



SHI PRODUCT PASSPORT

Find products. Certify buildings.

SHI Product Passport No.:

15305-10-1005

VELUX Glazing planes VGP

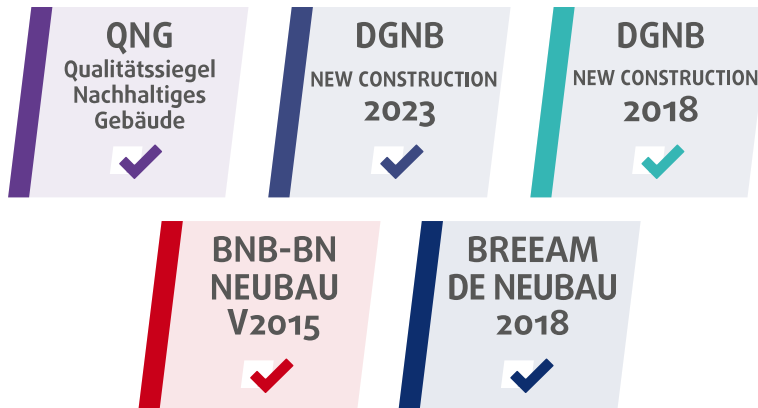
Product group: Skylight - Aluminum Windows - Skylights



VELUX A/S
Aadalsvej 99
2970 Hørsholm



Product qualities:








Köttner

Helmut Köttner
Scientific Director

Freiburg, 26 November 2025



Content

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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





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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.

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



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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.

Aluminium

| 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. | |

| 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./ We offer products which operated through electric/solar powered sources, which results in an automatised 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 |
|---|---|
| SOC2.1 Barrier-free design (*) | 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 | | | |



Beschichtung

| Criteria | No. / Relevant building components / construction materials / surfaces | Considered substances / aspects | Quality level |
|--|--|--|-----------------|
| ENV 1.2 Local environmental impact, 03.05.2024 (3rd edition) | 1 Coatings on non-mineral substrates: metals, wood, plastics | VVOC, VOC, SVOC Emissionen oder Gehalt | 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) | 1 Coatings on non-mineral substrates: metals, wood, plastics | VVOC, VOC, SVOC Emissionen oder Gehalt | Quality level 4 |
| Verification: Herstellererklärung vom 04.08.2025 | | | |



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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.

Aluminium

| 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

Beschichtung

| Criteria | No. / Relevant building components / construction materials / surfaces | Considered substances / aspects | Quality level |
|------------------------------------|--|---------------------------------|-----------------|
| ENV 1.2 Local environmental impact | 1 Coatings on non-mineral subsurfaces | VOC | Quality level 4 |

Verification: Herstellererklärung vom 04.08.2025



Product:

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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).

Aluminium

| 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

Beschichtung

| Criteria | Pos. / product type | Considered substance group | Quality level |
|-------------------------------------|---|--|-----------------|
| 1.1.6 Risiken für die lokale Umwelt | 3a Paints, stains, varnishes including priming coats (according to Decopaint Directive, Category D + E + F) | VOC / hazardous substances / heavy metals (lead, cadmium, chromium VI) | Quality level 5 |

Verification: Herstellererklärung vom 04.08.2025



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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 |



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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.



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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%BCfverfahren/C3%BCr%20Produkte>

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Publisher

Sentinel Holding Institut GmbH
Bötzingen Str. 38
79111 Freiburg im Breisgau
Tel.: +49 761 59048170
info@sentinel-holding.eu
www.sentinel-holding.eu

To whom it may concern



VELUX A/S
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 none¹ 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

A handwritten signature in black ink that reads "Birthe Kjeldsen". The signature is written in a cursive, flowing style.

Senior manager

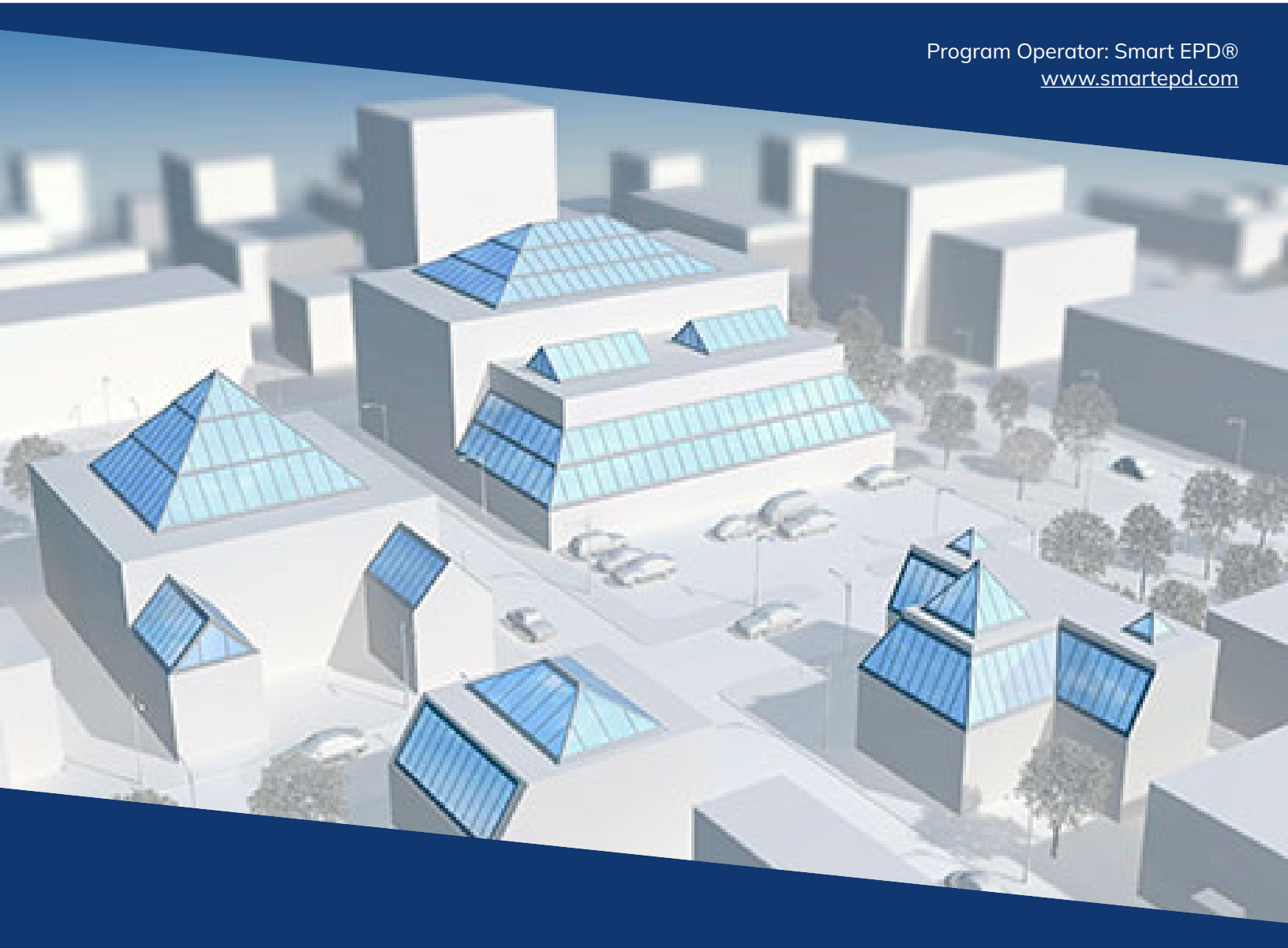
Technical Values

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.



Glazing Panels - Double Glazed

Date of Issue

Jul 30, 2025

Expiration date

Jul 30, 2030

Last updated

Jul 30, 2025

VELUX®

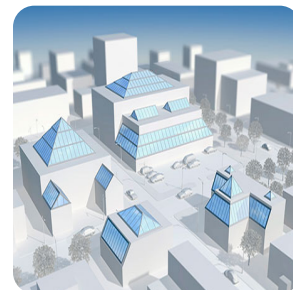
General Information

VELUX

Ådalsvej 99, 2970 Hørsholm, Denmark

+45 45164000

birthe.kjeldsen@velux.com [velux.com](https://www.velux.com)



| | |
|-----------------------------|--|
| Product Name: | Glazing Panels - Double Glazed |
| Declared Unit: | 1 m2 of a window $\leq 2,3 \text{ m}^2$ (reference dimensions according to EN 17213: 1,23 m \times 1,48 m) |
| Declaration Number: | SmartEPD-2025-001-0562-01 |
| 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 Hørsholm, 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 $\leq 2,3 \text{ m}^2$ (reference dimensions according to EN 17213: 1,23 m \times 1,48 m)



Mass:

48.1078 kg

Reference Service Life:

30 Years

Product Specificity:

 Product Average
 Product Specific

Product Description

A bespoke glass system with slim and shallow profiles for optimal daylight influx. VELUX Glazing Panels enable the creation of a wide range of rooflight designs from flush installations in a pitched roof to pyramids on a flat roof.

Further information can be found at: <https://commercial.velux.co.uk/products/glass-roof-systems/glazing-panels>

Product Specifications

Product Classification Codes:

EC3 - Openings -> TranslucentWallAndRoofAssemblies

Material Composition

| Material/Component Category | Origin | % Mass |
|--|----------|--------|
| Blind rivets, nuts , screws, plates | DNK, LTU | 4.19 |
| Gaskets, washers | DNK, LTU | 0.86 |
| Glazing | LTU | 80.47 |
| Profiles, support brackets, tubes and strips | LVA, DNK | 14.48 |

| Packaging Material | Origin | kg Mass |
|--------------------|--------|---------|
| Cardboard | | 0.08 |
| Pallet | | 0.05 |
| Plastic cover | | 0.39 |

| Biogenic Carbon Content | kg C per m2 |
|---|-------------|
| Biogenic carbon content in product | None |
| Biogenic carbon content in accompanying packaging | 0.06 |

| 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

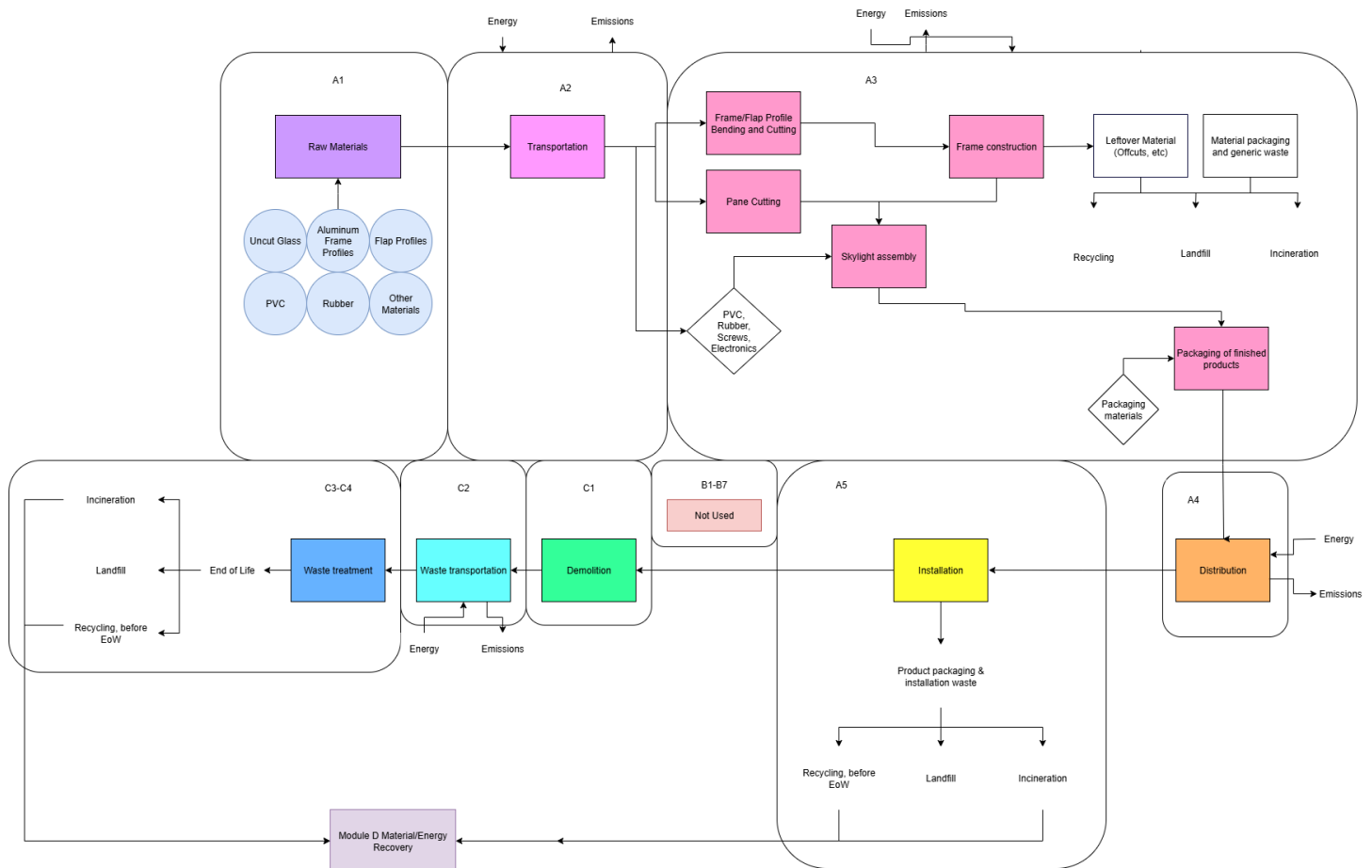
| | | | |
|---|----|-------------------------------------|----|
| Production | A1 | Raw material supply | ✓ |
| | A2 | Transport | ✓ |
| | A3 | Manufacturing | ✓ |
| Construction | A4 | Transport to site | ✓ |
| | A5 | Assembly / Install | ✓ |
| Use | B1 | Use | ND |
| | B2 | Maintenance | ND |
| | B3 | 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 | ✓ |
| Benefits & Loads Beyond System Boundary | D | Recycling, Reuse Recovery Potential | ✓ |

Plants



Voerde, DE
Alte Hünxer Str. 179, 46562 Voerde (Niederrhein)-Friedrichsfeld, Germany

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 input/output 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 separately (landfilled, 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: | 0.5104 kg |
| Weight of products transported: | 48.62 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: | 1.443 kg |
| Mass of Packaging Waste Specified by Type: | 0.5104 kg |
| Biogenic Carbon Contained in Packaging: | 0.05878 kg |
| Assumptions for scenario development: | |

End of Life (C1 - C4)

C1 - C4 Modules

Collection Process

| | |
|--|----------|
| Collected with Mixed Construction Waste: | 48.11 kg |
|--|----------|

Recovery

| | |
|---------------|----------|
| Recycling: | 19.4 kg |
| Landfill: | 27.02 kg |
| Incineration: | 1.689 kg |

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

D Module

| | |
|---|---|
| Recycling Rate of Product: | 0.4032 % |
| Recycled Content of Product: | 0.09491 % |
| Net Energy Benefit from Material Flow Declared in C3 for Energy Recovery: | 135.9 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 $\leq 2,3 \text{ m}^2$ (reference dimensions according to EN 17213: 1,23 m \times 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 | 1.07e+2 | 1.50e-2 | 4.16e+0 | 0 | 3.94e-1 | 3.56e+0 | 7.74e-2 | -4.07e+1 |
| GWP-biogenic | EF 3.1 | kg CO2 eq | 1.28e+0 | 1.20e-5 | 1.16e-1 | 0 | 3.14e-4 | 2.79e-4 | 1.73e-5 | 2.26e-1 |
| GWP-fossil | EF 3.1 | kg CO2 eq | 1.06e+2 | 1.50e-2 | 4.04e+0 | 0 | 3.93e-1 | 3.56e+0 | 7.73e-2 | -4.09e+1 |
| GWP-luluc | EF 3.1 | kg CO2 eq | 1.07e-1 | 7.33e-6 | 3.22e-3 | 0 | 1.92e-4 | 2.87e-5 | 9.19e-6 | -6.30e-2 |
| ODP | EF 3.1 | kg CFC11 eq | 3.39e-6 | 3.41e-10 | 1.03e-7 | 0 | 8.93e-9 | 3.72e-9 | 1.16e-9 | -7.37e-7 |
| AP | EF 3.1 | mol H+ eq | 6.84e-1 | 3.72e-5 | 2.08e-2 | 0 | 9.73e-4 | 8.27e-4 | 6.98e-4 | -2.80e-1 |
| EP-freshwater | EF 3.1 | kg P eq | 2.43e-2 | 1.11e-6 | 7.34e-4 | 0 | 2.90e-5 | 1.10e-5 | 3.93e-6 | -1.20e-2 |
| EP-marine | EF 3.1 | kg N eq | 1.28e-1 | 1.01e-5 | 3.97e-3 | 0 | 2.65e-4 | 4.69e-4 | 3.13e-4 | -4.72e-2 |
| EP-terrestrial | EF 3.1 | mol N eq | 1.40e+0 | 1.04e-4 | 4.32e-2 | 0 | 2.72e-3 | 4.01e-3 | 3.40e-3 | -5.29e-1 |
| POCP | EF 3.1 | kg NMVOC eq | 4.39e-1 | 6.07e-5 | 1.35e-2 | 0 | 1.59e-3 | 1.02e-3 | 1.03e-3 | -1.70e-1 |
| ADP-minerals&metals | EF 3.1 | kg Sb eq | 1.10e-3 | 4.20e-8 | 3.30e-5 | 0 | 1.10e-6 | 1.79e-7 | 2.77e-8 | -8.60e-5 |
| ADP-fossil | EF 3.1 | MJ | 1.41e+3 | 2.28e-1 | 4.29e+1 | 0 | 5.97e+0 | 7.09e-1 | 9.90e-1 | -4.54e+2 |
| WDP | EF 3.1 | m3 depriv. | 2.67e+1 | 1.09e-3 | 8.39e-1 | 0 | 2.85e-2 | 1.60e-1 | 2.21e-3 | -5.51e+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 | 1.05e+2 | 3.34e-3 | 3.15e+0 | 0 | 8.73e-2 | 2.79e-2 | 8.17e-3 | -4.25e+1 |
| PERM | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERT | MJ | 1.05e+2 | 3.34e-3 | 3.15e+0 | 0 | 8.73e-2 | 2.79e-2 | 8.17e-3 | -4.25e+1 |
| PENRE | MJ | 1.41e+3 | 2.28e-1 | 4.29e+1 | 0 | 5.97e+0 | 7.09e-1 | 9.90e-1 | -4.54e+2 |
| PENRM | MJ | 4.12e-1 | 9.62e-6 | 1.24e-2 | 0 | 2.52e-4 | 3.09e-5 | 1.16e-5 | -1.03e-1 |
| PENRT | MJ | 1.41e+3 | 2.28e-1 | 4.29e+1 | 0 | 5.97e+0 | 7.09e-1 | 9.90e-1 | -4.54e+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 | m ³ | 8.13e-1 | 3.09e-5 | 2.56e-2 | 0 | 8.09e-4 | 5.05e-3 | 5.31e-5 | -2.24e-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, NRPERT 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 | 3.66e-1 | 0 | 8.99e-1 | 0 | 0 | 0 | 2.70e+1 | 0 |
| RWD | kg | 1.80e-3 | 6.95e-8 | 5.42e-5 | 0 | 1.82e-6 | 3.48e-7 | 1.17e-7 | -5.74e-4 |
| CRU | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MFR | kg | 5.78e-1 | 0 | 6.69e-1 | 0 | 0 | 0 | 1.94e+1 | -2.00e+1 |
| MER | kg | 7.03e-1 | 0 | 4.33e-1 | 0 | 0 | 1.69e+0 | 0 | -2.10e+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:

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 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bio Carbon Emission from Product | kg C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bio Carbon Removal from Packaging | kg C | -2.30e-1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bio Carbon Emission from Packaging | kg C | 1.71e-1 | 0 | 5.88e-2 | 0 | 0 | 0 | 0 | 0 |
| Bio Carbon Emission from Waste during Manufacturing (renewable source) | kg C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Calcination Carbon Removal | 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 Manufacturing (non-renewable source) | kg C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Note:

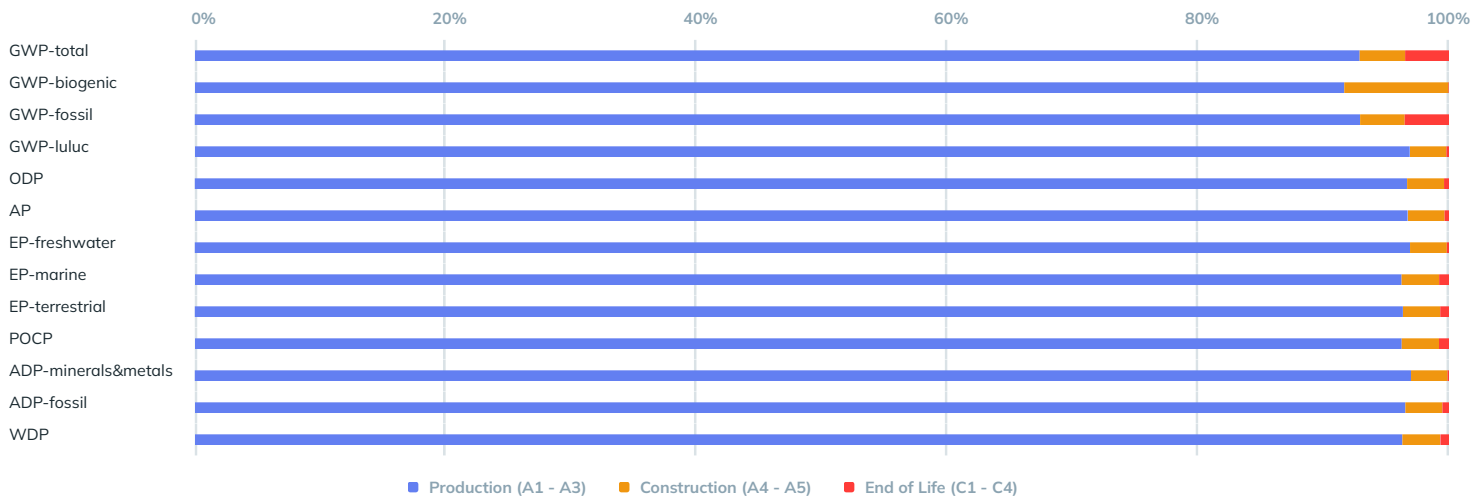
Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

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

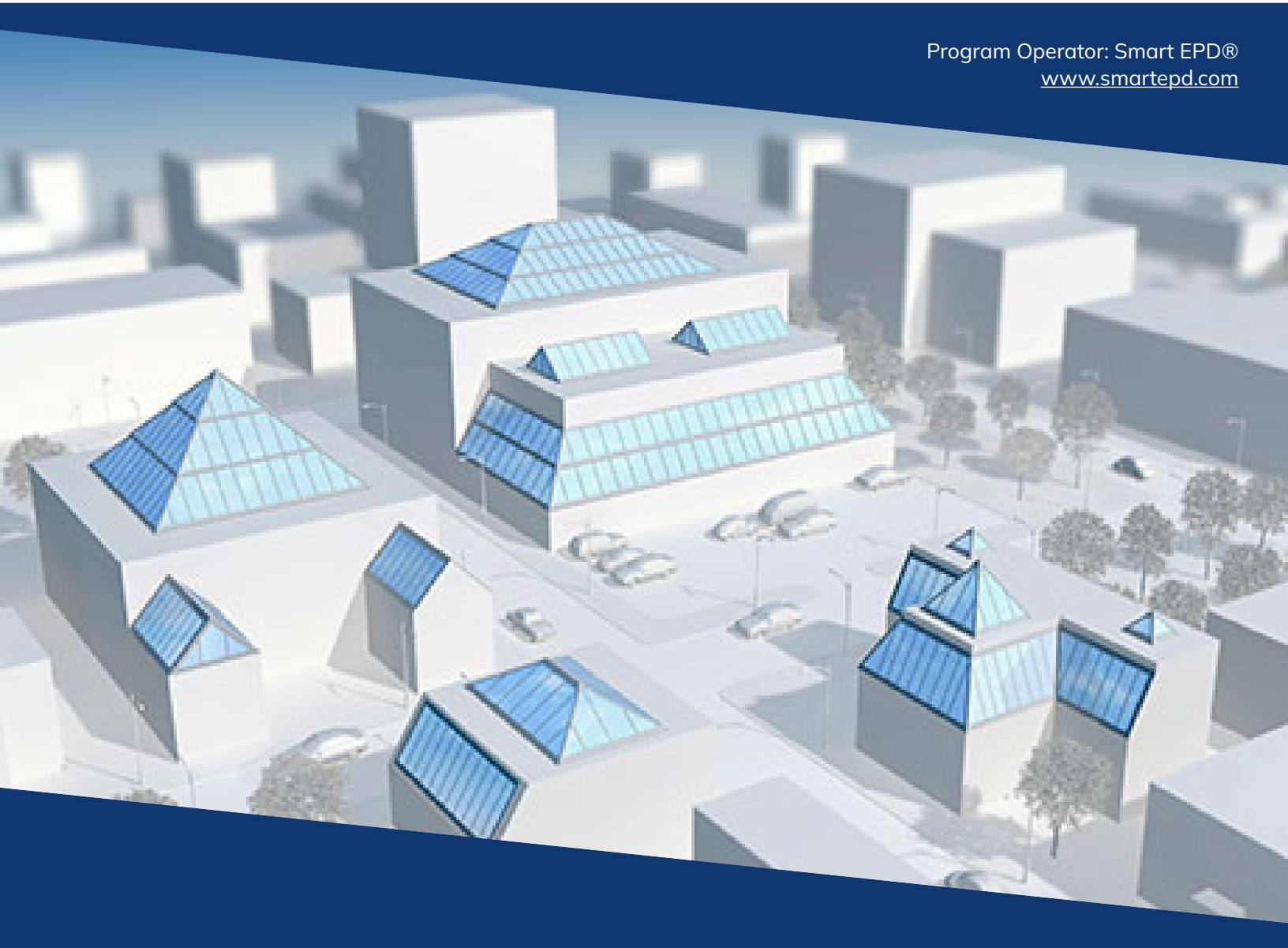
Further Information

| 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) | ~1.3 |
| Total energy transmittance | % | ~62 |
| 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 |
| Mounting type (sealing system) | – | Installed on bespoke sub-construction |
| Noise protection against external noise acc. DIN EN ISO 10140 and DIN EN ISO 717 | dB | ~35 |
| 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 | % | ~62 |
| Radiation properties EN 410 or 133631 and 2: Light transmission level rv | % | ~75 |
| 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, 08/2021. 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.



Glazing Panels - Triple Glazed

Date of Issue

Jul 30, 2025

Expiration date

Jul 30, 2030

Last updated

Jul 30, 2025

VELUX®

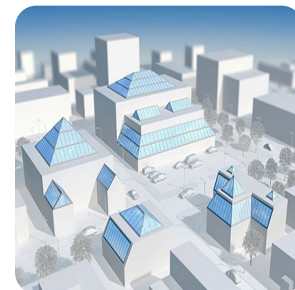
General Information

VELUX

Ådalsvej 99, 2970 Hørsholm, Denmark

+45 45164000

birthe.kjeldsen@velux.com [velux.com](https://www.velux.com)



| | |
|-----------------------------|--|
| Product Name: | Glazing Panels - Triple Glazed |
| Declared Unit: | 1 m2 of a window $\leq 2,3 \text{ m}^2$ (reference dimensions according to EN 17213: 1,23 m \times 1,48 m) |
| Declaration Number: | SmartEPD-2025-001-0563-01 |
| 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 Hørsholm, 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 $\leq 2,3 \text{ m}^2$ (reference dimensions according to EN 17213: 1,23 m \times 1,48 m)



Mass:

62.8992 kg

Reference Service Life:

30 Years

Product Specificity:

 Product Average
 Product Specific

Product Description

A bespoke glass system with slim and shallow profiles for optimal daylight influx. VELUX Glazing Panels enable the creation of a wide range of rooflight designs from flush installations in a pitched roof to pyramids on a flat roof.

Further information can be found at: <https://commercial.velux.co.uk/products/glass-roof-systems/glazing-panels>

Product Specifications

Product Classification Codes:

EC3 - Openings -> TranslucentWallAndRoofAssemblies

Material Composition

| Material/Component Category | Origin | % Mass |
|--|----------|--------|
| Blind rivets, nuts , screws, plates | LTU, DNK | 1.7 |
| Gaskets, washers | LTU, DNK | 1.3 |
| Glazing | LTU | 84.16 |
| Profiles, support brackets, tubes and strips | DNK, LVA | 12.84 |

| Packaging Material | Origin | kg Mass |
|--------------------|--------|---------|
| Cardboard | | 0.1 |
| Pallet | | 0.06 |
| Plastic cover | | 0.5 |

| Biogenic Carbon Content | kg C per m2 |
|---|-------------|
| Biogenic carbon content in product | None |
| Biogenic carbon content in accompanying packaging | 0.08 |

| 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

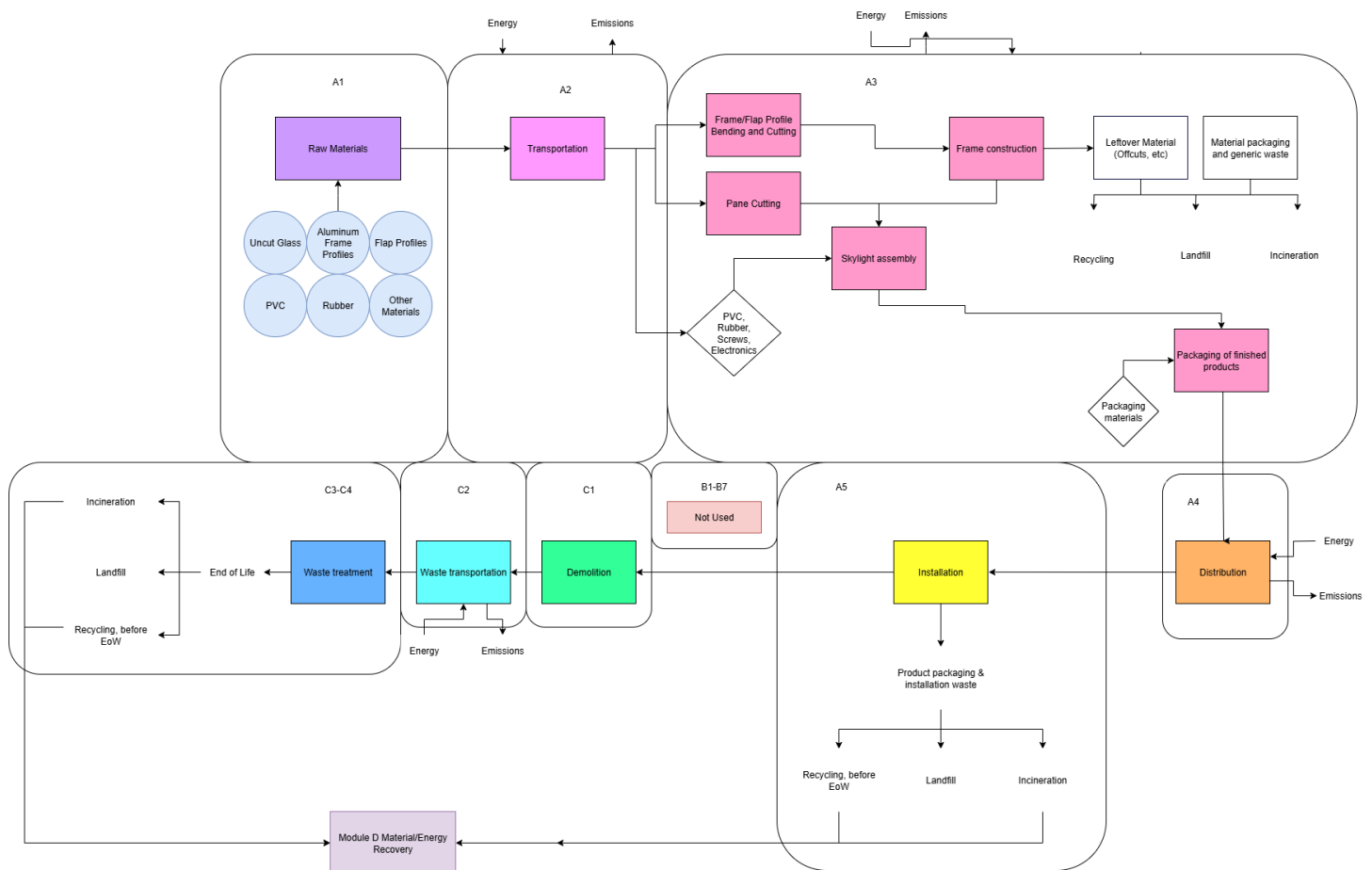
| | | | |
|---|----|-------------------------------------|----|
| Production | A1 | Raw material supply | ✓ |
| | A2 | Transport | ✓ |
| | A3 | Manufacturing | ✓ |
| Construction | A4 | Transport to site | ✓ |
| | A5 | Assembly / Install | ✓ |
| Use | B1 | Use | ND |
| | B2 | Maintenance | ND |
| | B3 | 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 | ✓ |
| Benefits & Loads Beyond System Boundary | D | Recycling, Reuse Recovery Potential | ✓ |

Plants



Voerde, DE
Alte Hünxer Str. 179, 46562 Voerde (Niederrhein)-Friedrichsfeld, Germany

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 input/output 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 separately (landfilled, 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: | 0.6673 kg |
| Weight of products transported: | 63.57 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: | 1.887 kg |
| Mass of Packaging Waste Specified by Type: | 0.6673 kg |
| Biogenic Carbon Contained in Packaging: | 0.07686 kg |
| Assumptions for scenario development: | |

End of Life (C1 - C4)

C1 - C4 Modules

Collection Process

| | |
|--|---------|
| Collected with Mixed Construction Waste: | 62.9 kg |
|--|---------|

Recovery

| | |
|---------------|----------|
| Recycling: | 23.88 kg |
| Landfill: | 37.01 kg |
| Incineration: | 2.012 kg |

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

D Module

| | |
|---|---|
| Recycling Rate of Product: | 0.3796 % |
| Recycled Content of Product: | 0.1002 % |
| Net Energy Benefit from Material Flow Declared in C3 for Energy Recovery: | 166.9 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 CO ₂ eq | 1.35e+2 | 1.50e-2 | 5.28e+0 | 0 | 5.21e-1 | 4.24e+0 | 1.06e-1 | -4.83e+1 |
| GWP-biogenic | EF 3.1 | kg CO ₂ eq | 1.57e+0 | 1.20e-5 | 1.49e-1 | 0 | 4.15e-4 | 3.32e-4 | 2.38e-5 | 2.32e-1 |
| GWP-fossil | EF 3.1 | kg CO ₂ eq | 1.34e+2 | 1.50e-2 | 5.13e+0 | 0 | 5.20e-1 | 4.24e+0 | 1.06e-1 | -4.85e+1 |
| GWP-luluc | EF 3.1 | kg CO ₂ eq | 1.25e-1 | 7.33e-6 | 3.78e-3 | 0 | 2.54e-4 | 3.42e-5 | 1.26e-5 | -7.52e-2 |
| ODP | EF 3.1 | kg CFC11 eq | 4.63e-6 | 3.41e-10 | 1.41e-7 | 0 | 1.18e-8 | 4.43e-9 | 1.59e-9 | -8.80e-7 |
| AP | EF 3.1 | mol H ⁺ eq | 8.80e-1 | 3.72e-5 | 2.68e-2 | 0 | 1.29e-3 | 9.84e-4 | 9.56e-4 | -3.45e-1 |
| EP-freshwater | EF 3.1 | kg P eq | 2.82e-2 | 1.11e-6 | 8.52e-4 | 0 | 3.84e-5 | 1.31e-5 | 5.38e-6 | -1.33e-2 |
| EP-marine | EF 3.1 | kg N eq | 1.63e-1 | 1.01e-5 | 5.08e-3 | 0 | 3.51e-4 | 5.58e-4 | 4.29e-4 | -5.76e-2 |
| EP-terrestrial | EF 3.1 | mol N eq | 1.80e+0 | 1.04e-4 | 5.55e-2 | 0 | 3.60e-3 | 4.77e-3 | 4.66e-3 | -6.50e-1 |
| POCP | EF 3.1 | kg NMVOC eq | 5.58e-1 | 6.07e-5 | 1.72e-2 | 0 | 2.10e-3 | 1.21e-3 | 1.40e-3 | -2.03e-1 |
| ADP-minerals&metals | EF 3.1 | kg Sb eq | 1.18e-3 | 4.20e-8 | 3.56e-5 | 0 | 1.46e-6 | 2.12e-7 | 3.79e-8 | -9.20e-5 |
| ADP-fossil | EF 3.1 | MJ | 1.79e+3 | 2.28e-1 | 5.43e+1 | 0 | 7.90e+0 | 8.44e-1 | 1.36e+0 | -5.40e+2 |
| WDP | EF 3.1 | m ³ depriv. | 3.49e+1 | 1.09e-3 | 1.10e+0 | 0 | 3.77e-2 | 1.90e-1 | 3.02e-3 | -6.56e+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.

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

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 PERM = Non-renewable primary resources with energy content used as material, NRPRT or PERT = 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...

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

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 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bio Carbon Emission from Product | kg C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bio Carbon Removal from Packaging | kg C | -2.61e-1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bio Carbon Emission from Packaging | kg C | 1.84e-1 | 0 | 7.69e-2 | 0 | 0 | 0 | 0 | 0 |
| Bio Carbon Emission from Waste during Manufacturing (renewable source) | kg C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Calcination Carbon Removal | 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 Manufacturing (non-renewable source) | kg C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Note:

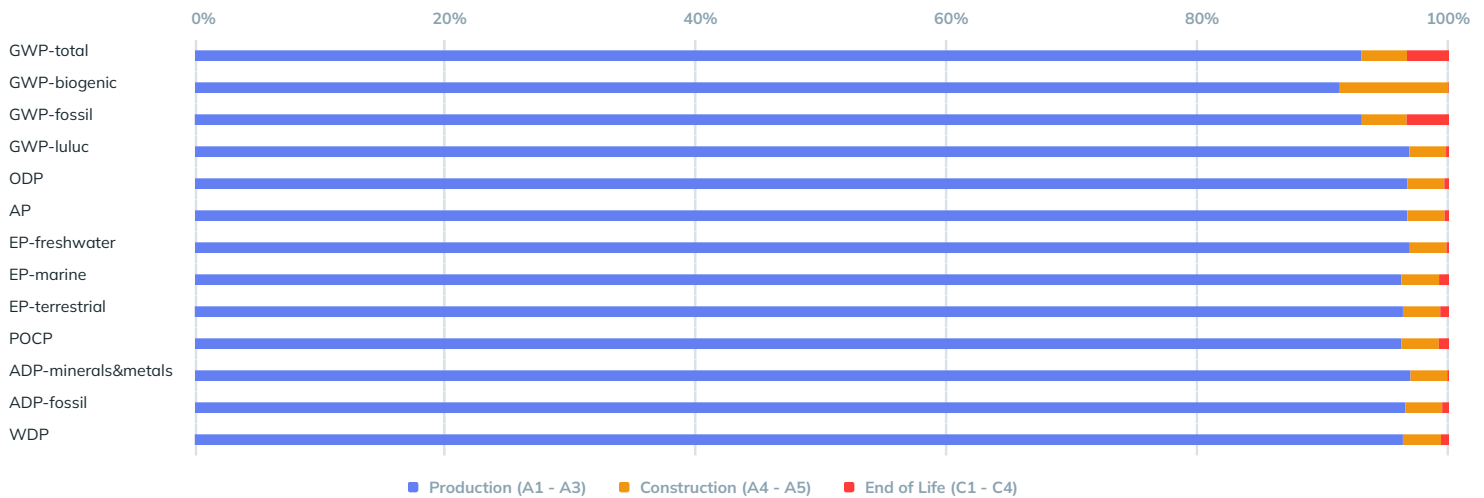
Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

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) | ~1.0 |
| 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 |
| Mounting type (sealing system) | – | Installed on bespoke sub-construction |
| 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 transmission level rv | % | 73 |
| Reaction to fire | class | B-s1,d0 |

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