSTITUT
www.sentinel-holding.eu

Köttner

Helmut Köttner
Scientific Director
Freiburg, 26 November 2025

SENTINEL HOLDING
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Product:
VELUX Modular rooflights UVL, UFL, UVM, UFM

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Content

The SHI Database is the first and only database for construction products whose comprehensive processes and data accuracy are regularly verified by the independent auditing company SGS-TÜV Saar

SGS SGS TÜV SAAR

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Product:
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QNG - Qualitätssiegel Nachhaltiges Gebäude

The Qualitätssiegel Nachhaltiges Gebäude (Quality Seal for Sustainable Buildings), developed by the German Federal Ministry for Housing, Urban Development and Building (BMWSB), defines requirements for the ecological, socio-cultural, and economic quality of buildings. The Sentinel Holding Institut evaluates construction products in accordance with QNG requirements for certification and awards the QNG ready label. Compliance with the QNG standard is a prerequisite for eligibility for the KfW funding programme. For certain product groups, the QNG currently has no specific requirements defined. Although classified as not assessment-relevant, these products remain suitable for QNG-certified projects.

General

Criteria	Pos. / product group	Considered substances	QNG assessment
3.1.3 Schadstoffvermeidung in Baumaterialien	not applicable	not applicable	QNG ready - Not relevant for assessment

Holzanteil

Criteria	Assessment
ANF2-WG1 Nachhaltige Materialgewinnung	May positively contribute to the overall building score
Verification: PEFC zertifiziert	

Product:

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DGNB New Construction 2023

The DGNB System (German Sustainable Building Council) assesses the sustainability of various types of buildings. It can be applied to both large-scale private and commercial projects as well as smaller residential buildings. The 2023 version sets high standards for ecological, economic, socio-cultural, and functional aspects throughout the entire life cycle of a building.

General

Criteria	Assessment
ECO1.1 Life cycle cost (*)	May positively contribute to the overall building score

Verification: An improved u-value can contribute to more energy efficient building components. Sloped roof windows, flat roof windows and other Velux windows can result in less frequent use of electric light. Use of window's opening can also increase ventilation. Further detailing can be completed with more case-to-case information.

Criteria	Assessment
ECO2.6 Climate resilience (*)	May positively contribute to the overall building score

Verification: Velux Products provide natural cooling and ventilation, see documentation of windows application. Materials providing heat protection are the individual window's glazing and implementation of various accessories. /With the use of the Velux windows and the ventilation, improves the wind circulation in the area of the building, which could mitigate the facts of radon.

Criteria	Assessment
ENV1.1 Climate action and energy (*)	May positively contribute to the overall building score

Verification: Some of the products include PV cells. This generates PV panels on both the roof and in the product./Connected to ECO 1.1 as well as an implementation of the automation of the windows and Velux Active./ We offer products which operated through electric/solar powered sources, which results in an automised product package.

Criteria	Assessment
SOC1.1 Thermal comfort (*)	May positively contribute to the overall building score

Verification: The opening of the windows introduce fresh air into the building + offering of various shading and glazing materials resulting in a solar protection

Criteria	Assessment
SOC1.3 Sound insulation and acoustic comfort (*)	May positively contribute to the overall building score
Verification: We offer some products with high sound properties as well as external accessories	

Criteria	Assessment
SOC1.4 Visual comfort (*)	May positively contribute to the overall building score
Verification: Connected to ECO 1.1	

Criteria	Assessment
TEC1.3 Quality of the building envelope (*)	May positively contribute to the overall building score
Verification: We offer some products with higher insulation properties with various glazings and an addition of various accessories	

Criteria	Assessment
TEC1.4 Use and integration of building technology (*)	May positively contribute to the overall building score
Verification: we offer products which can integrate automation systems.	

Criteria	No. / Relevant building components / construction materials / surfaces	Considered substances / aspects	Quality level
ENV 1.2 Local environmental impact, 03.05.2024 (3rd edition)	32 All of the shell's aluminium and stainless steel building components.	Chromium VI	Quality level 4
Verification: Herstellererklärung vom 04.08.2025			

Criteria	No. / Relevant building components / construction materials / surfaces	Considered substances / aspects	Quality level
ENV 1.2 Local environmental impact, 29.05.2025 (4th edition)	32 All of the shell's aluminium and stainless steel building components	Chromium VI	Quality level 4
Verification: Herstellererklärung vom 04.08.2025			

Holzanteil

Criteria	No. / Relevant building components / construction materials / surfaces	Considered substances / aspects	Quality level
ENV 1.2 Local environmental impact, 03.05.2024 (3rd edition)	30a Dimensionally stable wooden building components	Wood preservative (product type 8 according to 528/2012/EC)	Quality level 3
Verification: Herstellererklärung zu Bioziden vom Februar 2025			

Criteria	Quality level
ENV1.3 Responsible resource extraction	May positively contribute to the overall building score
Verification: PEFC zertifiziert	

Criteria	No. / Relevant building components / construction materials / surfaces	Considered substances / aspects	Quality level
ENV 1.2 Local environmental impact, 29.05.2025 (4th edition)	30a Dimensionally stable wooden building components: external doors and windows	Wood preservative (product type 8 according to 528/2012/EC)	Quality level 4
Verification: Herstellererklärung zu Bioziden vom Februar 2025			

Product:
VELUX Modular rooflights UVL, UFL, UVM, UFM

SHI Product Passport no.:
15305-10-1004

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DGNB New Construction 2018

The DGNB System (German Sustainable Building Council) assesses the sustainability of various types of buildings. It can be applied to both large-scale private and commercial projects as well as smaller residential buildings.

General

Criteria	No. / Relevant building components / construction materials / surfaces	Considered substances / aspects	Quality level
ENV 1.2 Local environmental impact	32 All aluminium and stainless steel components in the building envelope	Chromium VI	Quality level 4
Verification: Herstellererklärung vom 04.08.2025			

Holzanteil

Criteria	No. / Relevant building components / construction materials / surfaces	Considered substances / aspects	Quality level
ENV 1.2 Local environmental impact	30a Dimensionally Stable Timber Components		Quality level 3
Verification: Herstellererklärung zu Bioziden vom Februar 2025			

Product:

VELUX Modular rooflights UVL, UFL, UVM, UFM

SHI Product Passport no.:

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BNB-BN Neubau V2015

The Bewertungssystem Nachhaltiges Bauen (Assessment System for Sustainable Building) is a tool for evaluating public office and administrative buildings, educational facilities, laboratory buildings, and outdoor areas in Germany. The BNB was developed by the former Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) and is now overseen by the Federal Ministry for Housing, Urban Development and Building (BMWSB).

General

Criteria	Pos. / product type	Considered substance group	Quality level
1.1.6 Risiken für die lokale Umwelt	27 Anodized aluminum and passivated stainless steel surfaces	Heavy metals (chromium VI)	Quality level 5
Verification: Herstellererklärung vom 04.08.2025			

Holzanteil

Criteria	Pos. / product type	Considered substance group	Quality level
1.1.6 Risiken für die lokale Umwelt	26 Chemical impregnation of non-load-bearing components	Biocides	Quality level 3
Verification: Herstellererklärung vom 01.02.2025 und Herstellererklärung zu Bioziden vom Februar 2025			

Criteria	Assessment
1.1.7 Nachhaltige Materialgewinnung	May positively contribute to the overall building score
Verification: PEFC zertifiziert	

Product:
VELUX Modular rooflights UVL, UFL, UVM, UFM

SHI Product Passport no.:
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BREEAM DE Neubau 2018

BREEAM (Building Research Establishment Environmental Assessment Methodology) is a UK-based building assessment system that evaluates the sustainability of new constructions, refurbishments, and conversions. Developed by the Building Research Establishment (BRE), the system aims to assess and improve the environmental, economic, and social performance of buildings.

Criteria	Product category	Considered substances	Quality level
Hea 02 Indoor Air Quality			Not relevant for assessment

Product:
VELUX Modular rooflights UVL, UFL, UVM, UFM

SHI Product Passport no.:
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Product labels

In the construction industry, high-quality materials are crucial for a building's indoor air quality and sustainability. Product labels and certificates offer guidance to meet these requirements. However, the evaluation criteria of these labels vary, and it is important to carefully assess them to ensure products align with the specific needs of a construction project.

Products bearing the Sentinel Holding Institute QNG-ready seal are suitable for projects aiming to achieve the "Qualitätssiegel Nachhaltiges Gebäude" (Quality Seal for Sustainable Buildings). QNG-ready products meet the requirements of QNG Appendix Document 3.1.3, "Avoidance of Harmful Substances in Building Materials." The KfW loan program Climate-Friendly New Construction with QNG may allow for additional funding.

Smart EPD is an independent programme for the creation and publication of Environmental Product Declarations (EPDs). The programme supports manufacturers in presenting the environmental impacts of their products in a transparent and comparable way. The work of Smart EPD is based on internationally recognised standards such as ISO 14025, EN 15804 and ISO 21930. Every EPD published under the Smart EPD programme must first be reviewed by an independent verification body.

Product:
VELUX Modular rooflights UVL, UFL, UVM, UFM

SHI Product Passport no.:
15305-10-1004

Legal notices

(*) These criteria apply to the construction project as a whole. While individual products can positively contribute to the overall building score through proper planning, the evaluation is always conducted at the building level. The information was provided entirely by the manufacturer.

Find our criteria here: https://www.sentinel-holding.eu/de/Themenwelten/Pr%C3%BCfkriterien%20f%C3%BCr%20Produkte

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To whom it may concern

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Ådalsvej 99
DK-2970 Hørsholm
Denmark
Telephone +45 45 16 40 00
www.velux.com

Date: 04 August 2025

Sentinel Haus criteria

VOC content

We can confirm that the plants performing the factory coating of our products are operated in accordance with or (for smaller companies) in accordance with the 31st Ordinance of the Federal Emission Control Act or by the Europe-wide regulation Regulation 2010/75/EU - Industrial Emissions Directive (IED), (formerly Regulation 1999/13/EU).

We are working with our supplier base to investigate means of reducing the VOC content of the applied coating materials.

We are continuously working on reducing our negative social and environmental impact. Information on this work can be found in our Sustainability Report 2023 (link).

Chemical content
We hereby declare that all products comply with the following criteria.

- No use of halogenated blowing agents
- No use of brominated flame retardants (HBCD)
- No use of reproduction toxic boron compounds in quantities of more than 0.1% (w/w)
- No use of chrome VI oxide surface treatment (passivation)
- No use of lead, tin and cadmium compounds in quantities of more than 0,1% in our windows, except for MSL awning blind and KFX smoke ventilation control unit, both contains lead ((CAS no 743-92-1) in quantities of more than 0,1%.
- No use of chrome VI compounds
- None of our products contain any substances (incl. reproductive-toxic phthalates) of very high concern or substances from the candidate list in quantities of more than 0.1 % (w/w)
- No use of cadmium in PVC components in quantities of more than 0.01%

Yours sincerely,
Birthe Uldahl Kjeldsen

Senior manager,
Product Specification and Documentation
Product Regulatory Affairs

To Whom it May Concern

Ådalsvej 99
DK-2970 Hørsholm
Denmark
+45 45 16 40 00 Telephone
+45 45 16 40 01 Telefax

Valid: 22 January 2025 – 21 January 2026

VELUX A/S is aware of REACH regulation and acknowledge the obligations which derive from the regulation.

We can confirm that none of the VELUX products, packaging etc. are covered by the obligation to register in accordance to REACH.

Furthermore, we can confirm that none[1] of our products contain any Substances of Very High Concern or substances at the Candidate list in quantities of more than 0,1% (w/w).

We can also confirm that we are in contact with our suppliers to ensure that they are aware of REACH.

Birthe Uldahl Kjeldsen
Senior manager
Technical Values
Standardisation & Technical Performance
VELUX A/S
Ådalsvej 99, DK 2970 Hørsholm

[1] Apart from backup batteries for smoke ventilation products (KFX) and small PV modules used in VELUX MSL awning blinds, please see separate certificate.

CHAIN OF CUSTODY CERTIFICATE

Certificate no.:
DNVFI-PEFC-COC-000075

Initial certification date:
25 August 2008

Valid:
19 September 2022 – 09 January 2027

This is to certify that

VELUX A/S

Platinvej 14, 6000 Kolding, Denmark

and the sites as mentioned in the appendix accompanying this certificate

meets the requirements of following international PEFC standards:
PEFC ST 2002:2020, PEFC ST 2001:2020

This certificate is valid for the following product or service ranges:
Manufacturing, sales and distribution of wooden roof windows.

The validity of this certificate shall be verified on www.pefc.org.

Place and date:
Espoo, 19 September 2022

PEFC
PEFC/02-44-32
www.pefc.fi

FINAS
Finnish Accreditation Service
S018 (EN ISO/IEC 17065)

For the issuing office:
DNV - Business Assurance
Keilaranta 1, 02150 Espoo, Finland

Kimmo Haarala
Management Representative

Lack of fulfilment of conditions as set out in the Certification Agreement may render this Certificate invalid.

Certificate no.: DNVFI-PEFC-COC-000075
Place and date: Espoo, 19 September 2022

Appendix to Certificate

VELUX A/S

Locations included in the certification are as follows:

Site Name	Site Address	Site Scope
JTJ Sonneborn Industrie GmbH	Am Arzbach 13, DE-99869 Sonneborn, Germany	Manufacturing of wooden roof windows and windows components
NB Polska Sp. z o.o.	Ul. Sloneczna 29, PL-62-200 Gniezno, Poland	Manufacturing of roof windows and components for windows
NM Polska Sp. z o.o.	Ul. Olesnicka 12, PL-46-100 Namyslow, Poland	Manufacturing, sales and distribution of wooden roof windows
Østbirk Bygningsindustri A/S	Ryvej 21, 8752 Østbirk, Denmark	Manufacturing of wooden roof windows and windows components
Partizánske Building Components-SK s.r.o	Malobielicka 1/215, 95804 Partizanske, Slovak Republic	Manufacturing of wooden roof windows and windows components
Thyregod Bygningsindustri A/S	Nordre Ringvej 9, 7323 Give, Denmark	Manufacturing of wooden roof windows and windows components
VELUX A/S	Platinvej 14, 6000 Kolding, Denmark	Logistics HQ
VELUX A/S - DC Portugal	Travessa do Areeiro 272, PT-2440-05, Batalha, Portugal	Distribution and warehousing of wooden roof windows
VELUX A/S - European Central Warehouse CEE	H-9431 Fertod, Malom Köz 1, Hungary	Distribution and warehousing of wooden roof windows
VELUX A/S - Feuquières	Zone Industrielle, F-80210, Feuquières en Vimeu, France	Manufacturing of wooden roof windows and windows components
VELUX A/S - JTJ-D Sonneborn	Am Arzbach 13, DE-99869 Sonneborn, Germany	Distribution and warehousing of wooden roof windows
VELUX A/S - Kolding	Jupitervej 4, 6000 Kolding, Denmark	Central Purchasing
VELUX A/S - LOG-V	Platinvej 14, 6000 Kolding, Denmark	Manufacturing, sales and distribution of wooden roof windows.
VELUX A/S - NB PL Gniezno	Ul. Sloneczna 29, PL-62-200 Gniezno, Poland	Distribution and warehousing of wooden roof windows
VELUX A/S - NM PL Namyslow	Ul. Olesnicka 12, PL-46-100 Namyslow, Poland	Distribution and warehousing of wooden roof windows
VELUX A/S - Nordic DC FWH	Platinvej 14, 6000 Kolding, Denmark	Distribution and warehousing of wooden roof windows
VELUX A/S - PBC SK	Malobielická 1/225, SK-958 04 Partizánske, Slovak Republic	Distribution and warehousing of wooden roof windows
VELUX A/S V-LOG	Platinvej 14, 6000 Kolding, Denmark	Sales of wooden roof windows
VELUX Belgium	Boulevard de l'europe 121, B-1300 Wavre, Belgium	Sales of wooden roof windows
VELUX Company Ltd.	Woodside Way, Glenrothes East, GB-KY7 4ND, United Kingdom	Sales of wooden roof windows
VELUX Danmark A/S	Breeltevej 20, 2970 Hørsholm, Denmark	Sales of wooden roof windows
VELUX Deutschland GmbH	Gazellenkamp 168, DE-22527 Hamburg, Germany	Sales of wooden roof windows

Certificate no.: DNVFI-PEFC-COC-000075
Place and date: Espoo, 19 September 2022

Site Name	Site Address	Site Scope
VELUX France SAS	1, rue Paul Cézanne, F-91421, Morangis Cédex, France	Sales of wooden roof windows
VELUX Italia S.p.a.	Via Strà 152 - I-37030 Colognola ai Colli (VR) - Italy	Sales of wooden roof windows
VELUX Magyarország LKR Korlátolt Felelösségü TársaságS	H-9431 Fertod, Malom köz 1, Hungary	Manufacturing of wooden roof windows and windows components
VELUX Nederland B.V	Molensteijn 2, NL-3454 ZJ De Meern, Netherlands	Sales of wooden roof windows
VELUX Norway AS	Gjerdrumsvej 10 D, NO-0484 Oslo, Norway	Sales of wooden roof windows
VELUX Romania SRL	Coresi Business Park, 5 Turnului Street, RO-500152, Brasov, Romania	Sales of wooden roof windows
VELUX Schweiz AG	Industristrasse 7, CH-4632 Trimbach, Switzerland	Sales of wooden roof windows
VELUX Spain, S. A.	Ctra. de La Coruña 18, 150, E-28231, Las Rozas de Madrid, Spain	Sales of wooden roof windows
VELUX Svenska AB	Karbingatan 22, SE-254 67, Helsingborg, Sweden	Sales of wooden roof windows
VKR France (Feuquiéres-en-Vimeu)	ul. Krakowiaków 34, PL-02-255 Warszawa, Poland	Sales of wooden roof windows
VKR France (Feuquières-en-Vimeu)	Zone Industrielle, 80210, Feuquiéres-en-Vimeu, France	Distribution and warehousing of wooden roof windows

Certificate no.: DNVFI-PEFC-COC-000075
Place and date: Espoo, 19 September 2022

Appendix to Certificate

Multi-site certificate

Product category:	08031 (Windows)
Material category:	PEFC certified
Applied chain of custody method:	Percentage
Tree species:	Pinus sylvestris, Picea abies, Pinus pinaster, Quercus robur, Betula spp

To Whom it May Concern

Ådalsvej 99
DK-2970 Hørsholm
Denmark
+45 45 16 40 00 Telephone
+45 45 16 40 01 Telefax

February 2025
Renewal date: February 2027

VELUX A/S is aware of the Biocidal Product Regulation (528/2012/EU) (BPR) and Biocidal Product Regulation, implementing regulation (2023/2596 (EU)) and acknowledge the obligations which derive from the regulations.

VELUX wooden windows and wooden upstands for flat roof windows (VMR) are considered treated articles containing wood preservatives. All biocidal products used in our products are covered by the obligation to register in accordance with BPR.

We can confirm that all biocidal products used in our VELUX products are registered in accordance with BPR.

We can also confirm that we are in contact with our suppliers to ensure that they are aware of BPR.

One of the active substances (propiconazole) used in the wood preservation of VELUX wooden roof windows (PT8) triggers a labelling requirement, which entails that all VELUX roof wooden windows from 1 July 2024 has a label on with the text: "This product contains wood treated with propiconazole" in English. Furthermore the following information is available online through the QR code from the product data plate:

VELUX sloped roof windows:

This product contains wood treated with propiconazole. It must not be used for furniture and play structures such as playgrounds.

Use and Maintenance
VELUX wooden windows are treated with propiconazole and a topcoat to protect the product. In the case of sanding during repair on topcoat, dust must be collected and disposed of appropriately and respiration equipment must be worn. After grinding we recommend that a new topcoat is applied over the sanded area.

Disposal of product
It´s important to note that the product is not suitable for use as furniture or play structures, as per Biocidal Product Regulation, implementing regulation 2023/2596 (EU).
Treated or painted wood must be disposed of according to local regulations.

Birthe Kjeldsen

Birthe Kjeldsen
Manager, Technical Values
Ådalsvej 99, DK 2970 Hørsholm

Environmental Product Declaration

IN ACCORDANCE WITH ISO 14025 AND EN 15804+A2

Program Operator: Smart EPD®
www.smartepd.com

Modular Rooflights - Circularlight

Date of Issue	Expiration date	Last updated
Jul 30, 2025	**Jul 30, 2030**	**Jul 30, 2025**

Refer to the EPD Library at www.smartepd.com for the latest EPD listing information

General Information

VELUX

Ådalsvej 99, 2970 Hørsholm, Denmark

+45 45164000

birthe.kjeldsen@velux.com velux.com

Product Name:	Modular Rooflights - Circularlight
Declared Unit:	1 m2 of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m)
Declaration Number:	SmartEPD-2025-001-0567-01
Date of Issue:	July 30, 2025
Expiration:	July 30, 2030
Last updated:	July 30, 2025
EPD Scope:	Cradle to gate with other options A1 - A3, A4, A5, C1 - C4, D
Market(s) of Applicability:	Europe

General Organization Information

VELUX is a Danish manufacturing company that specializes in roof windows, skylights, sun tunnels and related accessories. The company is headquartered in Hrsholm, Denmark and is a part of VKR Holding A/S. VELUX Group is a founding partner of the global Active House Alliance.

Further information can be found at: https://www.velux.com

Limitations, Liability, and Ownership

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the whole building life cycle. EPD comparability is only possible when all stages of a life cycle have been considered. However, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared. The EPD owner has sole ownership, liability, and responsibility for the EPD.

Reference Standards

Standard(s):	ISO 14025 and EN 15804+A2
Core PCR:	IBU PCR for Building-Related Products and Services Part A v1.4 v.1.4 Date of issue: April 15, 2024
Sub-category PCR:	IBU Part B: Requirements on the EPD for Windows and Doors v.1.0/1.7/1.4 Date of issue: January 25, 2021 Valid until: January 25, 2026

Sub-category PCR review panel:	Contact Smart EPD for more information.
General Program Instructions:	Smart EPD General Program Instructions v.1.0, November 2022

Verification Information

LCA Author/Creator:	Juan David Villegas | juan@parqhq.com
EPD Program Operator:	Smart EPD | info@smartepd.com | www.smartepd.com 585 Grove St., Ste. 145 PMB 966, Herndon, VA 20170, USA
Verification:	Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071: External Rifat Karim | Independent Consultant | rifat.chimique@gmail.com Independent external verification of EPD, according to ISO 14025 and reference PCR(s): External Rifat Karim | Independent Consultant | rifat.chimique@gmail.com

Product Information

Declared Unit:	1 m2 of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m)
Mass:	104.8591 kg
Reference Service Life:	30 Years
Product Specificity:	✗ Product Average ✓ Product Specific

Product Description

Circularlight is a fixed single round rooflight that offers elegant rounded roof styling and is supplied without an upstand, making it suitable for flat or sloped roofs from 0 to 15 with a recommended minimum installation pitch of 5 on flat roofing materials; accommodating opening diameters from 900mm to 1350mm, it maximises daylight by keeping the frame invisible from below, its unique round shape adds a stylish touch, and its prefabricated top unit with top plate enables straightforward installation on a builders kerb, while bespoke sizing makes it an ideal choice for refurbishment projects.

Further information can be found at: https://commercial.velux.co.uk/products/domes-rooflights-and-flat-glass-rooflights/modular-rooflights/solutions/circularlight

Product Specifications

Product Classification Codes:	EC3 - Openings -> TranslucentWallAndRoofAssemblies

Material Composition

Material/Component Category	Origin	% Mass
Blind rivets, nuts , screws, plates	DNK	0.86
Gaskets, washers	DEU, DNK	6.64
Glazing	LTU	69.55
Profiles, support brackets, tubes and strips	DNK	8.2
Upstand	NLD, DNK, POL	14.76

Packaging Material	Origin	kg Mass
Cardboard		0.17
Pallet		0.1
Plastic cover		0.84

Biogenic Carbon Content	kg C per m2
Biogenic carbon content in product	0.13
Biogenic carbon content in accompanying packaging	0.13

Hazardous Materials
No regulated hazardous or dangerous substances are included in this product.

EPD Data Specificity

Primary Data Year: Jan 1, 2024 - Dec 31, 2025

Manufacturing Specificity:

- ✗ Industry Average
- ✗ Manufacturer Average
- ✓ Facility Specific

Averaging:

Averaging was not conducted for this EPD

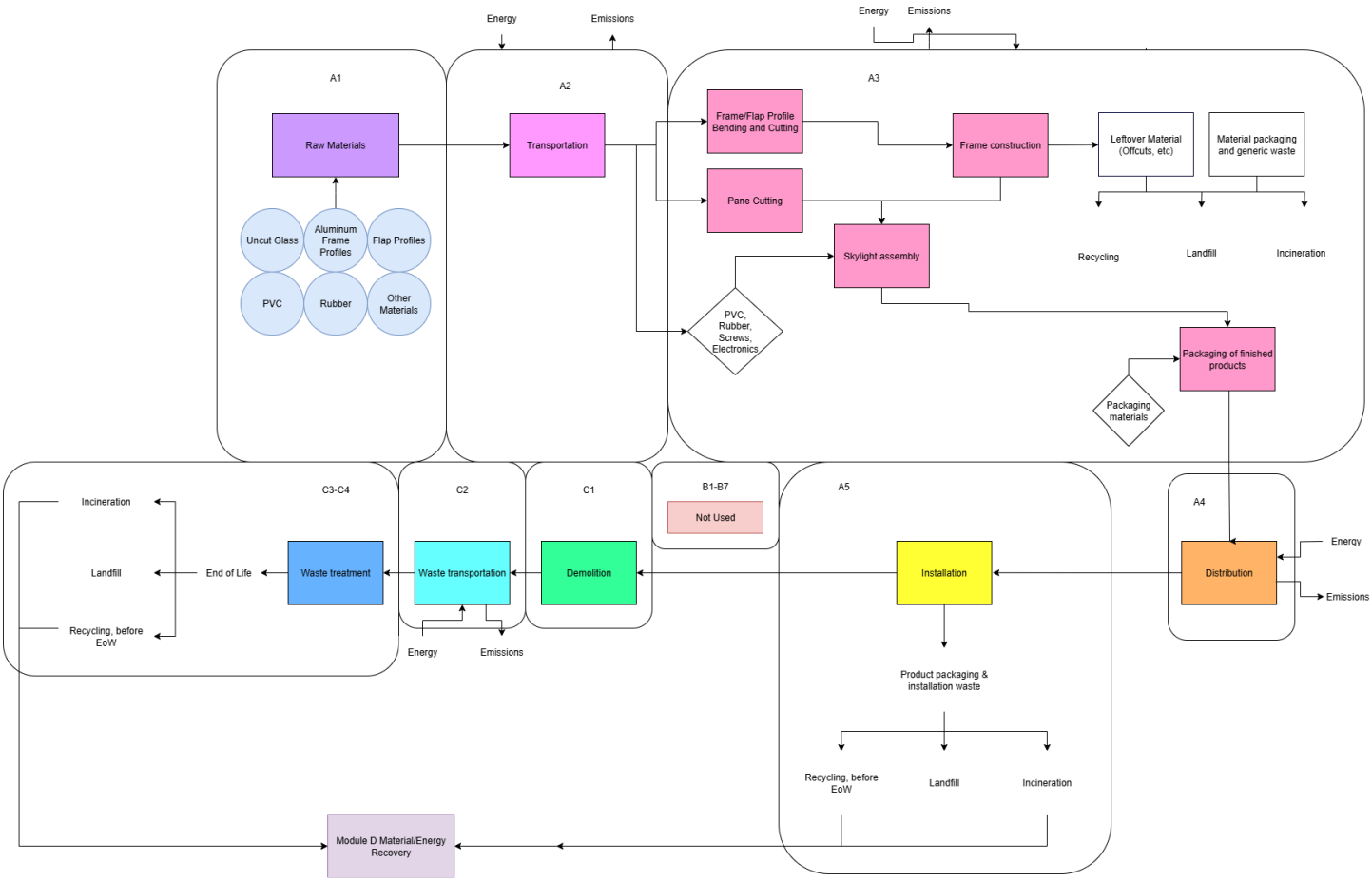
System Boundary

Production	A1	Raw material supply	✓
	A2	Transport	✓
	A3	Manufacturing	✓
Construction	A4	Transport to site	✓
	A5	Assembly / Install	✓
Use	B1	Use	ND
	B2	Maintenance	ND
	B3	Repair	ND
	B4	Replacement	ND
	B5	Refurbishment	ND
	B6	Operational Energy Use	ND
	B7	Operational Water Use	ND
End of Life	C1	Deconstruction	✓
	C2	Transport	✓
	C3	Waste Processing	✓
	C4	Disposal	ND
Benefits & Loads Beyond System Boundary	D	Recycling, Reuse Recovery Potential	✓

Plants

Opmeer, NL
De Veken 308, 1716 KJ

Product Flow Diagram



VELUX product manufacturing begins when flap profile parts, uncut glazing, aluminum or plastic profiles, vertical end pieces, and other small components such as screws and gaskets are bent, cut, welded, and assembled into complete flaps and skylight systems. If needed, extra components like DSL grids and electronic parts for home-automation systems are custom-cut and assembled to specification. Once manufacturing is finished, products are delivered to distribution centers and then transported to the end user by truck.

Software and Database

LCA Software:	SimaPro v. 9.5
LCI Foreground Database(s):	Ecoinvent v. 3.9.1
LCI Background Database(s):	Ecoinvent v. 3.9.1

Data Quality

Precision & Completeness

• **Precision:** Inventory data were directly measured, calculated, or conservatively estimated from primary sources using consistent units and QA checks. Background processes from ecoinvent v3 were adopted with their documented uncertainty/precision metadata where available, preserving a transparent record of data quality.

• **Completeness:** The product system's mass balance and inventory completeness were thoroughly checked. Some exclusions were made in line with the PCR requirements, such as personnel impacts, R&D activities, business travel, and point-of-sale infrastructure. However, no data were intentionally omitted.

Consistency and Reproducibility

• **Consistency:** Primary data for all modules were consistently gathered aiming at the highest level of detail possible. Background processes were modeled mainly with the ecoinvent database. The same allocation rules, cut-off criteria, and impact assessment methods were applied throughout, ensuring methodological coherence and consistent data quality across the entire LCA model.

• **Reproducibility:** This study ensures reproducibility by providing comprehensive disclosure of inputoutput data, dataset choices, and modeling approaches. A knowledgeable third party should be able to approximate the results using the same data and modeling methods.

Representativeness

• **Temporal:** Primary data were collected for a 12-month period representing the 2024 calendar year to ensure the representativeness of post-consumer content. Secondary data from the ecoinvent v3 database are typically representative of recent years.

• **Geographical:** Primary data represent VELUX's production facilities. Where applicable, differences in electric grid mix were considered using appropriate secondary data. The use of country-specific data ensures high geographical representativeness, and proxy data were only used when country-specific data were unavailable.

• **Technological:** Both primary and secondary data were tailored to the specific technologies studied, ensuring high technological representativeness.

Life Cycle Module Descriptions

Modules A1A3: The LCA model covers the manufacture of raw materials and components for VELUX products (A1) which are then transported to VELUX facilities by truck (A2). The manufacturing stage (A3) begins with receipt of these materials, which are bent, cut, welded, and assembled into finished flaps and skylight systems. When required, additional parts like DSL grids and electronic components for home-automation systems are custom-cut and assembled to order.

Modules A4A5: Once manufacture is completed, products are shipped to distribution centers and then to the end user by truck (A4). For installation (A5), a 3% material installation loss was assumed. This module includes disposal of that waste and of the product packaging.

Modules C1C4 and D: At end of life (C1C4), the product is assumed to be collected, and each waste stream (e.g., aluminum, glass, PVC) is handled separatelylandfilled, recycled, or incinerated with energy recovery. Loads and benefits beyond the system boundary are considered in Module D (e.g., displacement of virgin materials and electricity).

LCA Discussion

Allocation Procedure

Allocation of co-products was avoided, to the extent possible, based on the guidance given in ISO 14044:2006, 4.3, and in EN 15804+A2:2019. Energy use at the facility level was allocated by the amount of product produced. The manufacturing process does not consume water or generate wastewater or air emissions, other than those from fuel combustion. Solid waste was estimated using packaging masses and material losses and allocated following the polluter pays principle.

Cut-off Procedure

The system boundary was defined based on relevance to the goal of the study. For the raw material (A1) and process related inputs (A3), all available energy and material flow data have been included in the model.

Renewable Electricity

Energy Attribute Certificates (EACs) such as Renewable Energy Certificates (RECs) or Power Purchase Agreements (PPAs) are included in the baseline reported results:	✕ No

Scenarios

Transport to the building/construction site (A4)

A4 Module

Fuel Type:	Diesel
Vehicle Type:	Truck and Trailer
Transport Distance:	150 km
Capacity Utilization:	33 %
Packaging Mass:	1.113 kg
Weight of products transported:	106 kg
Capacity utilization volume factor:	1
Assumptions for scenario development:	Transport distance includes finished product to distribution center and distribution center to point of sale.

Installation in to the building/construction site (A5)

A5 Module

Installation Scrap Rate Assumed:	3 %
Product Lost per Declared/Functional Unit:	3.146 kg
Mass of Packaging Waste Specified by Type:	1.113 kg
Biogenic Carbon Contained in Packaging:	0.1281 kg
Assumptions for scenario development:	

End of Life (C1 - C4)

C1 - C4 Modules

Collection Process

Collected with Mixed Construction Waste:	104.9 kg

Recovery

Recycling:	31.26 kg
Landfill:	55.39 kg
Incineration:	18.21 kg

Reuse, Recovery and / or Recycling Potentials & Relevant Scenario Information (D)

D Module

Recycling Rate of Product:	0.2981 %
Recycled Content of Product:	0.08125 %
Net Energy Benefit from Material Flow Declared in C3 for Energy Recovery:	824 MJ

Results

Environmental Impact Assessment Results

EF 3.1

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Impact Category	Method	Unit	A1A2A3	A4	A5	C1	C2	C3	D
GWP-total	EF 3.1	kg CO2 eq	1.83e+2	1.50e-2	8.30e+0	0	9.86e-1	3.31e+1	-6.77e+1
GWP-biogenic	EF 3.1	kg CO2 eq	-1.43e+1	1.20e-5	1.77e-1	0	7.86e-4	1.45e+1	3.91e-1
GWP-fossil	EF 3.1	kg CO2 eq	1.97e+2	1.50e-2	8.12e+0	0	9.85e-1	1.86e+1	-6.80e+1
GWP-luluc	EF 3.1	kg CO2 eq	2.05e-1	7.33e-6	6.19e-3	0	4.80e-4	1.91e-4	-9.35e-2
ODP	EF 3.1	kg CFC11 eq	6.69e-6	3.41e-10	2.04e-7	0	2.24e-8	2.18e-8	-2.25e-6
AP	EF 3.1	mol H+ eq	1.35e+0	3.72e-5	4.12e-2	0	2.44e-3	5.86e-3	-4.61e-1
EP-freshwater	EF 3.1	kg P eq	4.68e-2	1.11e-6	1.42e-3	0	7.27e-5	1.24e-4	-1.59e-2
EP-marine	EF 3.1	kg N eq	2.50e-1	1.01e-5	7.87e-3	0	6.64e-4	3.28e-3	-7.87e-2
EP-terrestrial	EF 3.1	mol N eq	2.65e+0	1.04e-4	8.28e-2	0	6.82e-3	2.89e-2	-9.30e-1
POCP	EF 3.1	kg NMVOC eq	8.71e-1	6.07e-5	2.71e-2	0	3.98e-3	7.31e-3	-2.78e-1
ADP-minerals&metals	EF 3.1	kg Sb eq	1.66e-3	4.20e-8	5.01e-5	0	2.75e-6	1.17e-6	-1.33e-4
ADP-fossil	EF 3.1	MJ	2.84e+3	2.28e-1	8.65e+1	0	1.49e+1	4.86e+0	-8.07e+2
WDP	EF 3.1	m3 depriv.	6.65e+1	1.09e-3	2.09e+0	0	7.14e-2	7.18e-1	-8.72e+0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase when product performance and specifications have been established and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted. Any comparison of EPDs shall be subject to the requirements of ISO 21930 or EN 15804. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparison can be inaccurate, and could lead to erroneous selection of materials or products which are higher-impact, at least in some impact categories.

Resource Use Indicators

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

Indicator	Unit	A1A2A3	A4	A5	C1	C2	C3	D
PERE	MJ	5.43e+2	3.34e-3	1.63e+1	0	2.19e-1	1.75e-1	-1.53e+2
PERM	MJ	0	0	0	0	0	0	0
PERT	MJ	5.43e+2	3.34e-3	1.63e+1	0	2.19e-1	1.75e-1	-1.53e+2
PENRE	MJ	2.84e+3	2.28e-1	8.65e+1	0	1.49e+1	4.86e+0	-8.07e+2
PENRM	MJ	8.04e-1	9.62e-6	2.42e-2	0	6.30e-4	1.90e-4	-1.47e-1
PENRT	MJ	2.84e+3	2.28e-1	8.65e+1	0	1.49e+1	4.86e+0	-8.07e+2
SM	kg	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m3	1.91e+0	3.09e-5	6.04e-2	0	2.03e-3	2.42e-2	-3.20e-1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Waste and Output Flow Indicators

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

Indicator	Unit	A1A2A3	A4	A5	C1	C2	C3	D
HWD	kg	0	0	0	0	0	0	0
NHWD	kg	8.56e-1	0	1.84e+0	0	0	0	0
RWD	kg	3.67e-3	6.95e-8	1.11e-4	0	4.55e-6	2.16e-6	-8.25e-4
CRU	kg	0	0	0	0	0	0	0
MFR	kg	8.84e-1	0	1.12e+0	0	0	0	-3.23e+1
MER	kg	1.79e+0	0	1.39e+0	0	0	1.82e+1	-1.95e+1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Carbon Emissions and Removals

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

Indicator	Unit	A1A2A3	A4	A5	C1	C2	C3	D
Bio Carbon Removal from Product	kg C	-4.88e+0	0	-1.43e-1	0	0	0	0
Bio Carbon Emission from Product	kg C	1.26e-1	0	1.43e-1	0	0	4.51e+0	0
Bio Carbon Removal from Packaging	kg C	-3.82e-1	0	0	0	0	0	0
Bio Carbon Emission from Packaging	kg C	2.53e-1	0	1.28e-1	0	0	0	0
Bio Carbon Emission from Waste during Manufacturing (renewable source)	kg C	0	0	0	0	0	0	0
Calcination Carbon Removal	kg C	0	0	0	0	0	0	0
Carbonation Carbon Emission	kg C	0	0	0	0	0	0	0
Carbon Emission from Waste during Manufacturing (non-renewable source)	kg C	0	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

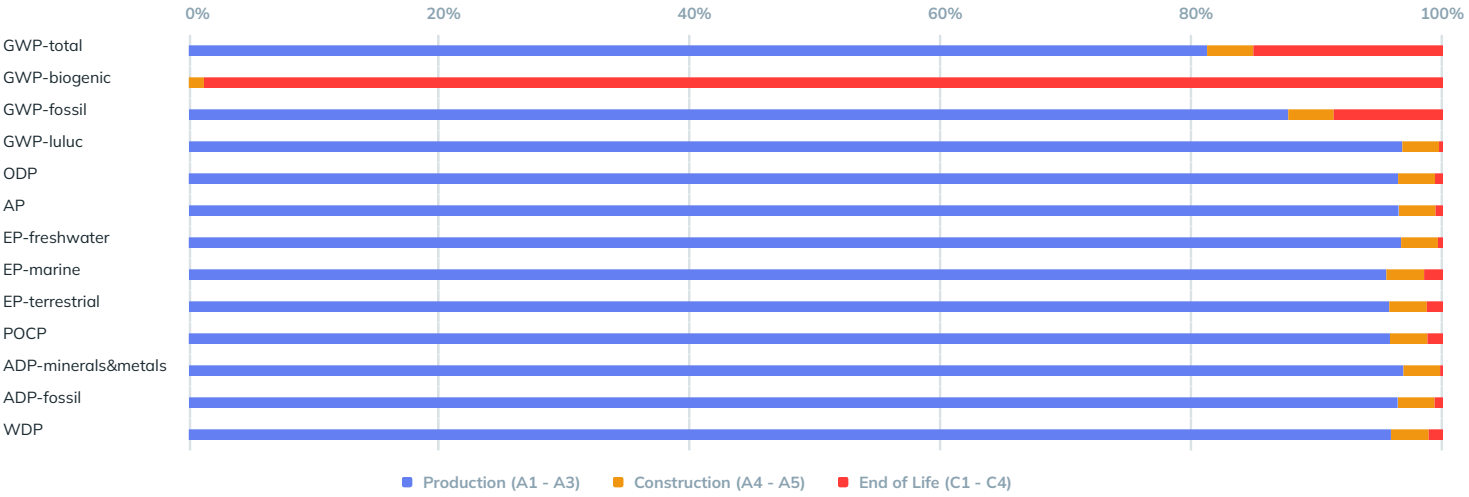
BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE = Calcination Carbon Emissions, CCR = Carbonation Carbon Removals, CWNR = Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes, GWP-luc = Carbon Emissions from Land-use Change.

Interpretation

• The manufacturing of the products in this analysis involves the direct procurement of raw materials from suppliers. These materials are then transported to manufacturing facilities in the EU where they are stored, processed, and combined to produce finished products. Notably, the product stage (stage 1) has the highest impact contribution, mainly attributed to the combined environmental impacts associated with raw material manufacturing and energy used in manufacturing the products.

• For products with significant manufacturing energy impacts, the shift to renewable energy sources is recommended.

• Given that the raw materials used in product manufacturing have a significant impact, exploration of opportunities to substitute these materials with alternatives that have a lower environmental impact. Additionally, consideration should be given to collaborating with suppliers who employ sustainable manufacturing techniques or integrate more renewable energy into their production processes. Such initiatives can lead to more environmentally friendly products and further enhance the sustainability of the products in this analysis.



Additional Environmental Information

None

Further Information

References

• Institut Bauen und Umwelt e.V. (IBU). (2021). General Programme Instructions for the IBU EPD Programme Part A: Calculation Rules for the LifeCycle Assessment and Requirements on the Background Report. Version 2.0, 01032021. Berlin: IBU.

• Institut Bauen und Umwelt e.V. (IBU). (2021). Product Category Rules for Construction Products Part B: Requirements on the EPD for Windows and Doors. Version 1.7, 082021. Berlin: IBU.

• European Committee for Standardization (CEN). (2019). EN 15804:2012+A2:2019 Sustainability of construction works Environmental product declarations Core rules for the product category of construction products. Brussels: CEN. (Including AC:2021)

• International Organization for Standardization (ISO). (2006). ISO 14040:2006 Environmental management Life cycle assessment Principles and framework. Geneva: ISO. (Amendment 1:2020; confirmed current 2022)

• International Organization for Standardization (ISO). (2006). ISO 14044:2006 Environmental management Life cycle assessment Requirements and guidelines. Geneva: ISO. (Amendments 1:2017 and 2:2020 included; confirmed current 2022)

• International Organization for Standardization (ISO). (2006). ISO 14025:2006 Environmental labels and declarations Type III environmental declarations Principles and procedures. Geneva: ISO

• Eurostat. (2024). Circular Economy indicators. Waste management: https://ec.europa.eu/eurostat/web/circular-economy/database

• Stichting National Environmental Database. (2022). Environmental Performance Assessment Method for Construction Works. version 1.1.

• European Committee for Standardization (CEN). (2019). EN 17074:2019 Sustainability of construction works Environmental product declarations Specific core rules for windows and doors. Brussels: CEN.

Environmental Product Declaration

IN ACCORDANCE WITH ISO 14025 AND EN 15804+A2

Program Operator: Smart EPD®
www.smartepd.com

Modular Rooflights Linearlight DG

Date of Issue	Expiration date	Last updated
Jul 28, 2025	**Jul 28, 2030**	**Jul 28, 2025**

Refer to the EPD Library at www.smartepd.com for the latest EPD listing information

General Information

VELUX

Ådalsvej 99, 2970 Hørsholm, Denmark

+45 45164000

birthe.kjeldsen@velux.com velux.com

Product Name:	Modular Rooflights Linearlight DG
Declared Unit:	1 m2 of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m)
Declaration Number:	SmartEPD-2025-001-0557-01
Date of Issue:	July 28, 2025
Expiration:	July 28, 2030
Last updated:	July 28, 2025
EPD Scope:	Cradle to gate with other options A1 - A3, A4, A5, C1 - C4, D
Market(s) of Applicability:	Europe

General Organization Information

VELUX is a Danish manufacturing company that specializes in roof windows, skylights, sun tunnels and related accessories. The company is headquartered in Hrsholm, Denmark and is a part of VKR Holding A/S. VELUX Group is a founding partner of the global Active House Alliance.
Further information can be found at: https://www.velux.com

Limitations, Liability, and Ownership

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the whole building life cycle. EPD comparability is only possible when all stages of a life cycle have been considered. However, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared. The EPD owner has sole ownership, liability, and responsibility for the EPD.

Reference Standards

Standard(s):	ISO 14025 and EN 15804+A2
Core PCR:	IBU PCR for Building-Related Products and Services Part A v1.4 v.1.4 Date of issue: April 15, 2024
Sub-category PCR:	IBU Part B: Requirements on the EPD for Windows and Doors v.1.0/1.7/1.4 Date of issue: January 25, 2021 Valid until: January 25, 2026

Sub-category PCR review panel:	Contact Smart EPD for more information.
General Program Instructions:	Smart EPD General Program Instructions v.1.0, November 2022

Verification Information

LCA Author/Creator:	Juan David Villegas | juan@parqhq.com
EPD Program Operator:	Smart EPD | info@smartepd.com | www.smartepd.com 585 Grove St., Ste. 145 PMB 966, Herndon, VA 20170, USA
Verification:	Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071: External Rifat Karim | Independent Consultant | rifat.chimique@gmail.com Independent external verification of EPD, according to ISO 14025 and reference PCR(s): External Rifat Karim | Independent Consultant | rifat.chimique@gmail.com

Product Information

Declared Unit:	1 m2 of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m)
Mass:	88.8939 kg
Reference Service Life:	30 Years
Product Specificity:	✗ Product Average ✓ Product Specific

Product Description

A row of connected bespoke flat glass rooflights with option to design wide, uninterrupted daylight sources. Prefabricated top unit with double glazing unit and wooden upstand available min fixed or venting versions.
Further information can be found at: https://commercial.velux.co.uk/products/domes-rooflights-and-flat-glass-rooflights/modular-rooflights/solutions/linearlight

Product Specifications

Product Classification Codes:	EC3 - Openings -> TranslucentWallAndRoofAssemblies

Material Composition

Material/Component Category	Origin	% Mass
Blind rivets, nuts , screws, plates	DNK	2.0
Gaskets, washers	DEU, POL, DNK	3.05
Glazing	LTU	75.36
Profiles, support brackets, tubes and strips	DNK	8.61
Upstand	NLD, POL, DNK	10.97

Packaging Material	Origin	kg Mass
Cardboard		0.14
Pallet		0.09
Plastic cover		0.71

Biogenic Carbon Content	kg C per m2
Biogenic carbon content in product	0.09
Biogenic carbon content in accompanying packaging	0.11

Hazardous Materials
No regulated hazardous or dangerous substances are included in this product.

EPD Data Specificity

Primary Data Year: Jan 1, 2024 - Dec 31, 2024

Manufacturing Specificity:

- ✗ Industry Average
- ✗ Manufacturer Average
- ✓ Facility Specific

Averaging:

Averaging was not conducted for this EPD

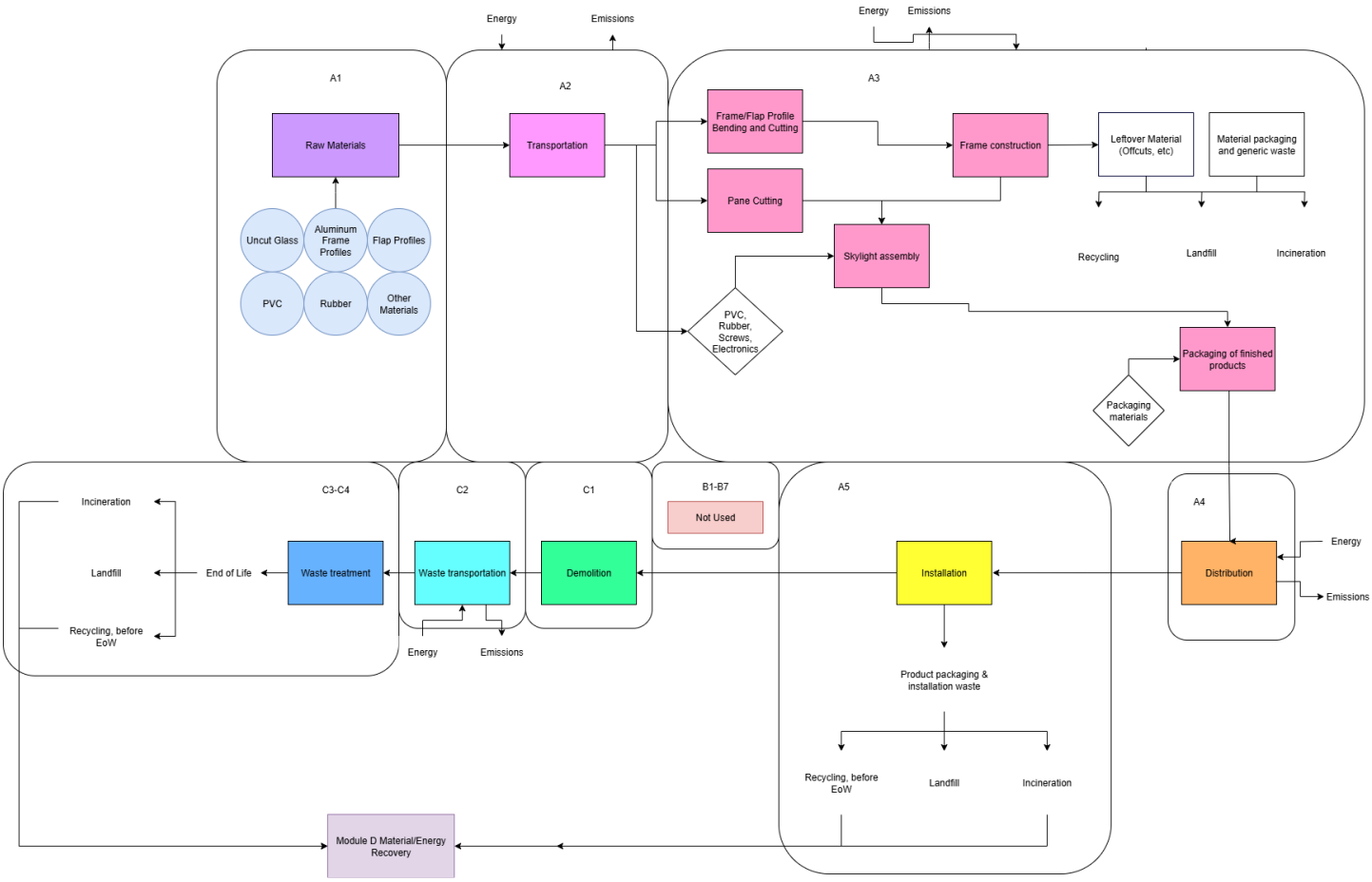
System Boundary

Production	A1	Raw material supply	✓
	A2	Transport	✓
	A3	Manufacturing	✓
Construction	A4	Transport to site	✓
	A5	Assembly / Install	✓
Use	B1	Use	ND
	B2	Maintenance	ND
	B3	Repair	ND
	B4	Replacement	ND
	B5	Refurbishment	ND
	B6	Operational Energy Use	ND
	B7	Operational Water Use	ND
End of Life	C1	Deconstruction	✓
	C2	Transport	✓
	C3	Waste Processing	✓
	C4	Disposal	✓
Benefits & Loads Beyond System Boundary	D	Recycling, Reuse Recovery Potential	✓

Plants

Opmeer, NL
De Veken 308, 1716 KJ

Product Flow Diagram



VELUX product manufacturing begins when flap profile parts, uncut glazing, aluminum or plastic profiles, vertical end pieces, and other small components such as screws and gaskets are bent, cut, welded, and assembled into complete flaps and skylight systems. If needed, extra components like DSL grids and electronic parts for home-automation systems are custom-cut and assembled to specification. Once manufacturing is finished, products are delivered to distribution centers and then transported to the end user by truck.

Software and Database

LCA Software:	SimaPro v. 9.5
LCI Foreground Database(s):	Ecoinvent v. 3.9.1
LCI Background Database(s):	Ecoinvent v. 3.9.1

Data Quality

Precision & Completeness

• **Precision:** Inventory data were directly measured, calculated, or conservatively estimated from primary sources using consistent units and QA checks. Background processes from ecoinvent v3 were adopted with their documented uncertainty/precision metadata where available, preserving a transparent record of data quality.

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• **Reproducibility:** This study ensures reproducibility by providing comprehensive disclosure of inputoutput data, dataset choices, and modeling approaches. A knowledgeable third party should be able to approximate the results using the same data and modeling methods.

Representativeness

• **Temporal:** Primary data were collected for a 12-month period representing the 2024 calendar year to ensure the representativeness of post-consumer content. Secondary data from the ecoinvent v3 database are typically representative of recent years.

• **Geographical:** Primary data represent VELUX's production facilities. Where applicable, differences in electric grid mix were considered using appropriate secondary data. The use of country-specific data ensures high geographical representativeness, and proxy data were only used when country-specific data were unavailable.

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LCA Discussion

Allocation Procedure

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Cut-off Procedure

The system boundary was defined based on relevance to the goal of the study. For the raw material (A1) and process related inputs (A3), all available energy and material flow data have been included in the model.

Renewable Electricity

Energy Attribute Certificates (EACs) such as Renewable Energy Certificates (RECs) or Power Purchase Agreements (PPAs) are included in the baseline reported results:	✕ No

Scenarios

Transport to the building/construction site (A4)

A4 Module

Fuel Type:	Diesel
Vehicle Type:	Truck and Trailer
Transport Distance:	150 km
Capacity Utilization:	33 %
Packaging Mass:	0.9431 kg
Weight of products transported:	89.84 kg
Capacity utilization volume factor:	1
Assumptions for scenario development:	Transport distance includes finished product to distribution center and distribution center to point of sale.

Installation in to the building/construction site (A5)

A5 Module

Installation Scrap Rate Assumed:	3 %
Product Lost per Declared/Functional Unit:	2.667 kg
Mass of Packaging Waste Specified by Type:	0.9431 kg
Biogenic Carbon Contained in Packaging:	0.1086 kg
Assumptions for scenario development:	

End of Life (C1 - C4)

C1 - C4 Modules

Collection Process

Collected with Mixed Construction Waste:	88.89 kg

Recovery

Recycling:	30.7 kg
Landfill:	46.94 kg
Incineration:	11.25 kg

Reuse, Recovery and / or Recycling Potentials & Relevant Scenario Information (D)

D Module

Recycling Rate of Product:	0.3454 %
Recycled Content of Product:	0.08971 %
Net Energy Benefit from Material Flow Declared in C3 for Energy Recovery:	521.1 MJ
Further assumptions for scenario development:	Energy recovery from incineration assumes 18% electrical efficiency and 31% thermal

Results

Environmental Impact Assessment Results

EF 3.1

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Impact Category	Method	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
GWP-total	EF 3.1	kg CO2 eq	1.57e+2	1.50e-2	6.85e+0	0	7.94e-1	1.96e+1	1.70e-1	-6.37e+1
GWP-biogenic	EF 3.1	kg CO2 eq	-8.35e+0	1.20e-5	2.09e-1	0	6.33e-4	1.05e+1	3.19e-2	3.76e-1
GWP-fossil	EF 3.1	kg CO2 eq	1.66e+2	1.50e-2	6.64e+0	0	7.93e-1	9.14e+0	1.38e-1	-6.39e+1
GWP-luluc	EF 3.1	kg CO2 eq	1.77e-1	7.33e-6	5.34e-3	0	3.87e-4	1.00e-4	1.92e-5	-9.64e-2
ODP	EF 3.1	kg CFC11 eq	4.41e-6	3.41e-10	1.35e-7	0	1.80e-8	1.13e-8	2.11e-9	-1.67e-6
AP	EF 3.1	mol H+ eq	1.12e+0	3.72e-5	3.42e-2	0	1.96e-3	3.24e-3	1.24e-3	-4.49e-1
EP-freshwater	EF 3.1	kg P eq	3.91e-2	1.11e-6	1.18e-3	0	5.85e-5	7.63e-5	7.66e-6	-1.73e-2
EP-marine	EF 3.1	kg N eq	2.05e-1	1.01e-5	6.44e-3	0	5.35e-4	1.80e-3	6.82e-4	-7.67e-2
EP-terrestrial	EF 3.1	mol N eq	2.28e+0	1.04e-4	7.10e-2	0	5.49e-3	1.60e-2	5.99e-3	-8.88e-1
POCP	EF 3.1	kg NMVOC eq	7.33e-1	6.07e-5	2.27e-2	0	3.20e-3	4.06e-3	1.82e-3	-2.71e-1
ADP-minerals&metals	EF 3.1	kg Sb eq	1.48e-3	4.20e-8	4.47e-5	0	2.22e-6	6.33e-7	5.71e-8	-1.36e-4
ADP-fossil	EF 3.1	MJ	2.28e+3	2.28e-1	6.94e+1	0	1.20e+1	2.67e+0	1.80e+0	-7.32e+2
WDP	EF 3.1	m3 depriv.	5.01e+1	1.09e-3	1.58e+0	0	5.75e-2	3.23e-1	7.87e-3	-8.65e+0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase when product performance and specifications have been established and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted. Any comparison of EPDs shall be subject to the requirements of ISO 21930 or EN 15804. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparison can be inaccurate, and could lead to erroneous selection of materials or products which are higher-impact, at least in some impact categories.

Resource Use Indicators

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

Indicator	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	4.13e+2	3.34e-3	1.24e+1	0	1.76e-1	9.30e-2	1.59e-2	-1.30e+2
PERM	MJ	0	0	0	0	0	0	0	0
PERT	MJ	4.13e+2	3.34e-3	1.24e+1	0	1.76e-1	9.30e-2	1.59e-2	-1.30e+2
PENRE	MJ	2.28e+3	2.28e-1	6.94e+1	0	1.20e+1	2.67e+0	1.80e+0	-7.32e+2
PENRM	MJ	6.73e-1	9.62e-6	2.02e-2	0	5.07e-4	1.02e-4	2.32e-5	-1.54e-1
PENRT	MJ	2.28e+3	2.28e-1	6.94e+1	0	1.20e+1	2.67e+0	1.80e+0	-7.32e+2
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m3	1.48e+0	3.09e-5	4.68e-2	0	1.63e-3	1.13e-2	1.89e-4	-3.33e-1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Waste and Output Flow Indicators

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

Indicator	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	0	0	0	0	0	0	0	0
NHWD	kg	6.54e-1	0	1.56e+0	0	0	0	4.66e+1	0
RWD	kg	3.13e-3	6.95e-8	9.43e-5	0	3.67e-6	1.14e-6	2.33e-7	-8.62e-4
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	3.62e-1	0	1.06e+0	0	0	0	3.07e+1	-3.18e+1
MER	kg	1.44e+0	0	1.05e+0	0	0	1.12e+1	0	-1.23e+1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Carbon Emissions and Removals

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

Indicator	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
Bio Carbon Removal from Product	kg C	-3.66e+0	0	-1.07e-1	0	0	0	0	0
Bio Carbon Emission from Product	kg C	9.48e-2	0	1.07e-1	0	0	3.39e+0	1.78e-1	0
Bio Carbon Removal from Packaging	kg C	-1.70e-1	0	0	0	0	0	0	0
Bio Carbon Emission from Packaging	kg C	6.10e-2	0	1.09e-1	0	0	0	0	0
Bio Carbon Emission from Waste during Manufac-turing (renewable source)	kg C	0	0	0	0	0	0	0	0
Calcination Carbon Re-moval	kg C	0	0	0	0	0	0	0	0
Carbonation Carbon Emission	kg C	0	0	0	0	0	0	0	0
Carbon Emission from Waste during Manu-facturing (non-renewable source)	kg C	0	0	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

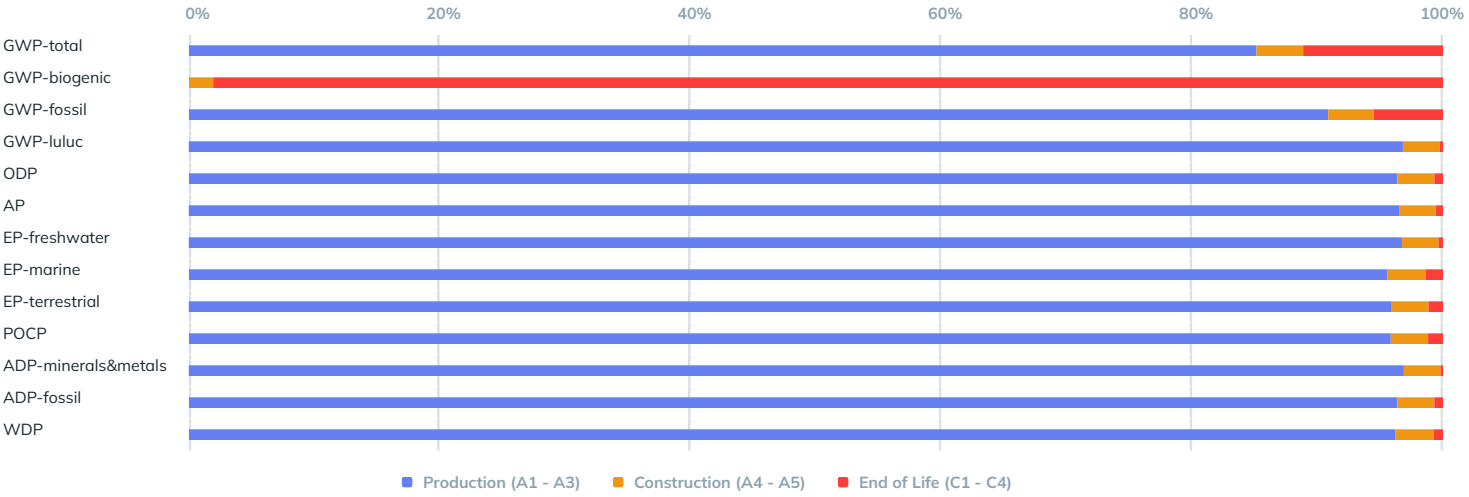
BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE = Calcination Carbon Emissions, CCR = Carbonation Carbon Removals, CWNR = Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes, GWP-luc = Carbon Emissions from Land-use Change.

Interpretation

• The manufacturing of the products in this analysis involves the direct procurement of raw materials from suppliers. These materials are then transported to manufacturing facilities in the EU where they are stored, processed, and combined to produce finished products. Notably, the product stage (stage 1) has the highest impact contribution, mainly attributed to the combined environmental impacts associated with raw material manufacturing and energy used in manufacturing the products.

• For products with significant manufacturing energy impacts, the shift to renewable energy sources is recommended.

• Given that the raw materials used in product manufacturing have a significant impact, exploration of opportunities to substitute these materials with alternatives that have a lower environmental impact. Additionally, consideration should be given to collaborating with suppliers who employ sustainable manufacturing techniques or integrate more renewable energy into their production processes. Such initiatives can lead to more environmentally friendly products and further enhance the sustainability of the products in this analysis.



Additional Environmental Information

None

Further Information

Name	Unit	Value
Heat transfer coefficient glass acc. to EN 674 / EN 675	W/(m²K)	1.1
Heat transfer coefficient window acc. to EN 674 / EN 675	W/(m²K)	1.4 or 1.7
Total energy transmittance	%	61
Joint permeability coefficient acc. to EN 1026	m³/mh	< 2.6
Water tightness acc. EN 12208 unprotected / protected	class	E1200
Deflection as a result of wind loads acc. to EN 12211	mm	< L/300
Fire resistance class (for fire windows and doors) DIN EN 16341	class	N/A (REI30 for HFS variant)
Mounting type (sealing system)	–	Factory timber-EPS upstand
Noise protection against external noise acc. DIN EN ISO 10140 and DIN EN ISO 717	dB	~32
Air permeability acc. EN 12207	class	Class 4
Resistance against wind loads acc. DIN EN 12211	mm	C5
Radiation properties acc. EN 410 or 133631 and 2: Total energy transmittance g	%	61
Radiation properties EN 410 or 133631 and 2: Light transmisson level rv	%	80
Reaction to fire	class	B-s1,d0

References

• Institut Bauen und Umwelt e.V. (IBU). (2021). General Programme Instructions for the IBU EPD Programme Part A: Calculation Rules for the LifeCycle Assessment and Requirements on the Background Report. Version 2.0, 01032021. Berlin: IBU.

• Institut Bauen und Umwelt e.V. (IBU). (2021). Product Category Rules for Construction Products Part B: Requirements on the EPD for Windows and Doors. Version 1.7, 082021. Berlin: IBU.

• European Committee for Standardization (CEN). (2019). EN 15804:2012+A2:2019 Sustainability of construction works Environmental product declarations Core rules for the product category of construction products. Brussels: CEN. (Including AC:2021)

• International Organization for Standardization (ISO). (2006). ISO 14040:2006 Environmental management Life cycle assessment Principles and framework. Geneva: ISO. (Amendment 1:2020; confirmed current 2022)

• International Organization for Standardization (ISO). (2006). ISO 14044:2006 Environmental management Life cycle assessment Requirements and guidelines. Geneva: ISO. (Amendments 1:2017 and 2:2020 included; confirmed current 2022)

• International Organization for Standardization (ISO). (2006). ISO 14025:2006 Environmental labels and declarations Type III environmental declarations Principles and procedures. Geneva: ISO

• Eurostat. (2024). Circular Economy indicators. Waste management: https://ec.europa.eu/eurostat/web/circular-economy/database

• Stichting National Environmental Database. (2022). Environmental Performance Assessment Method for Construction Works. version 1.1.

• European Committee for Standardization (CEN). (2019). EN 17074:2019 Sustainability of construction works Environmental product declarations Specific core rules for windows and doors. Brussels: CEN.

Environmental Product Declaration

IN ACCORDANCE WITH ISO 14025 AND EN 15804+A2

Program Operator: Smart EPD®
www.smartepd.com

Modular Rooflights Linearlight TG

Date of Issue	Expiration date	Last updated
Jul 28, 2025	**Jul 28, 2030**	**Jul 28, 2025**

Refer to the EPD Library at www.smartepd.com for the latest EPD listing information

General Information

VELUX

Ådalsvej 99, 2970 Hørsholm, Denmark

+45 45164000

birthe.kjeldsen@velux.com velux.com

Product Name:	Modular Rooflights Linearlight TG
Declared Unit:	1 m2 of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m)
Declaration Number:	SmartEPD-2025-001-0556-01
Date of Issue:	July 28, 2025
Expiration:	July 28, 2030
Last updated:	July 28, 2025
EPD Scope:	Cradle to gate with other options A1 - A3, A4, A5, C1 - C4, D
Market(s) of Applicability:	Europe

General Organization Information

VELUX is a Danish manufacturing company that specializes in roof windows, skylights, sun tunnels and related accessories. The company is headquartered in Hrsholm, Denmark and is a part of VKR Holding A/S. VELUX Group is a founding partner of the global Active House Alliance.
Further information can be found at: https://www.velux.com

Limitations, Liability, and Ownership

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the whole building life cycle. EPD comparability is only possible when all stages of a life cycle have been considered. However, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared. The EPD owner has sole ownership, liability, and responsibility for the EPD.

Reference Standards

Standard(s):	ISO 14025 and EN 15804+A2
Core PCR:	IBU PCR for Building-Related Products and Services Part A v1.4 v.1.4 Date of issue: April 15, 2024
Sub-category PCR:	IBU Part B: Requirements on the EPD for Windows and Doors v.1.0/1.7/1.4 Date of issue: January 25, 2021 Valid until: January 25, 2026

Sub-category PCR review panel:	Contact Smart EPD for more information.
General Program Instructions:	Smart EPD General Program Instructions v.1.0, November 2022

Verification Information

LCA Author/Creator:	Juan David Villegas | juan@parqhq.com
EPD Program Operator:	Smart EPD | info@smartepd.com | www.smartepd.com 585 Grove St., Ste. 145 PMB 966, Herndon, VA 20170, USA
Verification:	Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071: External Rifat Karim | Independent Consultant | rifat.chimique@gmail.com Independent external verification of EPD, according to ISO 14025 and reference PCR(s): External Rifat Karim | Independent Consultant | rifat.chimique@gmail.com

Product Information

Declared Unit:	1 m2 of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m)
Mass:	122.8648 kg
Reference Service Life:	30 Years
Product Specificity:	✗ Product Average ✓ Product Specific

Product Description

A row of connected bespoke flat glass rooflights with option to design wide, uninterrupted daylight sources. Prefabricated top unit with triple glazing unit and wooden upstand available min fixed or venting versions.
Further information can be found at: https://commercial.velux.co.uk/products/domes-rooflights-and-flat-glass-rooflights/modular-rooflights/solutions/linearlight

Product Specifications

Product Classification Codes:	EC3 - Openings -> TranslucentWallAndRoofAssemblies

Material Composition

Material/Component Category	Origin	% Mass
Blind rivets, nuts , screws, plates	DNK	2.12
Gaskets, washers	DEU, POL, DNK	2.6
Glazing	LTU	80.92
Profiles, support brackets, tubes and strips	DNK	6.23
Upstand	NLD, POL, DNK	8.13

Packaging Material	Origin	kg Mass
Cardboard		0.2
Pallet		0.12
Plastic cover		0.98

Biogenic Carbon Content	kg C per m2
Biogenic carbon content in product	0.1
Biogenic carbon content in accompanying packaging	0.15

Hazardous Materials
No regulated hazardous or dangerous substances are included in this product.

EPD Data Specificity

Primary Data Year: Jan 1, 2024 - Dec 31, 2024

Manufacturing Specificity:

- ✗ Industry Average
- ✗ Manufacturer Average
- ✓ Facility Specific

Averaging:

Averaging was not conducted for this EPD

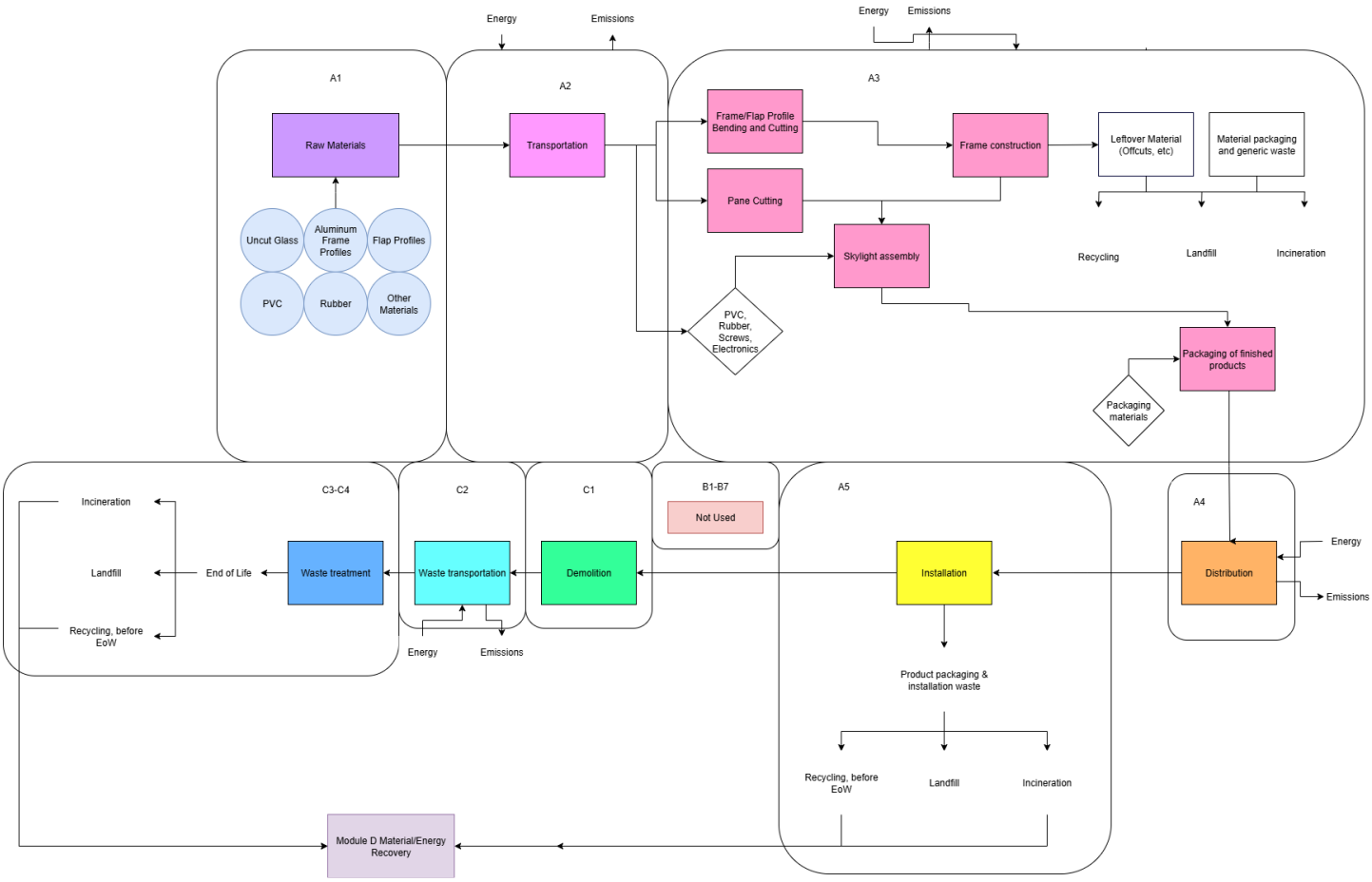
System Boundary

Production	A1	Raw material supply	✓
	A2	Transport	✓
	A3	Manufacturing	✓
Construction	A4	Transport to site	✓
	A5	Assembly / Install	✓
Use	B1	Use	ND
	B2	Maintenance	ND
	B3	Repair	ND
	B4	Replacement	ND
	B5	Refurbishment	ND
	B6	Operational Energy Use	ND
	B7	Operational Water Use	ND
End of Life	C1	Deconstruction	✓
	C2	Transport	✓
	C3	Waste Processing	✓
	C4	Disposal	✓
Benefits & Loads Beyond System Boundary	D	Recycling, Reuse Recovery Potential	✓

Plants

Opmeer, NL
De Veken 308, 1716 KJ

Product Flow Diagram



VELUX product manufacturing begins when flap profile parts, uncut glazing, aluminum or plastic profiles, vertical end pieces, and other small components such as screws and gaskets are bent, cut, welded, and assembled into complete flaps and skylight systems. If needed, extra components like DSL grids and electronic parts for home-automation systems are custom-cut and assembled to specification. Once manufacturing is finished, products are delivered to distribution centers and then transported to the end user by truck.

Software and Database

LCA Software:	SimaPro v. 9.5
LCI Foreground Database(s):	Ecoinvent v. 3.9.1
LCI Background Database(s):	Ecoinvent v. 3.9.1

Data Quality

Precision & Completeness

• **Precision:** Inventory data were directly measured, calculated, or conservatively estimated from primary sources using consistent units and QA checks. Background processes from ecoinvent v3 were adopted with their documented uncertainty/precision metadata where available, preserving a transparent record of data quality.

• **Completeness:** The product system's mass balance and inventory completeness were thoroughly checked. Some exclusions were made in line with the PCR requirements, such as personnel impacts, R&D activities, business travel, and point-of-sale infrastructure. However, no data were intentionally omitted.

Consistency and Reproducibility

• **Consistency:** Primary data for all modules were consistently gathered aiming at the highest level of detail possible. Background processes were modeled mainly with the ecoinvent database. The same allocation rules, cut-off criteria, and impact assessment methods were applied throughout, ensuring methodological coherence and consistent data quality across the entire LCA model.

• **Reproducibility:** This study ensures reproducibility by providing comprehensive disclosure of inputoutput data, dataset choices, and modeling approaches. A knowledgeable third party should be able to approximate the results using the same data and modeling methods.

Representativeness

• **Temporal:** Primary data were collected for a 12-month period representing the 2024 calendar year to ensure the representativeness of post-consumer content. Secondary data from the ecoinvent v3 database are typically representative of recent years.

• **Geographical:** Primary data represent VELUX's production facilities. Where applicable, differences in electric grid mix were considered using appropriate secondary data. The use of country-specific data ensures high geographical representativeness, and proxy data were only used when country-specific data were unavailable.

• **Technological:** Both primary and secondary data were tailored to the specific technologies studied, ensuring high technological representativeness.

Life Cycle Module Descriptions

Modules A1A3: The LCA model covers the manufacture of raw materials and components for VELUX products (A1) which are then transported to VELUX facilities by truck (A2). The manufacturing stage (A3) begins with receipt of these materials, which are bent, cut, welded, and assembled into finished flaps and skylight systems. When required, additional parts like DSL grids and electronic components for home-automation systems are custom-cut and assembled to order.

Modules A4A5: Once manufacture is completed, products are shipped to distribution centers and then to the end user by truck (A4). For installation (A5), a 3% material installation loss was assumed. This module includes disposal of that waste and of the product packaging.

Modules C1C4 and D: At end of life (C1C4), the product is assumed to be collected, and each waste stream (e.g., aluminum, glass, PVC) is handled separatelylandfilled, recycled, or incinerated with energy recovery. Loads and benefits beyond the system boundary are considered in Module D (e.g., displacement of virgin materials and electricity).

LCA Discussion

Allocation Procedure

Allocation of co-products was avoided, to the extent possible, based on the guidance given in ISO 14044:2006, 4.3, and in EN 15804+A2:2019. Energy use at the facility level was allocated by the amount of product produced. The manufacturing process does not consume water or generate wastewater or air emissions, other than those from fuel combustion. Solid waste was estimated using packaging masses and material losses and allocated following the polluter pays principle.

Cut-off Procedure

The system boundary was defined based on relevance to the goal of the study. For the raw material (A1) and process related inputs (A3), all available energy and material flow data have been included in the model.

Renewable Electricity

Energy Attribute Certificates (EACs) such as Renewable Energy Certificates (RECs) or Power Purchase Agreements (PPAs) are included in the baseline reported results:	✕ No

Scenarios

Transport to the building/construction site (A4)

A4 Module

Fuel Type:	Diesel
Vehicle Type:	Truck and Trailer
Transport Distance:	150 km
Capacity Utilization:	33 %
Packaging Mass:	1.304 kg
Weight of products transported:	124.2 kg
Capacity utilization volume factor:	1
Assumptions for scenario development:	Transport distance includes finished product to distribution center and distribution center to point of sale.

Installation in to the building/construction site (A5)

A5 Module

Installation Scrap Rate Assumed:	3 %
Product Lost per Declared/Functional Unit:	3.686 kg
Mass of Packaging Waste Specified by Type:	1.304 kg
Biogenic Carbon Contained in Packaging:	0.1501 kg
Assumptions for scenario development:	

End of Life (C1 - C4)

C1 - C4 Modules

Collection Process

Collected with Mixed Construction Waste:	122.9 kg

Recovery

Recycling:	40.99 kg
Landfill:	69.95 kg
Incineration:	11.93 kg

Reuse, Recovery and / or Recycling Potentials & Relevant Scenario Information (D)

D Module

Recycling Rate of Product:	0.3336 %
Recycled Content of Product:	0.09721 %
Net Energy Benefit from Material Flow Declared in C3 for Energy Recovery:	593.5 MJ
Further assumptions for scenario development:	Energy recovery from incineration assumes 18% electrical efficiency and 31% thermal

Results

Environmental Impact Assessment Results

EF 3.1

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Impact Category	Method	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
GWP-total	EF 3.1	kg CO2 eq	2.07e+2	1.50e-2	8.99e+0	0	1.09e+0	2.12e+1	2.36e-1	-7.58e+1
GWP-biogenic	EF 3.1	kg CO2 eq	-8.10e+0	1.20e-5	2.75e-1	0	8.66e-4	1.06e+1	3.22e-2	5.10e-1
GWP-fossil	EF 3.1	kg CO2 eq	2.15e+2	1.50e-2	8.71e+0	0	1.08e+0	1.06e+1	2.04e-1	-7.62e+1
GWP-luluc	EF 3.1	kg CO2 eq	1.97e-1	7.33e-6	5.94e-3	0	5.29e-4	1.12e-4	2.71e-5	-9.94e-2
ODP	EF 3.1	kg CFC11 eq	6.22e-6	3.41e-10	1.90e-7	0	2.46e-8	1.28e-8	3.10e-9	-1.71e-6
AP	EF 3.1	mol H+ eq	1.50e+0	3.72e-5	4.57e-2	0	2.69e-3	3.59e-3	1.83e-3	-5.56e-1
EP-freshwater	EF 3.1	kg P eq	4.59e-2	1.11e-6	1.39e-3	0	8.01e-5	8.11e-5	1.10e-5	-1.92e-2
EP-marine	EF 3.1	kg N eq	2.70e-1	1.01e-5	8.49e-3	0	7.32e-4	2.00e-3	9.50e-4	-9.40e-2
EP-terrestrial	EF 3.1	mol N eq	3.05e+0	1.04e-4	9.48e-2	0	7.51e-3	1.77e-2	8.89e-3	-1.10e+0
POCP	EF 3.1	kg NMVOC eq	9.66e-1	6.07e-5	2.99e-2	0	4.39e-3	4.49e-3	2.69e-3	-3.33e-1
ADP-minerals&metals	EF 3.1	kg Sb eq	1.75e-3	4.20e-8	5.27e-5	0	3.03e-6	7.05e-7	8.08e-8	-2.02e-4
ADP-fossil	EF 3.1	MJ	2.90e+3	2.28e-1	8.82e+1	0	1.65e+1	2.95e+0	2.65e+0	-8.61e+2
WDP	EF 3.1	m3 depriv.	6.45e+1	1.09e-3	2.03e+0	0	7.86e-2	3.90e-1	9.78e-3	-1.15e+1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase when product performance and specifications have been established and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted. Any comparison of EPDs shall be subject to the requirements of ISO 21930 or EN 15804. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparison can be inaccurate, and could lead to erroneous selection of materials or products which are higher-impact, at least in some impact categories.

Resource Use Indicators

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

Indicator	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	4.48e+2	3.34e-3	1.35e+1	0	2.41e-1	1.04e-1	2.28e-2	-1.40e+2
PERM	MJ	0	0	0	0	0	0	0	0
PERT	MJ	4.48e+2	3.34e-3	1.35e+1	0	2.41e-1	1.04e-1	2.28e-2	-1.40e+2
PENRE	MJ	2.90e+3	2.28e-1	8.82e+1	0	1.65e+1	2.96e+0	2.65e+0	-8.62e+2
PENRM	MJ	7.82e-1	9.62e-6	2.35e-2	0	6.94e-4	1.14e-4	3.31e-5	-1.77e-1
PENRT	MJ	2.90e+3	2.28e-1	8.82e+1	0	1.65e+1	2.96e+0	2.65e+0	-8.61e+2
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m3	1.87e+0	3.09e-5	5.93e-2	0	2.23e-3	1.34e-2	2.35e-4	-4.15e-1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Waste and Output Flow Indicators

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

Indicator	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	0	0	0	0	0	0	0	0
NHWD	kg	9.62e-1	0	2.31e+0	0	0	0	6.96e+1	0
RWD	kg	3.66e-3	6.95e-8	1.10e-4	0	5.02e-6	1.29e-6	3.33e-7	-9.71e-4
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	6.07e-1	0	1.43e+0	0	0	0	4.10e+1	-4.24e+1
MER	kg	1.98e+0	0	1.34e+0	0	0	1.19e+1	0	-1.32e+1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Carbon Emissions and Removals

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

Indicator	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
Bio Carbon Removal from Product	kg C	-3.69e+0	0	-1.08e-1	0	0	0	0	0
Bio Carbon Emission from Product	kg C	9.56e-2	0	1.08e-1	0	0	3.41e+0	1.80e-1	0
Bio Carbon Removal from Packaging	kg C	-2.29e-1	0	0	0	0	0	0	0
Bio Carbon Emission from Packaging	kg C	7.90e-2	0	1.50e-1	0	0	0	0	0
Bio Carbon Emission from Waste during Manufac-turing (renewable source)	kg C	0	0	0	0	0	0	0	0
Calcination Carbon Re-moval	kg C	0	0	0	0	0	0	0	0
Carbonation Carbon Emission	kg C	0	0	0	0	0	0	0	0
Carbon Emission from Waste during Manu-facturing (non-renewable source)	kg C	0	0	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

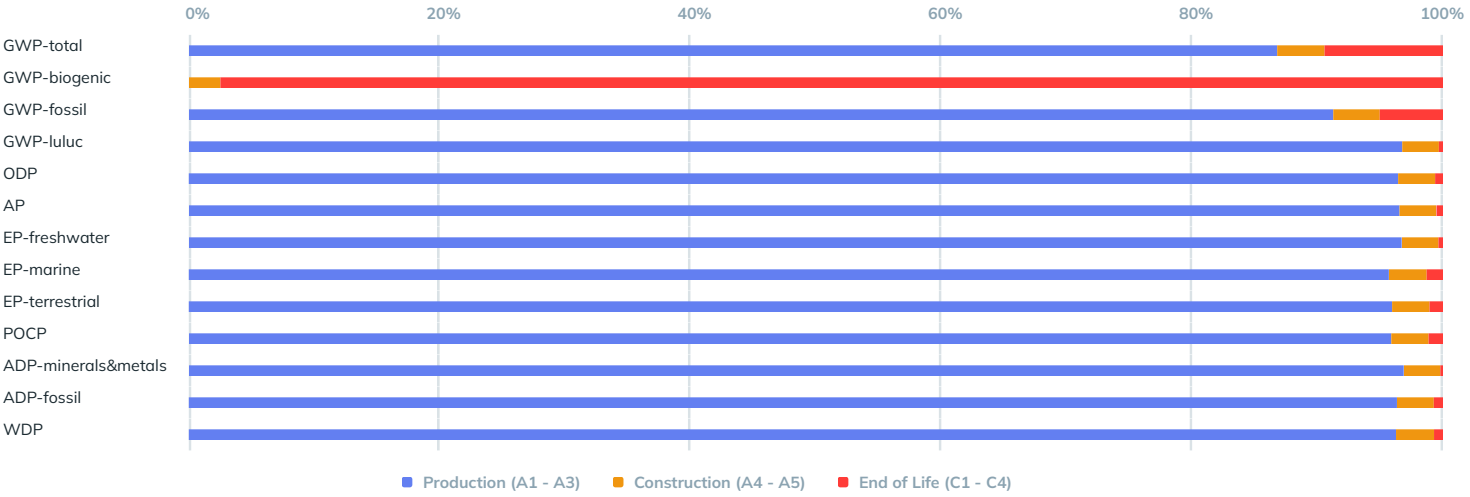
BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE = Calcination Carbon Emissions, CCR = Carbonation Carbon Removals, CWNR = Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes, GWP-luc = Carbon Emissions from Land-use Change.

Interpretation

• The manufacturing of the products in this analysis involves the direct procurement of raw materials from suppliers. These materials are then transported to manufacturing facilities in the EU where they are stored, processed, and combined to produce finished products. Notably, the product stage (stage 1) has the highest impact contribution, mainly attributed to the combined environmental impacts associated with raw material manufacturing and energy used in manufacturing the products.

• For products with significant manufacturing energy impacts, the shift to renewable energy sources is recommended.

• Given that the raw materials used in product manufacturing have a significant impact, exploration of opportunities to substitute these materials with alternatives that have a lower environmental impact. Additionally, consideration should be given to collaborating with suppliers who employ sustainable manufacturing techniques or integrate more renewable energy into their production processes. Such initiatives can lead to more environmentally friendly products and further enhance the sustainability of the products in this analysis.



Additional Environmental Information

None

Further Information

Name	Unit	Value
Heat transfer coefficient glass acc. to EN 674 / EN 675	W/(m²K)	0.5
Heat transfer coefficient window acc. to EN 674 / EN 675	W/(m²K)	1
Total energy transmittance	%	50
Joint permeability coefficient acc. to EN 1026	m³/mh	< 2.6
Water tightness acc. EN 12208 unprotected / protected	class	E1200
Deflection as a result of wind loads acc. to EN 12211	mm	< L/300
Fire resistance class (for fire windows and doors) DIN EN 16341	class	N/A (REI30 for HFS variant)
Mounting type (sealing system)	–	Factory timber-EPS upstand
Noise protection against external noise acc. DIN EN ISO 10140 and DIN EN ISO 717	dB	38
Air permeability acc. EN 12207	class	Class 4
Resistance against wind loads acc. DIN EN 12211	mm	C5
Radiation properties acc. EN 410 or 133631 and 2: Total energy transmittance g	%	50
Radiation properties EN 410 or 133631 and 2: Light transmisson level rv	%	73
Reaction to fire	class	B-s1,d0

References

• Institut Bauen und Umwelt e.V. (IBU). (2021). General Programme Instructions for the IBU EPD Programme Part A: Calculation Rules for the LifeCycle Assessment and Requirements on the Background Report. Version 2.0, 01032021. Berlin: IBU.

• Institut Bauen und Umwelt e.V. (IBU). (2021). Product Category Rules for Construction Products Part B: Requirements on the EPD for Windows and Doors. Version 1.7, 082021. Berlin: IBU.

• European Committee for Standardization (CEN). (2019). EN 15804:2012+A2:2019 Sustainability of construction works Environmental product declarations Core rules for the product category of construction products. Brussels: CEN. (Including AC:2021)

• International Organization for Standardization (ISO). (2006). ISO 14040:2006 Environmental management Life cycle assessment Principles and framework. Geneva: ISO. (Amendment 1:2020; confirmed current 2022)

• International Organization for Standardization (ISO). (2006). ISO 14044:2006 Environmental management Life cycle assessment Requirements and guidelines. Geneva: ISO. (Amendments 1:2017 and 2:2020 included; confirmed current 2022)

• International Organization for Standardization (ISO). (2006). ISO 14025:2006 Environmental labels and declarations Type III environmental declarations Principles and procedures. Geneva: ISO

• Eurostat. (2024). Circular Economy indicators. Waste management: https://ec.europa.eu/eurostat/web/circular-economy/database

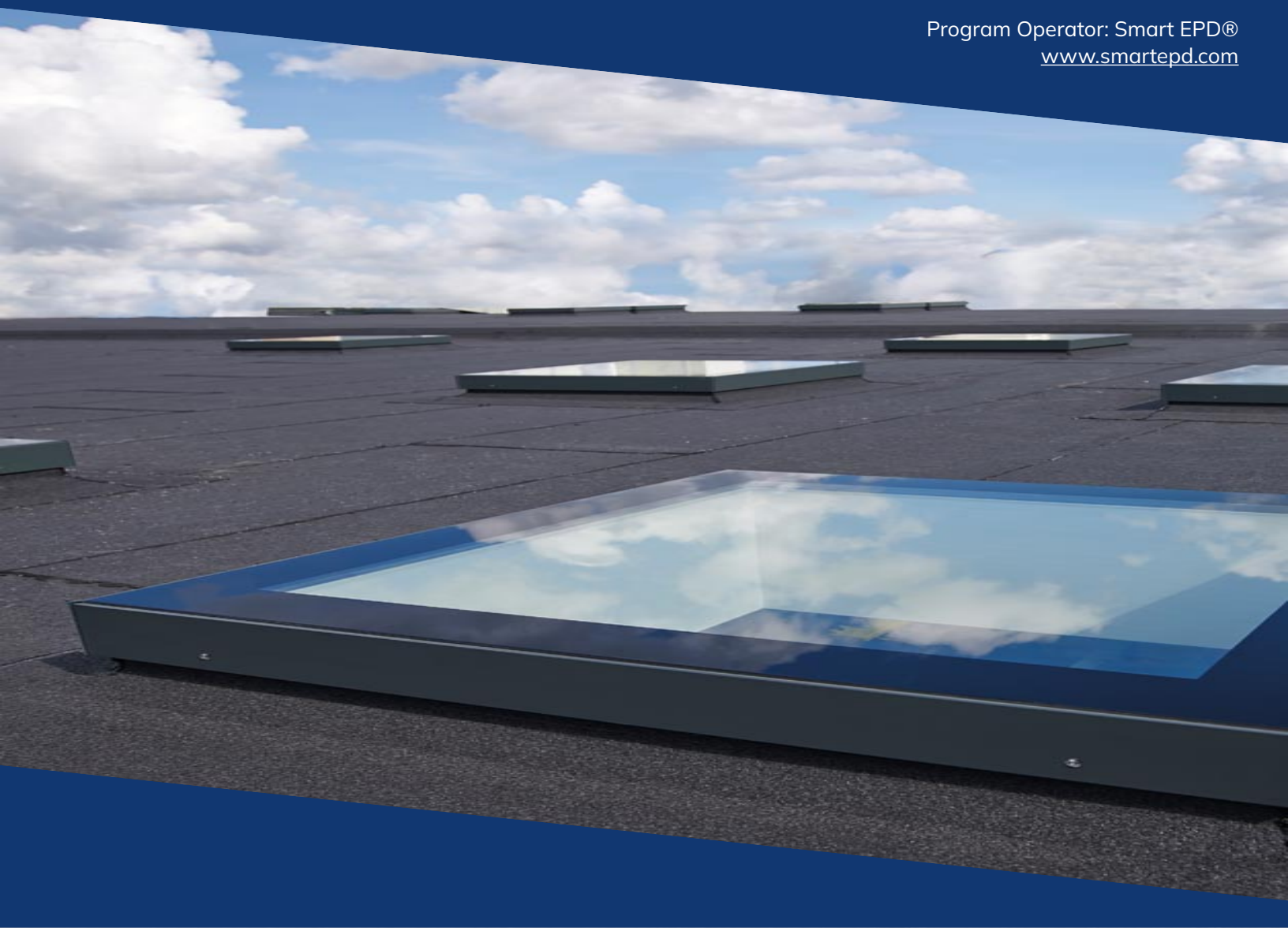
• Stichting National Environmental Database. (2022). Environmental Performance Assessment Method for Construction Works. version 1.1.

• European Committee for Standardization (CEN). (2019). EN 17074:2019 Sustainability of construction works Environmental product declarations Specific core rules for windows and doors. Brussels: CEN.

Environmental Product Declaration

IN ACCORDANCE WITH ISO 14025 AND EN 15804+A2

Program Operator: Smart EPD®
www.smartepd.com



Modular Rooflights Monolight DG

Date of Issue	Expiration date	Last updated
Jul 28, 2025	**Jul 28, 2030**	**Jul 28, 2025**

Refer to the EPD Library at www.smartepd.com for the latest EPD listing information

General Information

VELUX

Ådalsvej 99, 2970 Hørsholm, Denmark

+45 45164000

birthe.kjeldsen@velux.com velux.com

Product Name:	Modular Rooflights Monolight DG
Declared Unit:	1 m2 of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m)
Declaration Number:	SmartEPD-2025-001-0553-01
Date of Issue:	July 28, 2025
Expiration:	July 28, 2030
Last updated:	July 28, 2025
EPD Scope:	Cradle to gate with other options A1 - A3, A4, A5, C1 - C4, D
Market(s) of Applicability:	Europe

General Organization Information

VELUX is a Danish manufacturing company that specializes in roof windows, skylights, sun tunnels and related accessories. The company is headquartered in Hrsholm, Denmark and is a part of VKR Holding A/S. VELUX Group is a founding partner of the global Active House Alliance.
Further information can be found at: https://www.velux.com

Limitations, Liability, and Ownership

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the whole building life cycle. EPD comparability is only possible when all stages of a life cycle have been considered. However, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared. The EPD owner has sole ownership, liability, and responsibility for the EPD.

Reference Standards

Standard(s):	ISO 14025 and EN 15804+A2
Core PCR:	IBU PCR for Building-Related Products and Services Part A v1.4 v.1.4 Date of issue: April 15, 2024
Sub-category PCR:	IBU Part B: Requirements on the EPD for Windows and Doors v.1.0/1.7/1.4 Date of issue: January 25, 2021 Valid until: January 25, 2026

Sub-category PCR review panel:	Contact Smart EPD for more information.
General Program Instructions:	Smart EPD General Program Instructions v.1.0, November 2022

Verification Information

LCA Author/Creator:	Juan David Villegas | juan@parqhq.com
EPD Program Operator:	Smart EPD | info@smartepd.com | www.smartepd.com 585 Grove St., Ste. 145 PMB 966, Herndon, VA 20170, USA
Verification:	Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071: External Rifat Karim | Independent Consultant | rifat.chimique@gmail.com Independent external verification of EPD, according to ISO 14025 and reference PCR(s): External Rifat Karim | Independent Consultant | rifat.chimique@gmail.com

Product Information

Declared Unit:	1 m2 of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m)
Mass:	92.8088 kg
Reference Service Life:	30 Years
Product Specificity:	✗ Product Average ✓ Product Specific

Product Description

Bespoke single unit flat glass rooflights that direct daylight into specific areas of a building. Prefabricated top unit with double glazing unit and wooden upstand available min fixed or venting versions.
Further information can be found at: https://commercial.velux.co.uk/products/domes-rooflights-and-flat-glass-rooflights/modular-rooflights/solutions/monolight

Product Specifications

Product Classification Codes:	EC3 - Openings -> TranslucentWallAndRoofAssemblies

Material Composition

Material/Component Category	Origin	% Mass
Blind rivets, nuts , screws, plates	POL, DNK	1.37
Gaskets, washers	DEU, POL, DNK	2.84
Glazing	LTU	75.66
Profiles, support brackets, tubes and strips	DNK	7.66
Upstand	NLD, POL, DNK	12.47

Packaging Material	Origin	kg Mass
Cardboard		0.15
Pallet		0.09
Plastic cover		0.74

Biogenic Carbon Content	kg C per m2
Biogenic carbon content in product	0.12
Biogenic carbon content in accompanying packaging	0.11

Hazardous Materials
No regulated hazardous or dangerous substances are included in this product.

EPD Data Specificity

Primary Data Year: Jan 1, 2024 - Dec 31, 2024

Manufacturing Specificity:

- ✗ Industry Average
- ✗ Manufacturer Average
- ✓ Facility Specific

Averaging:

Averaging was not conducted for this EPD

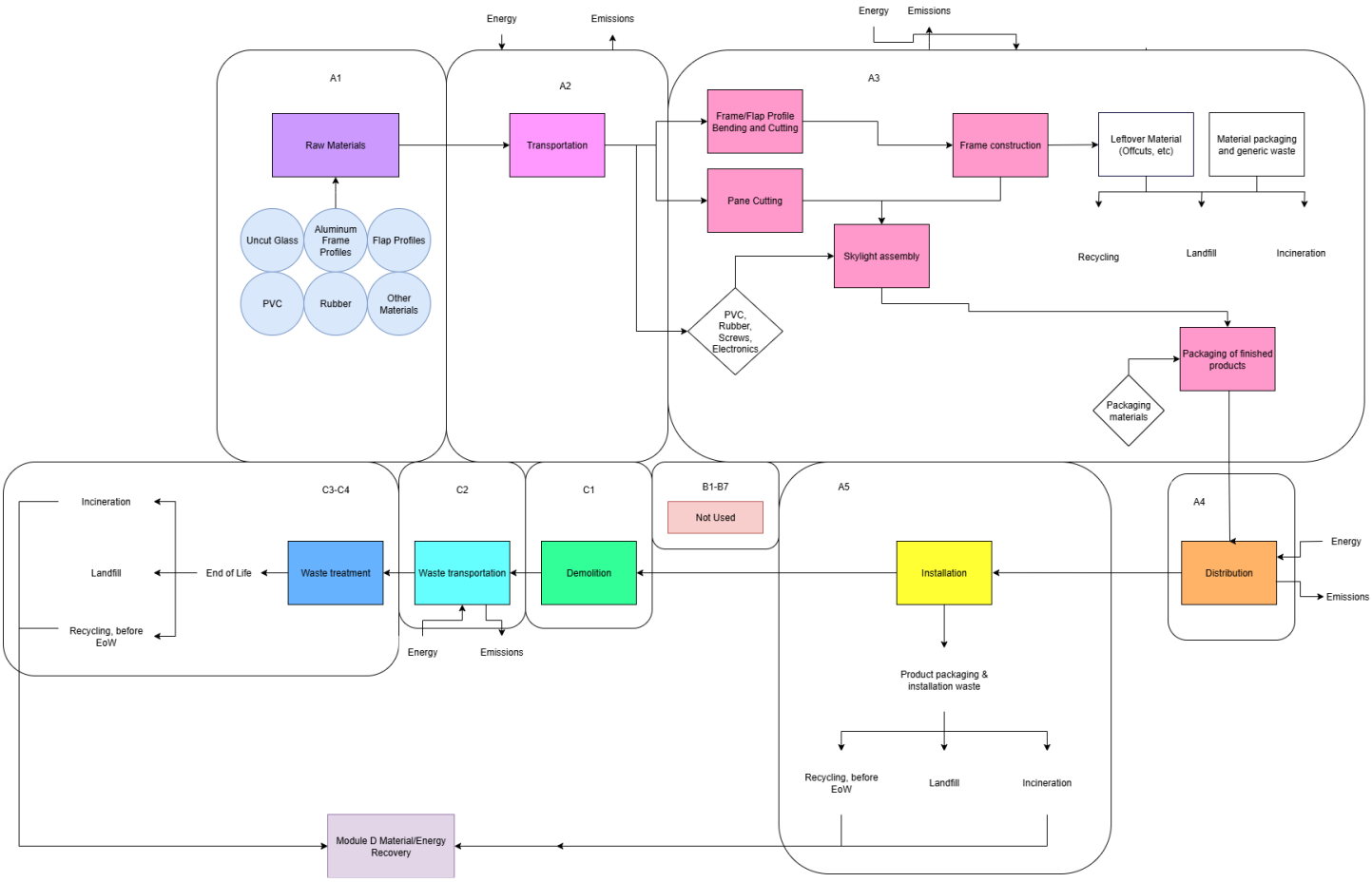
System Boundary

Production	A1	Raw material supply	✓
	A2	Transport	✓
	A3	Manufacturing	✓
Construction	A4	Transport to site	✓
	A5	Assembly / Install	✓
Use	B1	Use	ND
	B2	Maintenance	ND
	B3	Repair	ND
	B4	Replacement	ND
	B5	Refurbishment	ND
	B6	Operational Energy Use	ND
	B7	Operational Water Use	ND
End of Life	C1	Deconstruction	✓
	C2	Transport	✓
	C3	Waste Processing	✓
	C4	Disposal	✓
Benefits & Loads Beyond System Boundary	D	Recycling, Reuse Recovery Potential	✓

Plants

Hüllhorst, DE
Weidehorst 28, 32609

Product Flow Diagram



VELUX product manufacturing begins when flap profile parts, uncut glazing, aluminum or plastic profiles, vertical end pieces, and other small components such as screws and gaskets are bent, cut, welded, and assembled into complete flaps and skylight systems. If needed, extra components like DSL grids and electronic parts for home-automation systems are custom-cut and assembled to specification. Once manufacturing is finished, products are delivered to distribution centers and then transported to the end user by truck.

Software and Database

LCA Software:	SimaPro v. 9.5
LCI Foreground Database(s):	Ecoinvent v. 3.9.1
LCI Background Database(s):	Ecoinvent v. 3.9.1

Data Quality

Precision & Completeness

• **Precision:** Inventory data were directly measured, calculated, or conservatively estimated from primary sources using consistent units and QA checks. Background processes from ecoinvent v3 were adopted with their documented uncertainty/precision metadata where available, preserving a transparent record of data quality.

• **Completeness:** The product system's mass balance and inventory completeness were thoroughly checked. Some exclusions were made in line with the PCR requirements, such as personnel impacts, R&D activities, business travel, and point-of-sale infrastructure. However, no data were intentionally omitted.

Consistency and Reproducibility

• **Consistency:** Primary data for all modules were consistently gathered aiming at the highest level of detail possible. Background processes were modeled mainly with the ecoinvent database. The same allocation rules, cut-off criteria, and impact assessment methods were applied throughout, ensuring methodological coherence and consistent data quality across the entire LCA model.

• **Reproducibility:** This study ensures reproducibility by providing comprehensive disclosure of inputoutput data, dataset choices, and modeling approaches. A knowledgeable third party should be able to approximate the results using the same data and modeling methods.

Representativeness

• **Temporal:** Primary data were collected for a 12-month period representing the 2024 calendar year to ensure the representativeness of post-consumer content. Secondary data from the ecoinvent v3 database are typically representative of recent years.

• **Geographical:** Primary data represent VELUX's production facilities. Where applicable, differences in electric grid mix were considered using appropriate secondary data. The use of country-specific data ensures high geographical representativeness, and proxy data were only used when country-specific data were unavailable.

• **Technological:** Both primary and secondary data were tailored to the specific technologies studied, ensuring high technological representativeness.

Life Cycle Module Descriptions

Modules A1A3: The LCA model covers the manufacture of raw materials and components for VELUX products (A1) which are then transported to VELUX facilities by truck (A2). The manufacturing stage (A3) begins with receipt of these materials, which are bent, cut, welded, and assembled into finished flaps and skylight systems. When required, additional parts like DSL grids and electronic components for home-automation systems are custom-cut and assembled to order.
Modules A4A5: Once manufacture is completed, products are shipped to distribution centers and then to the end user by truck (A4). For installation (A5), a 3% material installation loss was assumed. This module includes disposal of that waste and of the product packaging.
Modules C1C4 and D: At end of life (C1C4), the product is assumed to be collected, and each waste stream (e.g., aluminum, glass, PVC) is handled separatelylandfilled, recycled, or incinerated with energy recovery. Loads and benefits beyond the system boundary are considered in Module D (e.g., displacement of virgin materials and electricity).

LCA Discussion

Allocation Procedure

Allocation of co-products was avoided, to the extent possible, based on the guidance given in ISO 14044:2006, 4.3, and in EN 15804+A2:2019. Energy use at the facility level was allocated by the amount of product produced. The manufacturing process does not consume water or generate wastewater or air emissions, other than those from fuel combustion. Solid waste was estimated using packaging masses and material losses and allocated following the polluter pays principle.

Cut-off Procedure

The system boundary was defined based on relevance to the goal of the study. For the raw material (A1) and process related inputs (A3), all available energy and material flow data have been included in the model.

Renewable Electricity

Energy Attribute Certificates (EACs) such as Renewable Energy Certificates (RECs) or Power Purchase Agreements (PPAs) are included in the baseline reported results:	✕ No

Scenarios

Transport to the building/construction site (A4)

A4 Module

Fuel Type:	Diesel
Vehicle Type:	Truck and Trailer
Transport Distance:	277 km
Capacity Utilization:	33 %
Packaging Mass:	0.9847 kg
Weight of products transported:	93.79 kg
Capacity utilization volume factor:	1
Assumptions for scenario development:	Transport distance includes finished product to distribution center and distribution center to point of sale.

Installation in to the building/construction site (A5)

A5 Module

Installation Scrap Rate Assumed:	3 %
Product Lost per Declared/Functional Unit:	2.784 kg
Mass of Packaging Waste Specified by Type:	0.9847 kg
Biogenic Carbon Contained in Packaging:	0.1134 kg
Assumptions for scenario development:	

End of Life (C1 - C4)

C1 - C4 Modules

Collection Process

Collected with Mixed Construction Waste:	92.81 kg

Recovery

Recycling:	30.3 kg
Landfill:	49.01 kg
Incineration:	13.5 kg

Reuse, Recovery and / or Recycling Potentials & Relevant Scenario Information (D)

D Module

Recycling Rate of Product:	0.3265 %
Recycled Content of Product:	0.08845 %
Net Energy Benefit from Material Flow Declared in C3 for Energy Recovery:	609.6 MJ
Further assumptions for scenario development:	Energy recovery from incineration assumes 18% electrical efficiency and 31% thermal

Results

Environmental Impact Assessment Results

EF 3.1

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Impact Category	Method	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
GWP-total	EF 3.1	kg CO2 eq	1.56e+2	2.78e-2	7.00e+0	0	8.46e-1	2.35e+1	1.84e-1	-6.13e+1
GWP-biogenic	EF 3.1	kg CO2 eq	-1.08e+1	2.21e-5	2.18e-1	0	6.74e-4	1.30e+1	3.96e-2	3.76e-1
GWP-fossil	EF 3.1	kg CO2 eq	1.67e+2	2.77e-2	6.78e+0	0	8.45e-1	1.05e+1	1.45e-1	-6.16e+1
GWP-luluc	EF 3.1	kg CO2 eq	1.74e-1	1.35e-5	5.27e-3	0	4.12e-4	1.17e-4	2.07e-5	-8.81e-2
ODP	EF 3.1	kg CFC11 eq	4.17e-6	6.30e-10	1.28e-7	0	1.92e-8	1.31e-8	2.22e-9	-1.42e-6
AP	EF 3.1	mol H+ eq	1.14e+0	6.87e-5	3.47e-2	0	2.09e-3	3.82e-3	1.29e-3	-4.37e-1
EP-freshwater	EF 3.1	kg P eq	3.84e-2	2.05e-6	1.16e-3	0	6.24e-5	9.19e-5	8.16e-6	-1.60e-2
EP-marine	EF 3.1	kg N eq	2.09e-1	1.87e-5	6.59e-3	0	5.70e-4	2.12e-3	7.40e-4	-7.48e-2
EP-terrestrial	EF 3.1	mol N eq	2.34e+0	1.92e-4	7.29e-2	0	5.85e-3	1.89e-2	6.27e-3	-8.78e-1
POCP	EF 3.1	kg NMVOC eq	7.50e-1	1.12e-4	2.33e-2	0	3.42e-3	4.79e-3	1.91e-3	-2.65e-1
ADP-minerals&metals	EF 3.1	kg Sb eq	1.52e-3	7.76e-8	4.58e-5	0	2.36e-6	7.40e-7	6.14e-8	-1.38e-4
ADP-fossil	EF 3.1	MJ	2.33e+3	4.21e-1	7.10e+1	0	1.28e+1	3.13e+0	1.90e+0	-7.03e+2
WDP	EF 3.1	m3 depriv.	5.30e+1	2.01e-3	1.67e+0	0	6.13e-2	3.63e-1	9.01e-3	-8.72e+0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase when product performance and specifications have been established and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted. Any comparison of EPDs shall be subject to the requirements of ISO 21930 or EN 15804. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparison can be inaccurate, and could lead to erroneous selection of materials or products which are higher-impact, at least in some impact categories.

Resource Use Indicators

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

Indicator	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	4.71e+2	6.16e-3	1.41e+1	0	1.88e-1	1.08e-1	1.69e-2	-1.42e+2
PERM	MJ	0	0	0	0	0	0	0	0
PERT	MJ	4.71e+2	6.16e-3	1.41e+1	0	1.88e-1	1.08e-1	1.69e-2	-1.42e+2
PENRE	MJ	2.33e+3	4.21e-1	7.10e+1	0	1.28e+1	3.13e+0	1.90e+0	-7.03e+2
PENRM	MJ	6.77e-1	1.78e-5	2.04e-2	0	5.41e-4	1.18e-4	2.48e-5	-1.46e-1
PENRT	MJ	2.33e+3	4.21e-1	7.10e+1	0	1.28e+1	3.13e+0	1.90e+0	-7.03e+2
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m3	1.55e+0	5.71e-5	4.89e-2	0	1.74e-3	1.28e-2	2.16e-4	-3.27e-1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Waste and Output Flow Indicators

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

Indicator	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	0	0	0	0	0	0	0	0
NHWD	kg	3.28e-1	0	1.61e+0	0	0	0	4.85e+1	0
RWD	kg	3.13e-3	1.28e-7	9.43e-5	0	3.91e-6	1.33e-6	2.50e-7	-8.04e-4
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	3.45e-1	0	1.05e+0	0	0	0	3.03e+1	-3.13e+1
MER	kg	1.53e+0	0	1.15e+0	0	0	1.35e+1	0	-1.46e+1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Carbon Emissions and Removals

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

Indicator	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
Bio Carbon Removal from Product	kg C	-4.56e+0	0	-1.33e-1	0	0	0	0	0
Bio Carbon Emission from Product	kg C	1.18e-1	0	1.33e-1	0	0	4.22e+0	2.22e-1	0
Bio Carbon Removal from Packaging	kg C	-1.79e-1	0	0	0	0	0	0	0
Bio Carbon Emission from Packaging	kg C	6.61e-2	0	1.13e-1	0	0	0	0	0
Bio Carbon Emission from Waste during Manufac-turing (renewable source)	kg C	0	0	0	0	0	0	0	0
Calcination Carbon Re-moval	kg C	0	0	0	0	0	0	0	0
Carbonation Carbon Emission	kg C	0	0	0	0	0	0	0	0
Carbon Emission from Waste during Manu-facturing (non-renewable source)	kg C	0	0	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

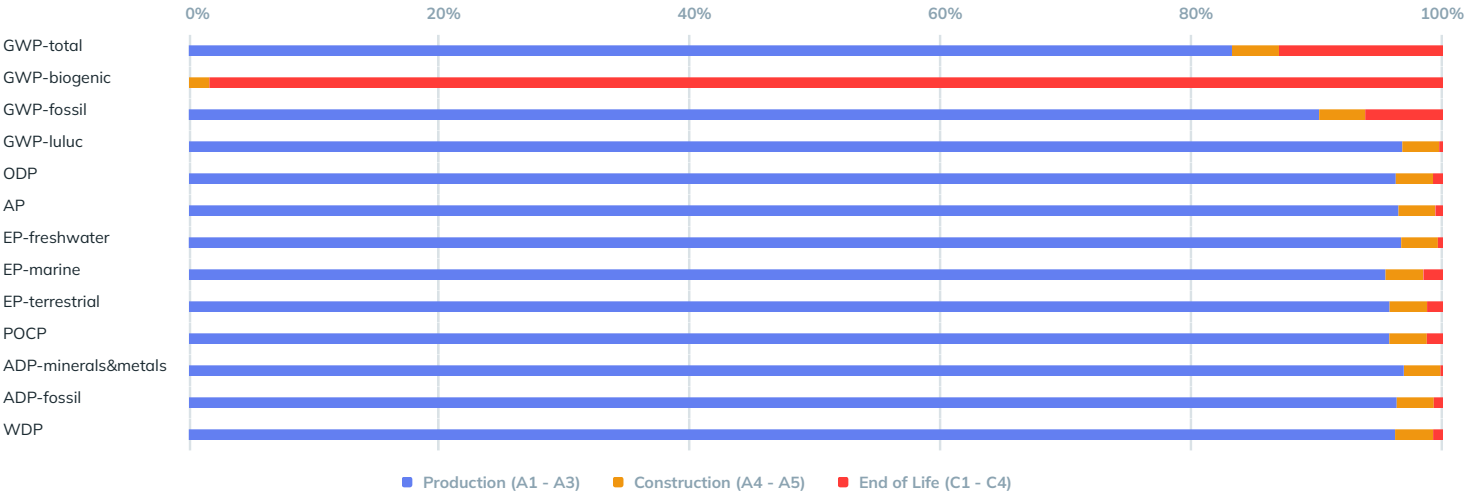
BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE = Calcination Carbon Emissions, CCR = Carbonation Carbon Removals, CWNR = Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes, GWP-luc = Carbon Emissions from Land-use Change.

Interpretation

• The manufacturing of the products in this analysis involves the direct procurement of raw materials from suppliers. These materials are then transported to manufacturing facilities in the EU where they are stored, processed, and combined to produce finished products. Notably, the product stage (stage 1) has the highest impact contribution, mainly attributed to the combined environmental impacts associated with raw material manufacturing and energy used in manufacturing the products.

• For products with significant manufacturing energy impacts, the shift to renewable energy sources is recommended.

• Given that the raw materials used in product manufacturing have a significant impact, exploration of opportunities to substitute these materials with alternatives that have a lower environmental impact. Additionally, consideration should be given to collaborating with suppliers who employ sustainable manufacturing techniques or integrate more renewable energy into their production processes. Such initiatives can lead to more environmentally friendly products and further enhance the sustainability of the products in this analysis.



Additional Environmental Information

None

Further Information

Name	Unit	Value
Heat transfer coefficient glass acc. to EN 674 / EN 675	W/(m²K)	1.1
Heat transfer coefficient window acc. to EN 674 / EN 675	W/(m²K)	1.4 or 1.7
Total energy transmittance	%	61
Joint permeability coefficient acc. to EN 1026	m³/mh	< 2.6
Water tightness acc. EN 12208 unprotected / protected	class	E1200
Deflection as a result of wind loads acc. to EN 12211	mm	< L/300
Fire resistance class (for fire windows and doors) DIN EN 16341	class	N/A (REI30 for HFS variant)
Mounting type (sealing system)	–	Factory timber-EPS upstand
Noise protection against external noise acc. DIN EN ISO 10140 and DIN EN ISO 717	dB	~32
Air permeability acc. EN 12207	class	Class 4
Resistance against wind loads acc. DIN EN 12211	mm	C5
Radiation properties acc. EN 410 or 133631 and 2: Total energy transmittance g	%	61
Radiation properties EN 410 or 133631 and 2: Light transmisson level rv	%	80
Reaction to fire	class	B-s1,d0

References

• Institut Bauen und Umwelt e.V. (IBU). (2021). General Programme Instructions for the IBU EPD Programme Part A: Calculation Rules for the LifeCycle Assessment and Requirements on the Background Report. Version 2.0, 01032021. Berlin: IBU.

• Institut Bauen und Umwelt e.V. (IBU). (2021). Product Category Rules for Construction Products Part B: Requirements on the EPD for Windows and Doors. Version 1.7, 082021. Berlin: IBU.

• European Committee for Standardization (CEN). (2019). EN 15804:2012+A2:2019 Sustainability of construction works Environmental product declarations Core rules for the product category of construction products. Brussels: CEN. (Including AC:2021)

• International Organization for Standardization (ISO). (2006). ISO 14040:2006 Environmental management Life cycle assessment Principles and framework. Geneva: ISO. (Amendment 1:2020; confirmed current 2022)

• International Organization for Standardization (ISO). (2006). ISO 14044:2006 Environmental management Life cycle assessment Requirements and guidelines. Geneva: ISO. (Amendments 1:2017 and 2:2020 included; confirmed current 2022)

• International Organization for Standardization (ISO). (2006). ISO 14025:2006 Environmental labels and declarations Type III environmental declarations Principles and procedures. Geneva: ISO

• Eurostat. (2024). Circular Economy indicators. Waste management: https://ec.europa.eu/eurostat/web/circular-economy/database

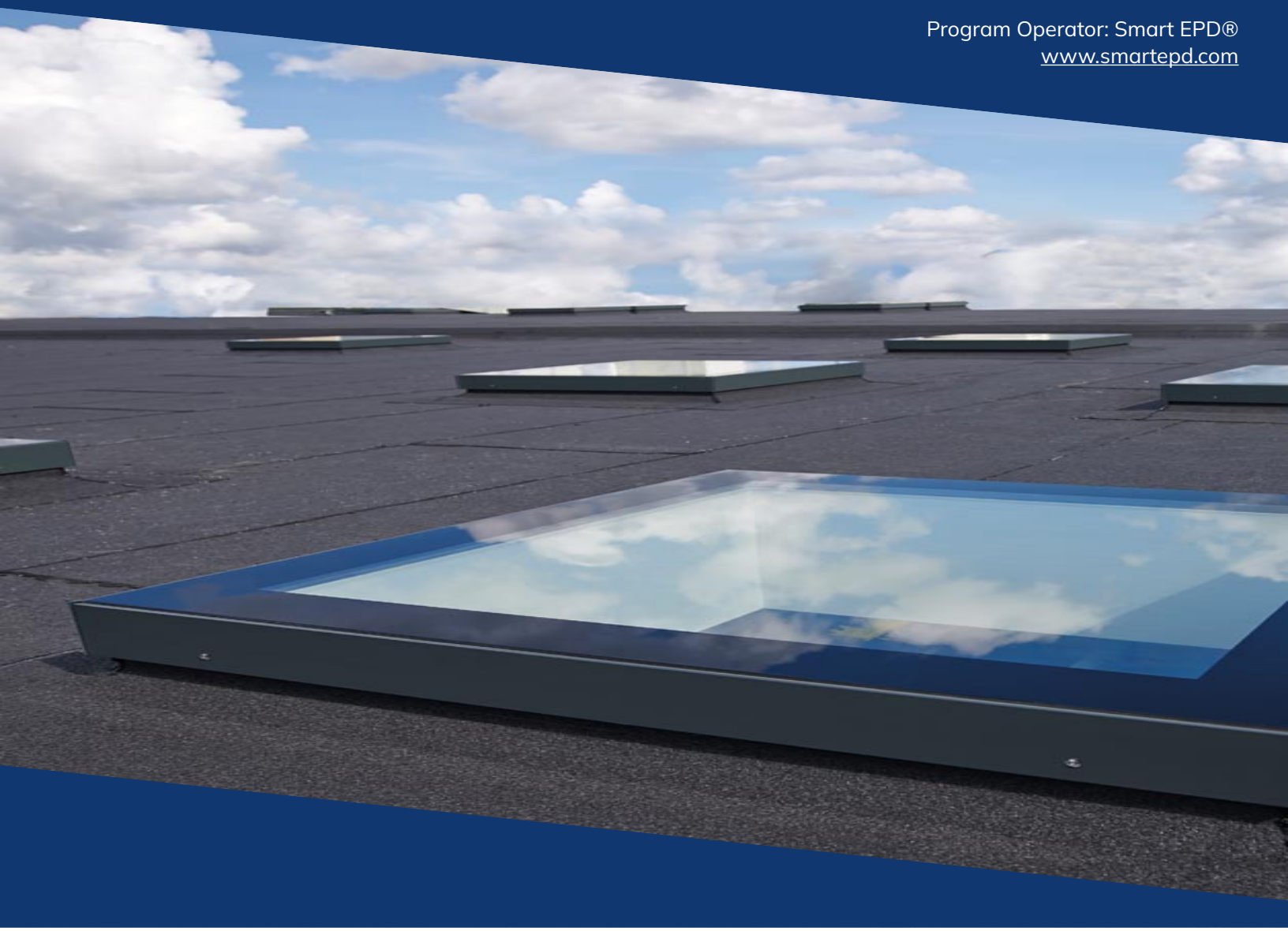
• Stichting National Environmental Database. (2022). Environmental Performance Assessment Method for Construction Works. version 1.1.

• European Committee for Standardization (CEN). (2019). EN 17074:2019 Sustainability of construction works Environmental product declarations Specific core rules for windows and doors. Brussels: CEN.

Environmental Product Declaration

IN ACCORDANCE WITH ISO 14025 AND EN 15804+A2

Program Operator: Smart EPD®
www.smartepd.com



Modular Rooflights Monolight TG

Date of Issue	Expiration date	Last updated
Jul 28, 2025	**Jul 28, 2030**	**Jul 28, 2025**

Refer to the EPD Library at www.smartepd.com for the latest EPD listing information

General Information

VELUX

Ådalsvej 99, 2970 Hørsholm, Denmark

+45 45164000

birthe.kjeldsen@velux.com velux.com

Product Name:	Modular Rooflights Monolight TG
Declared Unit:	1 m2 of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m)
Declaration Number:	SmartEPD-2025-001-0559-01
Date of Issue:	July 28, 2025
Expiration:	July 28, 2030
Last updated:	July 28, 2025
EPD Scope:	Cradle to gate with other options A1 - A3, A4, A5, C1 - C4, D
Market(s) of Applicability:	Europe

General Organization Information

VELUX is a Danish manufacturing company that specializes in roof windows, skylights, sun tunnels and related accessories. The company is headquartered in Hrsholm, Denmark and is a part of VKR Holding A/S. VELUX Group is a founding partner of the global Active House Alliance.
Further information can be found at: https://www.velux.com

Limitations, Liability, and Ownership

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the whole building life cycle. EPD comparability is only possible when all stages of a life cycle have been considered. However, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared. The EPD owner has sole ownership, liability, and responsibility for the EPD.

Reference Standards

Standard(s):	ISO 14025 and EN 15804+A2
Core PCR:	IBU PCR for Building-Related Products and Services Part A v1.4 v.1.4 Date of issue: April 15, 2024
Sub-category PCR:	IBU Part B: Requirements on the EPD for Windows and Doors v.1.0/1.7/1.4 Date of issue: January 25, 2021 Valid until: January 25, 2026

Sub-category PCR review panel:	Contact Smart EPD for more information.
General Program Instructions:	Smart EPD General Program Instructions v.1.0, November 2022

Verification Information

LCA Author/Creator:	Juan David Villegas | juan@parqhq.com
EPD Program Operator:	Smart EPD | info@smartepd.com | www.smartepd.com 585 Grove St., Ste. 145 PMB 966, Herndon, VA 20170, USA
Verification:	Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071: External Rifat Karim | Independent Consultant | rifat.chimique@gmail.com Independent external verification of EPD, according to ISO 14025 and reference PCR(s): External Rifat Karim | Independent Consultant | rifat.chimique@gmail.com

Product Information

Declared Unit:	1 m2 of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m)
Mass:	129.41 kg
Reference Service Life:	30 Years
Product Specificity:	✗ Product Average ✓ Product Specific

Product Description

Bespoke single unit flat glass rooflights that direct daylight into specific areas of a building. Prefabricated top unit with triple glazing unit and wooden upstand available min fixed or venting versions.
Further information can be found at: https://commercial.velux.co.uk/products/domes-rooflights-and-flat-glass-rooflights/modular-rooflights/solutions/monolight

Product Specifications

Product Classification Codes:	EC3 - Openings -> TranslucentWallAndRoofAssemblies

Material Composition

Material/Component Category	Origin	% Mass
Blind rivets, nuts , screws, plates	POL, DNK	1.25
Gaskets, washers	DEU, POL, DNK	2.81
Glazing	LTU	79.86
Profiles, support brackets, tubes and strips	DNK	6.96
Upstand	NLD, POL, DNK	9.12

Packaging Material	Origin	kg Mass
Cardboard		0.21
Pallet		0.13
Plastic cover		1.04

Biogenic Carbon Content	kg C per m2
Biogenic carbon content in product	0.03
Biogenic carbon content in accompanying packaging	0.16

Hazardous Materials
No regulated hazardous or dangerous substances are included in this product.

EPD Data Specificity

Primary Data Year: Jan 1, 2024 - Dec 31, 2024

Manufacturing Specificity:

- ✗ Industry Average
- ✗ Manufacturer Average
- ✓ Facility Specific

Averaging:

Averaging was not conducted for this EPD

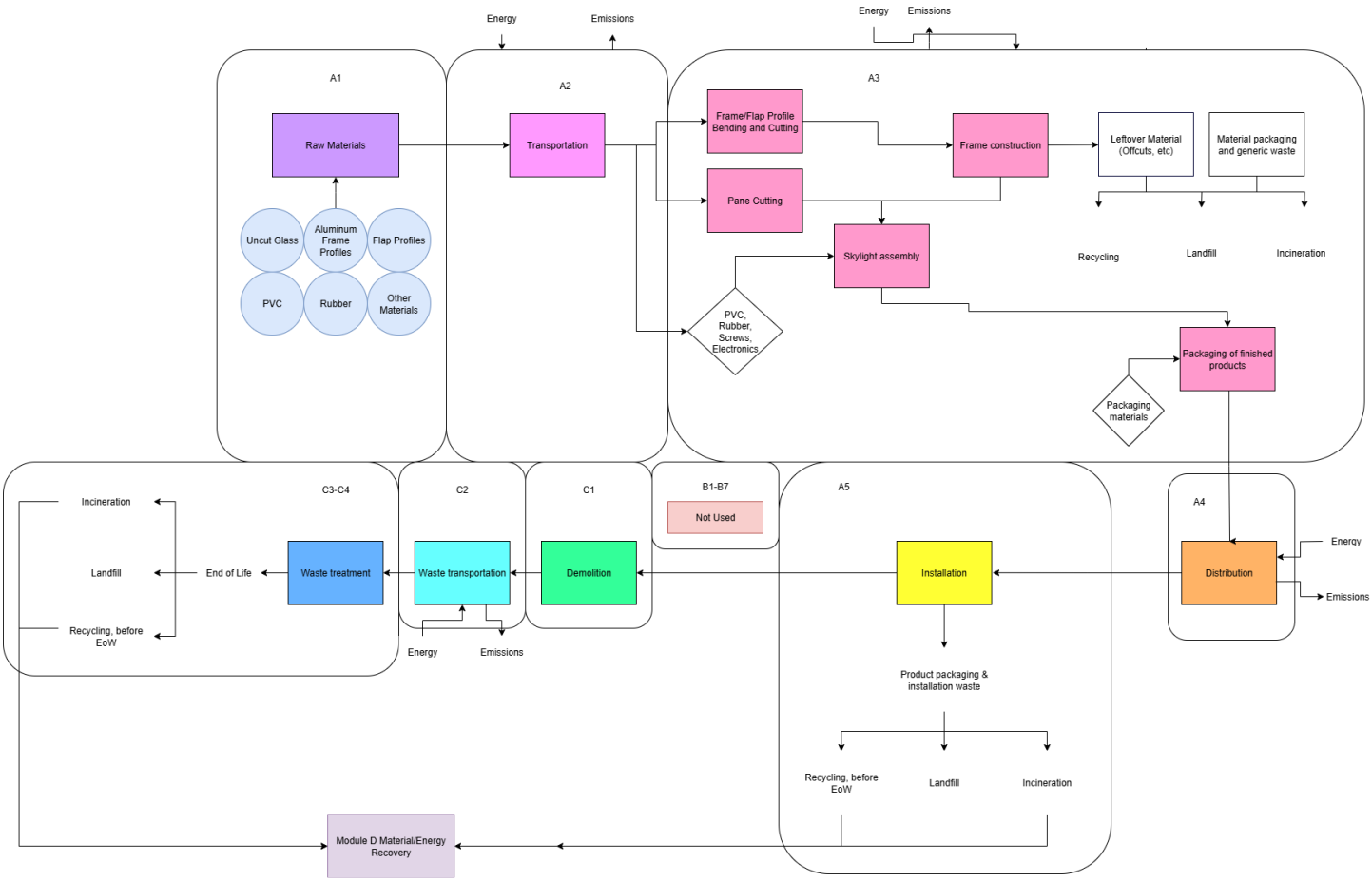
System Boundary

Production	A1	Raw material supply	✓
	A2	Transport	✓
	A3	Manufacturing	✓
Construction	A4	Transport to site	✓
	A5	Assembly / Install	✓
Use	B1	Use	ND
	B2	Maintenance	ND
	B3	Repair	ND
	B4	Replacement	ND
	B5	Refurbishment	ND
	B6	Operational Energy Use	ND
	B7	Operational Water Use	ND
End of Life	C1	Deconstruction	✓
	C2	Transport	✓
	C3	Waste Processing	✓
	C4	Disposal	✓
Benefits & Loads Beyond System Boundary	D	Recycling, Reuse Recovery Potential	✓

Plants

Opmeer, NL
De Veken 308, 1716 KJ

Product Flow Diagram



VELUX product manufacturing begins when flap profile parts, uncut glazing, aluminum or plastic profiles, vertical end pieces, and other small components such as screws and gaskets are bent, cut, welded, and assembled into complete flaps and skylight systems. If needed, extra components like DSL grids and electronic parts for home-automation systems are custom-cut and assembled to specification. Once manufacturing is finished, products are delivered to distribution centers and then transported to the end user by truck.

Software and Database

LCA Software:	SimaPro v. 9.5
LCI Foreground Database(s):	Ecoinvent v. 3.9.1
LCI Background Database(s):	Ecoinvent v. 3.9.1

Data Quality

Precision & Completeness

• **Precision:** Inventory data were directly measured, calculated, or conservatively estimated from primary sources using consistent units and QA checks. Background processes from ecoinvent v3 were adopted with their documented uncertainty/precision metadata where available, preserving a transparent record of data quality.

• **Completeness:** The product system's mass balance and inventory completeness were thoroughly checked. Some exclusions were made in line with the PCR requirements, such as personnel impacts, R&D activities, business travel, and point-of-sale infrastructure. However, no data were intentionally omitted.

Consistency and Reproducibility

• **Consistency:** Primary data for all modules were consistently gathered aiming at the highest level of detail possible. Background processes were modeled mainly with the ecoinvent database. The same allocation rules, cut-off criteria, and impact assessment methods were applied throughout, ensuring methodological coherence and consistent data quality across the entire LCA model.

• **Reproducibility:** This study ensures reproducibility by providing comprehensive disclosure of inputoutput data, dataset choices, and modeling approaches. A knowledgeable third party should be able to approximate the results using the same data and modeling methods.

Representativeness

• **Temporal:** Primary data were collected for a 12-month period representing the 2024 calendar year to ensure the representativeness of post-consumer content. Secondary data from the ecoinvent v3 database are typically representative of recent years.

• **Geographical:** Primary data represent VELUX's production facilities. Where applicable, differences in electric grid mix were considered using appropriate secondary data. The use of country-specific data ensures high geographical representativeness, and proxy data were only used when country-specific data were unavailable.

• **Technological:** Both primary and secondary data were tailored to the specific technologies studied, ensuring high technological representativeness.

Life Cycle Module Descriptions

Modules A1A3: The LCA model covers the manufacture of raw materials and components for VELUX products (A1) which are then transported to VELUX facilities by truck (A2). The manufacturing stage (A3) begins with receipt of these materials, which are bent, cut, welded, and assembled into finished flaps and skylight systems. When required, additional parts like DSL grids and electronic components for home-automation systems are custom-cut and assembled to order.

Modules A4A5: Once manufacture is completed, products are shipped to distribution centers and then to the end user by truck (A4). For installation (A5), a 3% material installation loss was assumed. This module includes disposal of that waste and of the product packaging.

Modules C1C4 and D: At end of life (C1C4), the product is assumed to be collected, and each waste stream (e.g., aluminum, glass, PVC) is handled separatelylandfilled, recycled, or incinerated with energy recovery. Loads and benefits beyond the system boundary are considered in Module D (e.g., displacement of virgin materials and electricity).

LCA Discussion

Allocation Procedure

Allocation of co-products was avoided, to the extent possible, based on the guidance given in ISO 14044:2006, 4.3, and in EN 15804+A2:2019. Energy use at the facility level was allocated by the amount of product produced. The manufacturing process does not consume water or generate wastewater or air emissions, other than those from fuel combustion. Solid waste was estimated using packaging masses and material losses and allocated following the polluter pays principle.

Cut-off Procedure

The system boundary was defined based on relevance to the goal of the study. For the raw material (A1) and process related inputs (A3), all available energy and material flow data have been included in the model.

Renewable Electricity

Energy Attribute Certificates (EACs) such as Renewable Energy Certificates (RECs) or Power Purchase Agreements (PPAs) are included in the baseline reported results:	✕ No

Scenarios

Transport to the building/construction site (A4)

A4 Module

Fuel Type:	Diesel
Vehicle Type:	Truck and Trailer
Transport Distance:	150 km
Capacity Utilization:	33 %
Packaging Mass:	1.373 kg
Weight of products transported:	130.8 kg
Capacity utilization volume factor:	1
Assumptions for scenario development:	Transport distance includes finished product to distribution center and distribution center to point of sale.

Installation in to the building/construction site (A5)

A5 Module

Installation Scrap Rate Assumed:	3 %
Product Lost per Declared/Functional Unit:	3.882 kg
Mass of Packaging Waste Specified by Type:	1.373 kg
Biogenic Carbon Contained in Packaging:	0.1581 kg
Assumptions for scenario development:	

End of Life (C1 - C4)

C1 - C4 Modules

Collection Process

Collected with Mixed Construction Waste:	129.4 kg

Recovery

Recycling:	42.49 kg
Landfill:	72.81 kg
Incineration:	14.11 kg

Reuse, Recovery and / or Recycling Potentials & Relevant Scenario Information (D)

D Module

Recycling Rate of Product:	0.3283 %
Recycled Content of Product:	0.09531 %
Net Energy Benefit from Material Flow Declared in C3 for Energy Recovery:	672.4 MJ
Further assumptions for scenario development:	Energy recovery from incineration assumes 18% electrical efficiency and 31% thermal

Results

Environmental Impact Assessment Results

EF 3.1

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Impact Category	Method	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
GWP-total	EF 3.1	kg CO2 eq	2.14e+2	1.50e-2	9.40e+0	0	1.16e+0	2.48e+1	2.53e-1	-7.86e+1
GWP-biogenic	EF 3.1	kg CO2 eq	-1.04e+1	1.20e-5	2.93e-1	0	9.21e-4	1.31e+1	3.99e-2	5.39e-1
GWP-fossil	EF 3.1	kg CO2 eq	2.24e+2	1.50e-2	9.10e+0	0	1.15e+0	1.17e+1	2.13e-1	-7.91e+1
GWP-luluc	EF 3.1	kg CO2 eq	2.07e-1	7.33e-6	6.27e-3	0	5.63e-4	1.27e-4	2.89e-5	-1.02e-1
ODP	EF 3.1	kg CFC11 eq	6.73e-6	3.41e-10	2.06e-7	0	2.62e-8	1.44e-8	3.25e-9	-1.80e-6
AP	EF 3.1	mol H+ eq	1.56e+0	3.72e-5	4.76e-2	0	2.86e-3	4.11e-3	1.91e-3	-5.77e-1
EP-freshwater	EF 3.1	kg P eq	4.82e-2	1.11e-6	1.46e-3	0	8.52e-5	9.60e-5	1.16e-5	-1.97e-2
EP-marine	EF 3.1	kg N eq	2.83e-1	1.01e-5	8.89e-3	0	7.78e-4	2.28e-3	1.02e-3	-9.79e-2
EP-terrestrial	EF 3.1	mol N eq	3.19e+0	1.04e-4	9.92e-2	0	7.99e-3	2.03e-2	9.27e-3	-1.15e+0
POCP	EF 3.1	kg NMVOC eq	1.01e+0	6.07e-5	3.14e-2	0	4.66e-3	5.14e-3	2.81e-3	-3.47e-1
ADP-minerals&metals	EF 3.1	kg Sb eq	1.89e-3	4.20e-8	5.71e-5	0	3.23e-6	8.01e-7	8.59e-8	-2.12e-4
ADP-fossil	EF 3.1	MJ	3.03e+3	2.28e-1	9.22e+1	0	1.75e+1	3.37e+0	2.77e+0	-8.95e+2
WDP	EF 3.1	m3 depriv.	6.92e+1	1.09e-3	2.18e+0	0	8.36e-2	4.17e-1	1.10e-2	-1.20e+1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

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GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

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Resource Use Indicators

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

Indicator	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	5.12e+2	3.34e-3	1.54e+1	0	2.56e-1	1.18e-1	2.41e-2	-1.58e+2
PERM	MJ	0	0	0	0	0	0	0	0
PERT	MJ	5.12e+2	3.34e-3	1.54e+1	0	2.56e-1	1.18e-1	2.41e-2	-1.58e+2
PENRE	MJ	3.03e+3	2.28e-1	9.23e+1	0	1.75e+1	3.37e+0	2.77e+0	-8.95e+2
PENRM	MJ	8.31e-1	9.62e-6	2.50e-2	0	7.39e-4	1.28e-4	3.51e-5	-1.83e-1
PENRT	MJ	3.03e+3	2.28e-1	9.22e+1	0	1.75e+1	3.37e+0	2.77e+0	-8.95e+2
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m3	2.00e+0	3.09e-5	6.34e-2	0	2.37e-3	1.45e-2	2.63e-4	-4.30e-1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Waste and Output Flow Indicators

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

Indicator	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	0	0	0	0	0	0	0	0
NHWD	kg	4.57e-1	0	2.39e+0	0	0	0	7.23e+1	0
RWD	kg	3.87e-3	6.95e-8	1.17e-4	0	5.34e-6	1.45e-6	3.53e-7	-9.99e-4
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	4.58e-1	0	1.48e+0	0	0	0	4.25e+1	-4.39e+1
MER	kg	1.87e+0	0	1.45e+0	0	0	1.41e+1	0	-1.55e+1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Carbon Emissions and Removals

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

Indicator	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
Bio Carbon Removal from Product	kg C	-4.50e+0	0	-1.34e-1	0	0	0	0	0
Bio Carbon Emission from Product	kg C	3.42e-2	0	1.34e-1	0	0	4.24e+0	2.23e-1	0
Bio Carbon Removal from Packaging	kg C	-2.52e-1	0	0	0	0	0	0	0
Bio Carbon Emission from Packaging	kg C	9.41e-2	0	1.58e-1	0	0	0	0	0
Bio Carbon Emission from Waste during Manufac-turing (renewable source)	kg C	0	0	0	0	0	0	0	0
Calcination Carbon Re-moval	kg C	0	0	0	0	0	0	0	0
Carbonation Carbon Emission	kg C	0	0	0	0	0	0	0	0
Carbon Emission from Waste during Manu-facturing (non-renewable source)	kg C	0	0	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

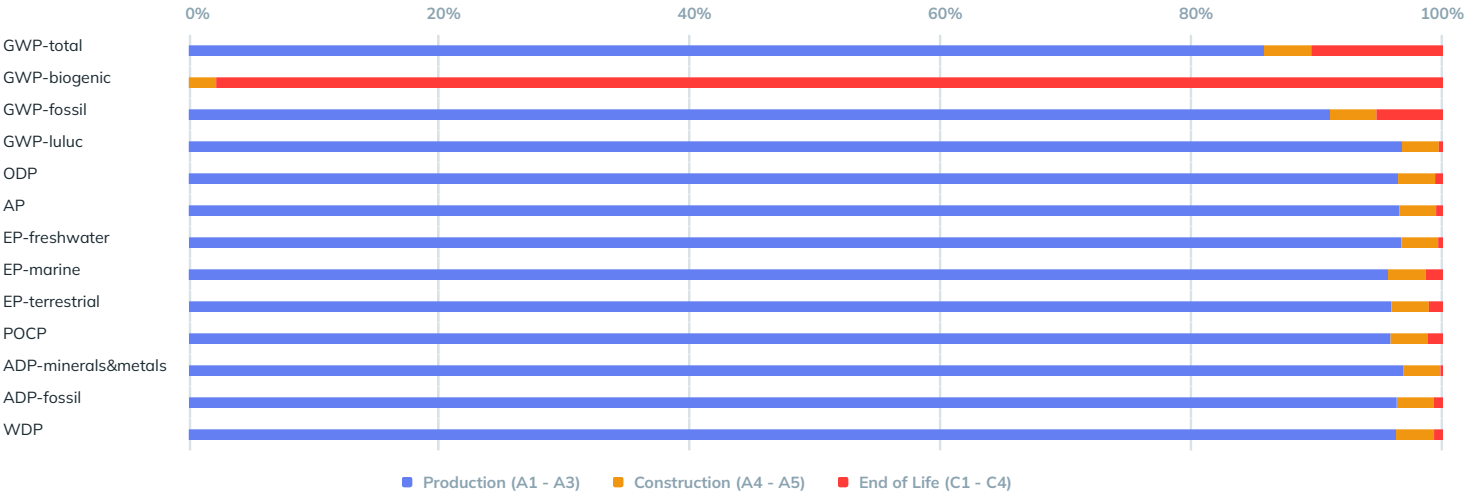
BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE = Calcination Carbon Emissions, CCR = Carbonation Carbon Removals, CWNR = Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes, GWP-luc = Carbon Emissions from Land-use Change.

Interpretation

• The manufacturing of the products in this analysis involves the direct procurement of raw materials from suppliers. These materials are then transported to manufacturing facilities in the EU where they are stored, processed, and combined to produce finished products. Notably, the product stage (stage 1) has the highest impact contribution, mainly attributed to the combined environmental impacts associated with raw material manufacturing and energy used in manufacturing the products.

• For products with significant manufacturing energy impacts, the shift to renewable energy sources is recommended.

• Given that the raw materials used in product manufacturing have a significant impact, exploration of opportunities to substitute these materials with alternatives that have a lower environmental impact. Additionally, consideration should be given to collaborating with suppliers who employ sustainable manufacturing techniques or integrate more renewable energy into their production processes. Such initiatives can lead to more environmentally friendly products and further enhance the sustainability of the products in this analysis.



Additional Environmental Information

None

Further Information

Name	Unit	Value
Heat transfer coefficient glass acc. to EN 674 / EN 675	W/(m²K)	0.5
Heat transfer coefficient window acc. to EN 674 / EN 675	W/(m²K)	1
Total energy transmittance	%	50
Joint permeability coefficient acc. to EN 1026	m³/mh	< 2.6
Water tightness acc. EN 12208 unprotected / protected	class	E1200
Deflection as a result of wind loads acc. to EN 12211	mm	< L/300
Fire resistance class (for fire windows and doors) DIN EN 16341	class	N/A (REI30 for HFS variant)
Mounting type (sealing system)	–	Factory timber-EPS upstand
Noise protection against external noise acc. DIN EN ISO 10140 and DIN EN ISO 717	dB	38
Air permeability acc. EN 12207	class	Class 4
Resistance against wind loads acc. DIN EN 12211	mm	C5
Radiation properties acc. EN 410 or 133631 and 2: Total energy transmittance g	%	50
Radiation properties EN 410 or 133631 and 2: Light transmisson level rv	%	73
Reaction to fire	class	B-s1,d0

References

• Institut Bauen und Umwelt e.V. (IBU). (2021). General Programme Instructions for the IBU EPD Programme Part A: Calculation Rules for the LifeCycle Assessment and Requirements on the Background Report. Version 2.0, 01032021. Berlin: IBU.

• Institut Bauen und Umwelt e.V. (IBU). (2021). Product Category Rules for Construction Products Part B: Requirements on the EPD for Windows and Doors. Version 1.7, 082021. Berlin: IBU.

• European Committee for Standardization (CEN). (2019). EN 15804:2012+A2:2019 Sustainability of construction works Environmental product declarations Core rules for the product category of construction products. Brussels: CEN. (Including AC:2021)

• International Organization for Standardization (ISO). (2006). ISO 14040:2006 Environmental management Life cycle assessment Principles and framework. Geneva: ISO. (Amendment 1:2020; confirmed current 2022)

• International Organization for Standardization (ISO). (2006). ISO 14044:2006 Environmental management Life cycle assessment Requirements and guidelines. Geneva: ISO. (Amendments 1:2017 and 2:2020 included; confirmed current 2022)

• International Organization for Standardization (ISO). (2006). ISO 14025:2006 Environmental labels and declarations Type III environmental declarations Principles and procedures. Geneva: ISO

• Eurostat. (2024). Circular Economy indicators. Waste management: https://ec.europa.eu/eurostat/web/circular-economy/database

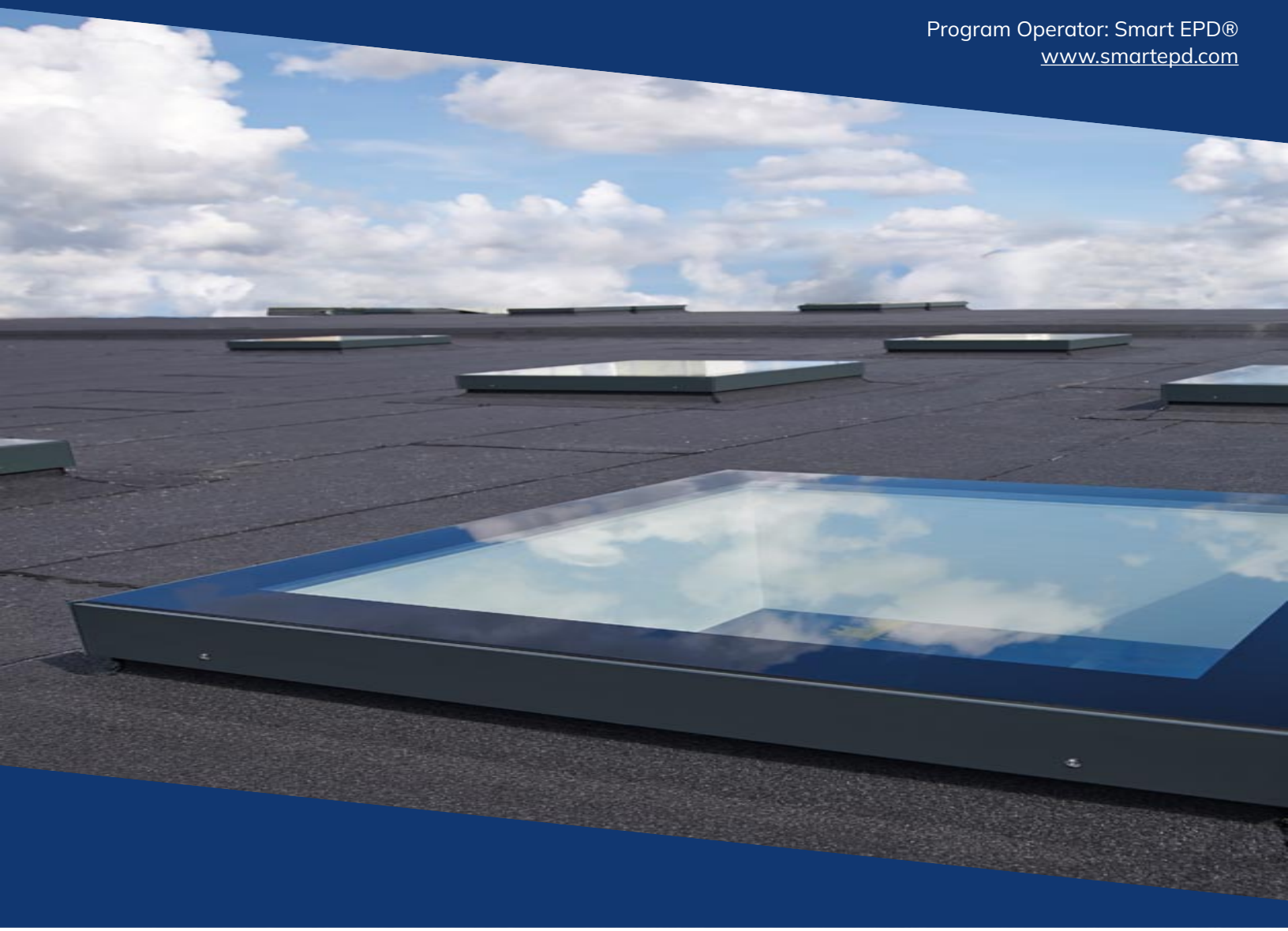
• Stichting National Environmental Database. (2022). Environmental Performance Assessment Method for Construction Works. version 1.1.

• European Committee for Standardization (CEN). (2019). EN 17074:2019 Sustainability of construction works Environmental product declarations Specific core rules for windows and doors. Brussels: CEN.

Environmental Product Declaration

IN ACCORDANCE WITH ISO 14025 AND EN 15804+A2

Program Operator: Smart EPD®
www.smartepd.com



Modular Rooflights Monolight Walk-on

Date of Issue	Expiration date	Last updated
Jul 28, 2025	**Jul 28, 2030**	**Jul 28, 2025**

Refer to the EPD Library at www.smartepd.com for the latest EPD listing information

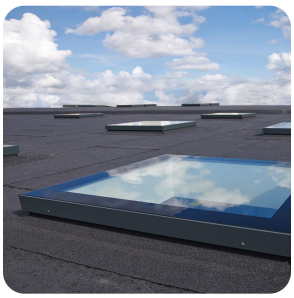
General Information

VELUX

Ådalsvej 99, 2970 Hørsholm, Denmark

+45 45164000

birthe.kjeldsen@velux.com velux.com



Product Name:	Modular Rooflights Monolight Walk-on
Declared Unit:	1 m2 of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m)
Declaration Number:	SmartEPD-2025-001-0558-01
Date of Issue:	July 28, 2025
Expiration:	July 28, 2030
Last updated:	July 28, 2025
EPD Scope:	Cradle to gate with other options A1 - A3, A4, A5, C1 - C4, D
Market(s) of Applicability:	Europe

General Organization Information

VELUX is a Danish manufacturing company that specializes in roof windows, skylights, sun tunnels and related accessories. The company is headquartered in Hrsholm, Denmark and is a part of VKR Holding A/S. VELUX Group is a founding partner of the global Active House Alliance.
Further information can be found at: https://www.velux.com

Limitations, Liability, and Ownership

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the whole building life cycle. EPD comparability is only possible when all stages of a life cycle have been considered. However, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared. The EPD owner has sole ownership, liability, and responsibility for the EPD.

Reference Standards

Standard(s):	ISO 14025 and EN 15804+A2
Core PCR:	IBU PCR for Building-Related Products and Services Part A v1.4 v.1.4 Date of issue: April 15, 2024
Sub-category PCR:	IBU Part B: Requirements on the EPD for Windows and Doors v.1.0/1.7/1.4 Date of issue: January 25, 2021 Valid until: January 25, 2026

Sub-category PCR review panel:	Contact Smart EPD for more information.
General Program Instructions:	Smart EPD General Program Instructions v.1.0, November 2022

Verification Information

LCA Author/Creator:	Juan David Villegas | juan@parqhq.com
EPD Program Operator:	Smart EPD | info@smartepd.com | www.smartepd.com 585 Grove St., Ste. 145 PMB 966, Herndon, VA 20170, USA
Verification:	Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071: External Rifat Karim | Independent Consultant | rifat.chimique@gmail.com Independent external verification of EPD, according to ISO 14025 and reference PCR(s): External Rifat Karim | Independent Consultant | rifat.chimique@gmail.com

Product Information

Declared Unit:	1 m2 of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m)
Mass:	164.793 kg
Reference Service Life:	30 Years
Product Specificity:	✗ Product Average ✓ Product Specific

Product Description

A walkable single unit flat glass rooflight that direct daylight into a building under an accessible roof. Prefabricated top unit with a special double glazing unit and optional anti-slip coating.
Further information can be found at: https://commercial.velux.co.uk/products/domes-rooflights-and-flat-glass-rooflights/modular-rooflights/solutions/monolight

Product Specifications

Product Classification Codes:	EC3 - Openings -> TranslucentWallAndRoofAssemblies

Material Composition

Material/Component Category	Origin	% Mass
Blind rivets, nuts , screws, plates	DNK	0.63
Gaskets, washers	DEU, POL, DNK	1.66
Glazing	LTU	87.77
Profiles, support brackets, tubes and strips	DNK	5.77
Upstand	POL	4.16

Packaging Material	Origin	kg Mass
Cardboard		0.26
Pallet		0.16
Plastic cover		1.32

Biogenic Carbon Content	kg C per m2
Biogenic carbon content in product	0.09
Biogenic carbon content in accompanying packaging	0.2

Hazardous Materials
No regulated hazardous or dangerous substances are included in this product.

EPD Data Specificity

Primary Data Year: Jan 1, 2024 - Dec 31, 2024

Manufacturing Specificity:

- ✗ Industry Average
- ✗ Manufacturer Average
- ✓ Facility Specific

Averaging:

Averaging was not conducted for this EPD

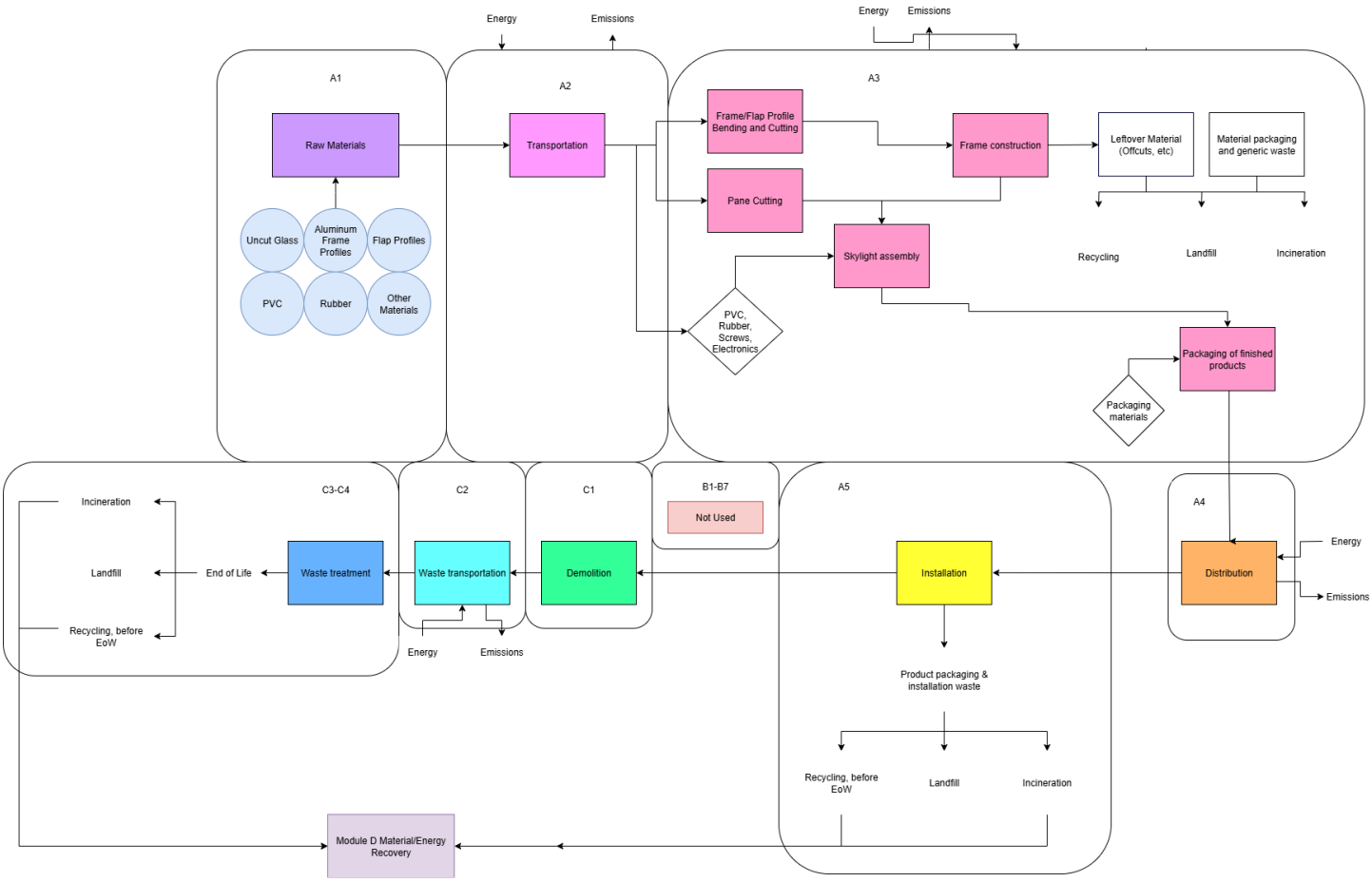
System Boundary

Production	A1	Raw material supply	✓
	A2	Transport	✓
	A3	Manufacturing	✓
Construction	A4	Transport to site	✓
	A5	Assembly / Install	✓
Use	B1	Use	ND
	B2	Maintenance	ND
	B3	Repair	ND
	B4	Replacement	ND
	B5	Refurbishment	ND
	B6	Operational Energy Use	ND
	B7	Operational Water Use	ND
End of Life	C1	Deconstruction	✓
	C2	Transport	✓
	C3	Waste Processing	✓
	C4	Disposal	✓
Benefits & Loads Beyond System Boundary	D	Recycling, Reuse Recovery Potential	✓

Plants

Opmeer, NL
De Veken 308, 1716 KJ

Product Flow Diagram



VELUX product manufacturing begins when flap profile parts, uncut glazing, aluminum or plastic profiles, vertical end pieces, and other small components such as screws and gaskets are bent, cut, welded, and assembled into complete flaps and skylight systems. If needed, extra components like DSL grids and electronic parts for home-automation systems are custom-cut and assembled to specification. Once manufacturing is finished, products are delivered to distribution centers and then transported to the end user by truck.

Software and Database

LCA Software:	SimaPro v. 9.5
LCI Foreground Database(s):	Ecoinvent v. 3.9.1
LCI Background Database(s):	Ecoinvent v. 3.9.1

Data Quality

Precision & Completeness

• **Precision:** Inventory data were directly measured, calculated, or conservatively estimated from primary sources using consistent units and QA checks. Background processes from ecoinvent v3 were adopted with their documented uncertainty/precision metadata where available, preserving a transparent record of data quality.

• **Completeness:** The product system's mass balance and inventory completeness were thoroughly checked. Some exclusions were made in line with the PCR requirements, such as personnel impacts, R&D activities, business travel, and point-of-sale infrastructure. However, no data were intentionally omitted.

Consistency and Reproducibility

• **Consistency:** Primary data for all modules were consistently gathered aiming at the highest level of detail possible. Background processes were modeled mainly with the ecoinvent database. The same allocation rules, cut-off criteria, and impact assessment methods were applied throughout, ensuring methodological coherence and consistent data quality across the entire LCA model.

• **Reproducibility:** This study ensures reproducibility by providing comprehensive disclosure of inputoutput data, dataset choices, and modeling approaches. A knowledgeable third party should be able to approximate the results using the same data and modeling methods.

Representativeness

• **Temporal:** Primary data were collected for a 12-month period representing the 2024 calendar year to ensure the representativeness of post-consumer content. Secondary data from the ecoinvent v3 database are typically representative of recent years.

• **Geographical:** Primary data represent VELUX's production facilities. Where applicable, differences in electric grid mix were considered using appropriate secondary data. The use of country-specific data ensures high geographical representativeness, and proxy data were only used when country-specific data were unavailable.

• **Technological:** Both primary and secondary data were tailored to the specific technologies studied, ensuring high technological representativeness.

Life Cycle Module Descriptions

Modules A1A3: The LCA model covers the manufacture of raw materials and components for VELUX products (A1) which are then transported to VELUX facilities by truck (A2). The manufacturing stage (A3) begins with receipt of these materials, which are bent, cut, welded, and assembled into finished flaps and skylight systems. When required, additional parts like DSL grids and electronic components for home-automation systems are custom-cut and assembled to order.

Modules A4A5: Once manufacture is completed, products are shipped to distribution centers and then to the end user by truck (A4). For installation (A5), a 3% material installation loss was assumed. This module includes disposal of that waste and of the product packaging.

Modules C1C4 and D: At end of life (C1C4), the product is assumed to be collected, and each waste stream (e.g., aluminum, glass, PVC) is handled separatelylandfilled, recycled, or incinerated with energy recovery. Loads and benefits beyond the system boundary are considered in Module D (e.g., displacement of virgin materials and electricity).

LCA Discussion

Allocation Procedure

Allocation of co-products was avoided, to the extent possible, based on the guidance given in ISO 14044:2006, 4.3, and in EN 15804+A2:2019. Energy use at the facility level was allocated by the amount of product produced. The manufacturing process does not consume water or generate wastewater or air emissions, other than those from fuel combustion. Solid waste was estimated using packaging masses and material losses and allocated following the polluter pays principle.

Cut-off Procedure

The system boundary was defined based on relevance to the goal of the study. For the raw material (A1) and process related inputs (A3), all available energy and material flow data have been included in the model.

Renewable Electricity

Energy Attribute Certificates (EACs) such as Renewable Energy Certificates (RECs) or Power Purchase Agreements (PPAs) are included in the baseline reported results:	✕ No

Scenarios

Transport to the building/construction site (A4)

A4 Module

Fuel Type:	Diesel
Vehicle Type:	Truck and Trailer
Transport Distance:	150 km
Capacity Utilization:	33 %
Packaging Mass:	1.748 kg
Weight of products transported:	166.5 kg
Capacity utilization volume factor:	1
Assumptions for scenario development:	Transport distance includes finished product to distribution center and distribution center to point of sale.

Installation in to the building/construction site (A5)

A5 Module

Installation Scrap Rate Assumed:	3 %
Product Lost per Declared/Functional Unit:	4.944 kg
Mass of Packaging Waste Specified by Type:	1.748 kg
Biogenic Carbon Contained in Packaging:	0.2014 kg
Assumptions for scenario development:	

End of Life (C1 - C4)

C1 - C4 Modules

Collection Process

Collected with Mixed Construction Waste:	164.8 kg

Recovery

Recycling:	51.84 kg
Landfill:	98.91 kg
Incineration:	14.05 kg

Reuse, Recovery and / or Recycling Potentials & Relevant Scenario Information (D)

D Module

Recycling Rate of Product:	0.3146 %
Recycled Content of Product:	0.1014 %
Net Energy Benefit from Material Flow Declared in C3 for Energy Recovery:	788.5 MJ
Further assumptions for scenario development:	Energy recovery from incineration assumes 18% electrical efficiency and 31% thermal

Results

Environmental Impact Assessment Results

EF 3.1

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Impact Category	Method	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
GWP-total	EF 3.1	kg CO2 eq	2.68e+2	1.50e-2	1.17e+1	0	1.46e+0	2.69e+1	3.15e-1	-8.92e+1
GWP-biogenic	EF 3.1	kg CO2 eq	-6.78e+0	1.20e-5	3.51e-1	0	1.17e-3	9.53e+0	2.90e-2	6.14e-1
GWP-fossil	EF 3.1	kg CO2 eq	2.74e+2	1.50e-2	1.13e+1	0	1.46e+0	1.74e+1	2.86e-1	-8.97e+1
GWP-luluc	EF 3.1	kg CO2 eq	2.09e-1	7.33e-6	6.32e-3	0	7.13e-4	1.60e-4	3.66e-5	-9.88e-2
ODP	EF 3.1	kg CFC11 eq	6.81e-6	3.41e-10	2.09e-7	0	3.32e-8	1.96e-8	4.34e-9	-2.46e-6
AP	EF 3.1	mol H+ eq	1.94e+0	3.72e-5	5.93e-2	0	3.62e-3	5.01e-3	2.58e-3	-6.70e-1
EP-freshwater	EF 3.1	kg P eq	5.09e-2	1.11e-6	1.54e-3	0	1.08e-4	9.64e-5	1.51e-5	-1.91e-2
EP-marine	EF 3.1	kg N eq	3.46e-1	1.01e-5	1.09e-2	0	9.85e-4	2.82e-3	1.27e-3	-1.12e-1
EP-terrestrial	EF 3.1	mol N eq	3.94e+0	1.04e-4	1.23e-1	0	1.01e-2	2.46e-2	1.25e-2	-1.32e+0
POCP	EF 3.1	kg NMVOC eq	1.24e+0	6.07e-5	3.85e-2	0	5.91e-3	6.22e-3	3.79e-3	-3.92e-1
ADP-minerals&metals	EF 3.1	kg Sb eq	2.01e-3	4.20e-8	6.05e-5	0	4.09e-6	1.01e-6	1.10e-7	-2.60e-4
ADP-fossil	EF 3.1	MJ	3.82e+3	2.28e-1	1.16e+2	0	2.22e+1	4.11e+0	3.70e+0	-1.03e+3
WDP	EF 3.1	m3 depriv.	7.84e+1	1.09e-3	2.49e+0	0	1.06e-1	7.05e-1	1.17e-2	-1.39e+1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase when product performance and specifications have been established and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted. Any comparison of EPDs shall be subject to the requirements of ISO 21930 or EN 15804. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparison can be inaccurate, and could lead to erroneous selection of materials or products which are higher-impact, at least in some impact categories.

Resource Use Indicators

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

Indicator	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	4.53e+2	3.34e-3	1.36e+1	0	3.24e-1	1.53e-1	3.14e-2	-1.38e+2
PERM	MJ	0	0	0	0	0	0	0	0
PERT	MJ	4.53e+2	3.34e-3	1.36e+1	0	3.24e-1	1.53e-1	3.14e-2	-1.38e+2
PENRE	MJ	3.82e+3	2.28e-1	1.16e+2	0	2.22e+1	4.11e+0	3.70e+0	-1.03e+3
PENRM	MJ	8.90e-1	9.62e-6	2.68e-2	0	9.35e-4	1.66e-4	4.52e-5	-1.92e-1
PENRT	MJ	3.81e+3	2.28e-1	1.16e+2	0	2.22e+1	4.11e+0	3.70e+0	-1.03e+3
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m3	2.22e+0	3.09e-5	7.11e-2	0	3.01e-3	2.32e-2	2.82e-4	-4.71e-1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Waste and Output Flow Indicators

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

Indicator	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	0	0	0	0	0	0	0	0
NHWD	kg	1.32e+0	0	3.26e+0	0	0	0	9.86e+1	0
RWD	kg	4.18e-3	6.95e-8	1.26e-4	0	6.76e-6	1.89e-6	4.55e-7	-1.04e-3
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	4.10e-1	0	1.81e+0	0	0	0	5.18e+1	-5.36e+1
MER	kg	2.55e+0	0	1.73e+0	0	0	1.40e+1	0	-1.57e+1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Carbon Emissions and Removals

per 1 m2 of product of a window ≤ 2,3 m² (reference dimensions according to EN 17213: 1,23 m × 1,48 m) .

Indicator	Unit	A1A2A3	A4	A5	C1	C2	C3	C4	D
Bio Carbon Removal from Product	kg C	-3.33e+0	0	-9.74e-2	0	0	0	0	0
Bio Carbon Emission from Product	kg C	8.64e-2	0	9.74e-2	0	0	3.09e+0	1.62e-1	0
Bio Carbon Removal from Packaging	kg C	-2.54e-1	0	0	0	0	0	0	0
Bio Carbon Emission from Packaging	kg C	5.30e-2	0	2.01e-1	0	0	0	0	0
Bio Carbon Emission from Waste during Manufac-turing (renewable source)	kg C	0	0	0	0	0	0	0	0
Calcination Carbon Re-moval	kg C	0	0	0	0	0	0	0	0
Carbonation Carbon Emission	kg C	0	0	0	0	0	0	0	0
Carbon Emission from Waste during Manu-facturing (non-renewable source)	kg C	0	0	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

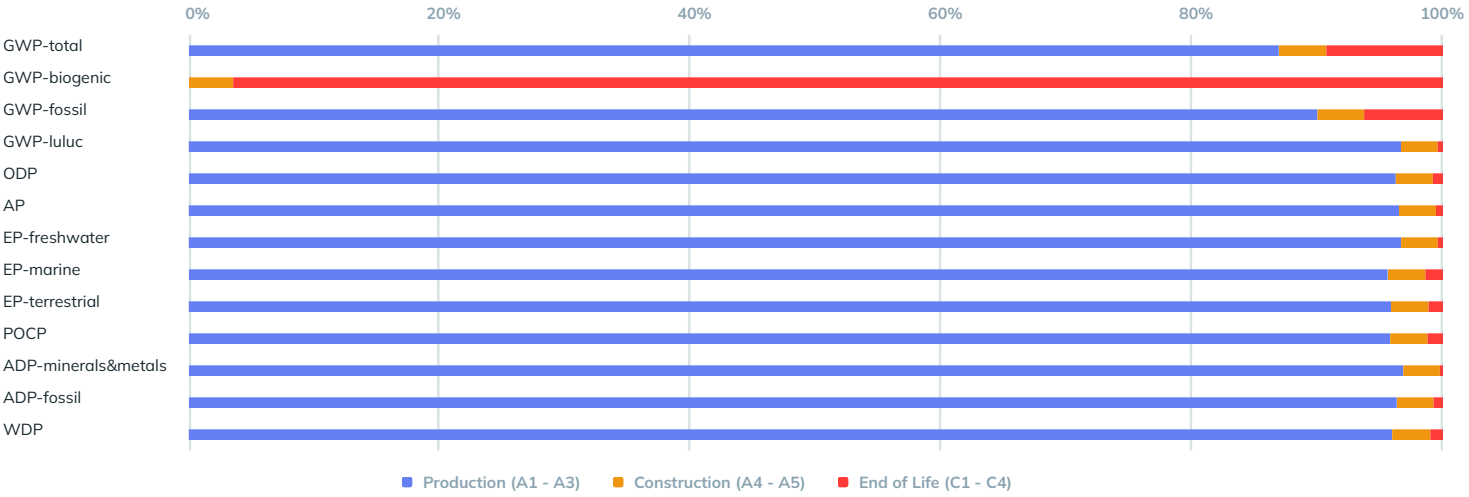
BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE = Calcination Carbon Emissions, CCR = Carbonation Carbon Removals, CWNR = Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes, GWP-luc = Carbon Emissions from Land-use Change.

Interpretation

• The manufacturing of the products in this analysis involves the direct procurement of raw materials from suppliers. These materials are then transported to manufacturing facilities in the EU where they are stored, processed, and combined to produce finished products. Notably, the product stage (stage 1) has the highest impact contribution, mainly attributed to the combined environmental impacts associated with raw material manufacturing and energy used in manufacturing the products.

• For products with significant manufacturing energy impacts, the shift to renewable energy sources is recommended.

• Given that the raw materials used in product manufacturing have a significant impact, exploration of opportunities to substitute these materials with alternatives that have a lower environmental impact. Additionally, consideration should be given to collaborating with suppliers who employ sustainable manufacturing techniques or integrate more renewable energy into their production processes. Such initiatives can lead to more environmentally friendly products and further enhance the sustainability of the products in this analysis.



Additional Environmental Information

None

Further Information

Name	Unit	Value
Heat transfer coefficient glass acc. to EN 674 / EN 675	W/(m²K)	1.3
Heat transfer coefficient window acc. to EN 674 / EN 675	W/(m²K)	2
Water tightness acc. EN 12208 unprotected / protected	class	E1200
Mounting type (sealing system)	–	Factory timber upstand (rockwool for Vario Walk-on type)
Air permeability acc. EN 12207	class	Class 4
Resistance against wind loads acc. DIN EN 12211	mm	C5
Radiation properties EN 410 or 133631 and 2: Light transmisson level rv	%	73
Reaction to fire	class	B-s1,d0

References

• Institut Bauen und Umwelt e.V. (IBU). (2021). General Programme Instructions for the IBU EPD Programme Part A: Calculation Rules for the LifeCycle Assessment and Requirements on the Background Report. Version 2.0, 01032021. Berlin: IBU.

• Institut Bauen und Umwelt e.V. (IBU). (2021). Product Category Rules for Construction Products Part B: Requirements on the EPD for Windows and Doors. Version 1.7, 082021. Berlin: IBU.

• European Committee for Standardization (CEN). (2019). EN 15804:2012+A2:2019 Sustainability of construction works Environmental product declarations Core rules for the product category of construction products. Brussels: CEN. (Including AC:2021)

• International Organization for Standardization (ISO). (2006). ISO 14040:2006 Environmental management Life cycle assessment Principles and framework. Geneva: ISO. (Amendment 1:2020; confirmed current 2022)

• International Organization for Standardization (ISO). (2006). ISO 14044:2006 Environmental management Life cycle assessment Requirements and guidelines. Geneva: ISO. (Amendments 1:2017 and 2:2020 included; confirmed current 2022)

• International Organization for Standardization (ISO). (2006). ISO 14025:2006 Environmental labels and declarations Type III environmental declarations Principles and procedures. Geneva: ISO

• Eurostat. (2024). Circular Economy indicators. Waste management: https://ec.europa.eu/eurostat/web/circular-economy/database

• Stichting National Environmental Database. (2022). Environmental Performance Assessment Method for Construction Works. version 1.1.

• European Committee for Standardization (CEN). (2019). EN 17074:2019 Sustainability of construction works Environmental product declarations Specific core rules for windows and doors. Brussels: CEN.