

Environmental Product Declaration

 **EPD**®
THE INTERNATIONAL EPD® SYSTEM



In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

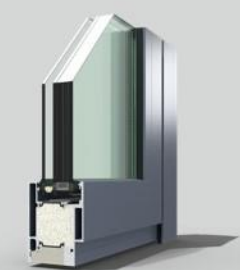
Aluminium - glass structures (doors, windows, curtain walls, partition kits)

From UAB Aluflam



| | |
|--------------------------|---|
| Programme: | The International EPD® System, www.environdec.com |
| Programme operator: | EPD International AB |
| EPD registration number: | EPD-IES- 0020042 |
| Publication date: | 2025-02-27 |
| Valid until: | 2030-02-27 |

*EPD of multiple products, based on "worst-case" results
An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com*



AF70 and AF85 fire rated doors

General information

Programme information

| | |
|-------------------|---|
| Programme: | The International EPD [®] System |
| Address: | EPD International AB Box 210 60 SE-100 31 Stockholm Sweden |
| Website: | www.environdec.com |
| E-mail: | info@environdec.com |

| |
|--|
| Accountabilities for PCR, LCA and independent, third-party verification |
| Product Category Rules (PCR) |
| CEN standard EN 15804 serves as the Core Product Category Rules (PCR) |
| PCR 2019:14 Construction Products, Version 1.3.4 (2024-04-30) c-PCR-007, Windows and doors, version 2024-04-30 |
| PCR review was conducted by: The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact . |
| Life Cycle Assessment (LCA) |
| LCA accountability: Urtė Valdavičė, UAB Vesta consulting |
| Third-party verification |
| Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: <input checked="" type="checkbox"/> EPD verification by individual verifier Third-party verifier: Mari Kirss, Meetripuu OÜ Approved by: The International EPD [®] System |
| OR |
| Procedure for follow-up of data during EPD validity involves third party verifier: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: UAB Aluflam

Contact: info@aluflam.lt www.aluflam.com

Description of the organisation: UAB ALUFLAM was founded in 2001 as a branch of the Danish company ALUFLAM A/S in Eastern Europe. The main activity of the company – production and montage of various aluminium constructions in all Europe, especially production of fireproof aluminium-glass constructions. Company offers a wide selection of fire-rated constructions, from fire-resistance classes E15 to EI120 such as facades, windows, doors, sliding doors, skylights and glass roofs. Our designs range from standard to more complex, specially designed systems. We are able to make customized solutions. Aluflam works closely with architects, contractors and building developers throughout the entire process, from the planning phase and delivery to installation of the finished product.

Product-related or management system-related certifications: The company is certified under ISO 9001:2015 (Quality Management Systems).

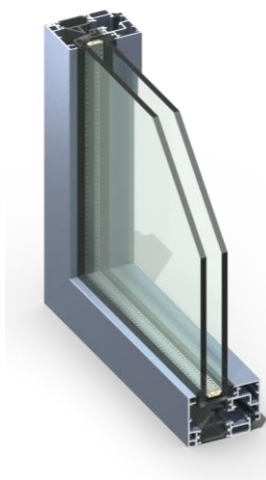
Name and location of production site(s): Ukmerges str. 7, LT-55101 Jonava, Lithuania

Product information

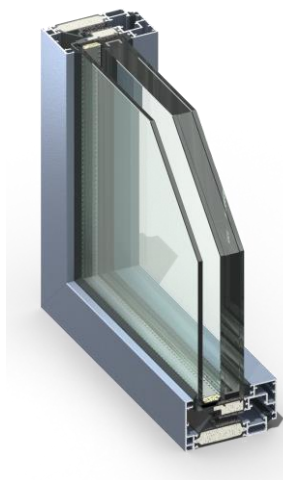
Product name: Aluminium - glass structures (doors, windows, curtain walls, partition kits)

Product description: The EPD focuses on aluminium-glass structures designed for construction applications, both indoors and outdoors, whether installed in marine environments or onshore. These systems facilitate the creation of various types of doors, windows, and fixed frame structures, tailored to their intended use and specific requirements for functionality, aesthetics, thermal insulation, burglar resistance, smoke insulation, and fire resistance. Each system comprises a series of "profiles" (e.g., frame, sash, glazing unit) that distinguish it by design, dimensions, weight, and technical characteristics. The product is available with double or triple glazing options, and the aluminium surfaces can be finished with powder coating, anodizing, or without surface treatment.

Examples of products included in the EPD are presented below.



A+ system
windows and partitions



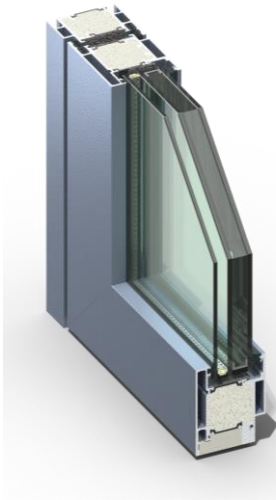
A+ system
fire rated windows and
partitions



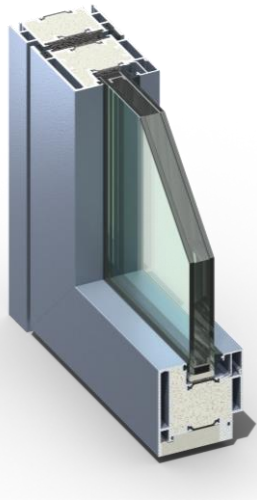
A+ OUT system
windows



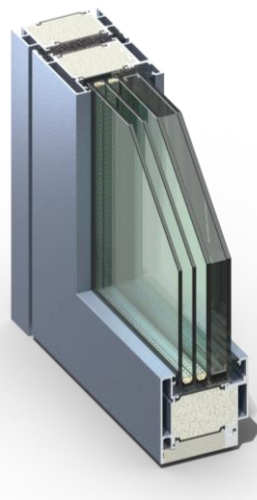
A+OUT system
fire rated windows



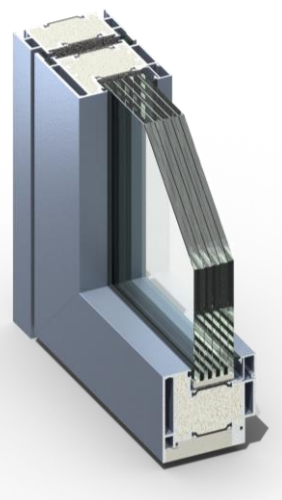
AF70 system
fire rated doors



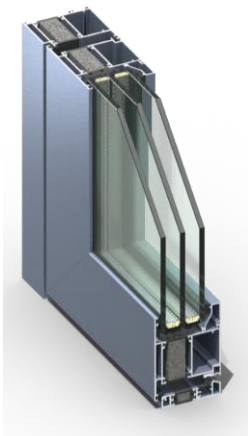
AF85 system
fire rated doors



AF88 system
fire rated doors



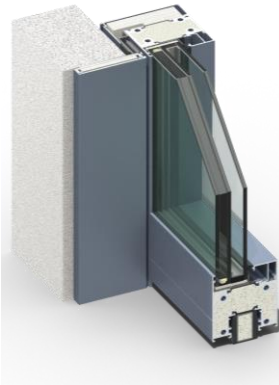
AF091 system
fire rated doors



WUBERN system
window



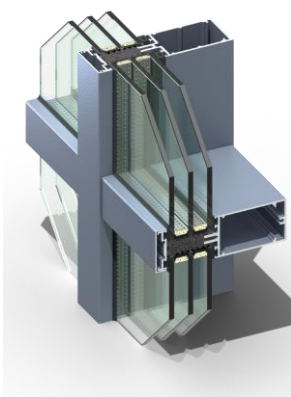
WUBERN system
doors



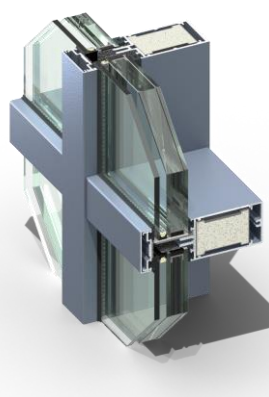
ALUMAX system
doors



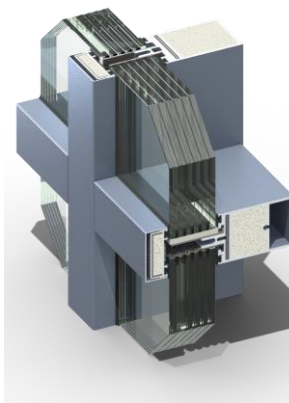
ENERGY system
windows



AW50 system
curtain wall



AW50 system
fire rated curtain wall



AW60 system
fire rated curtain wall



AF120 system
fire rated partitions

Product application areas: Aluminium-glass structural systems are extensively utilized in industrial, commercial, and residential buildings, as well as in logistic centres, sports arenas, warehouses, power plants, the shipbuilding industry, and other projects requiring rapid construction and optimal use of natural light. These systems enable the creation of safe, fire-resistant, and smoke-controlled buildings.

Product standards: The product bears the CE marking, signifying compliance with the EU's New Approach Directives. Aluminium-glass structures are manufactured in accordance with the following European standards:

- EN 14351-1: Windows and doors – Product standard, performance characteristics – Part 1: Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics.
- EN 16034: Pedestrian doorsets, industrial, commercial, and garage doors and openable windows – Product standard, performance characteristics – Fire resistance and/or smoke control characteristics.
- EN 14351-2: Windows and doors – Product standard, performance characteristics – Part 2: Internal pedestrian doorsets.
- EN 13501-2: Fire classification of construction products and building elements – Part 2: Classification using data from fire resistance tests, excluding ventilation services.
- EN 13830: Curtain walling – Product standard.

Product technical data: The products included in this EPD are aluminium-glass structures (for example, windows, doors, etc.) consisting of an aluminium frame (finished with powder coating, anodizing, or without surface treatment) with double or triple glazing options. The aluminium frame can be incorporated with thermal break for enhancing energy efficiency or/and with fire resistant filling to improve safety. Each product is developed in strict accordance with design and technical documentation, offering extensive possibilities for customization and variation. Sash and frame are assembled using components known as fittings (such as alignment brackets). Among these are also the systems that allow the opening of the leaf (handle, hinges etc.). To guarantee the air and water tightness of the window, gaskets made of EPDM and other plastic materials are installed.

UN CPC code: 42120 – doors, windows and their frames and thresholds for doors, of iron, steel or aluminium.

Geographical scope: Global

LCA information

Declared unit: 1 m² of product supplied to the client. The mass of per declared unit is 88.20 kg.

Dimensions: Standard measurements given in EN 17213:2020 (1230 mm x 2180 mm).

Time representativeness: Primary data was collected internally. The production data refers to the average of the year 2023.

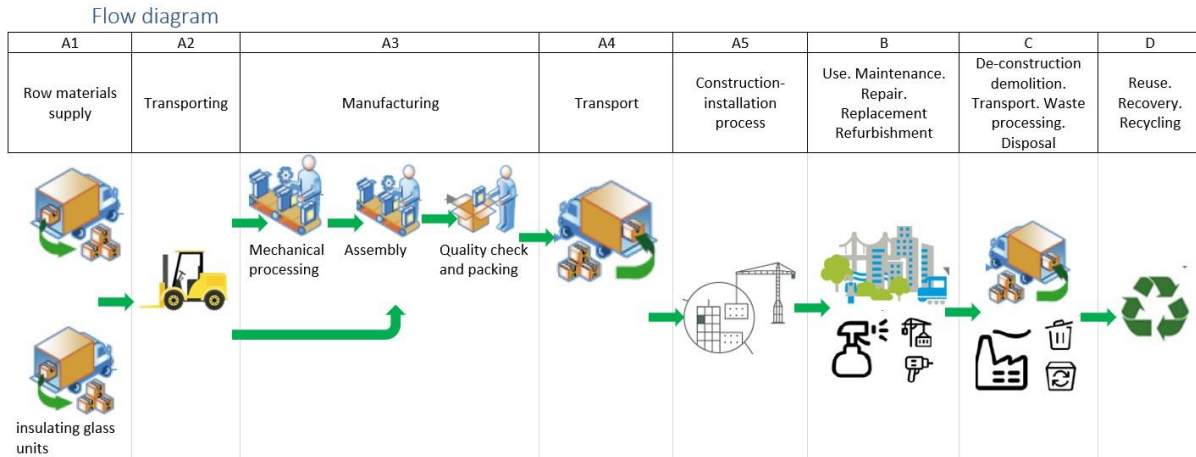
Database(s) and LCA software used: The Ecoinvent database provides the life cycle inventory data for the raw and process materials obtained from the background system. The used database is Ecoinvent 3.10.1 and verified EPDs. The LCA software used is One Click LCA.

Data quality: The foreground data collected internally is based on yearly production amounts and extrapolations of measurements on specific machines and plants. Overall, the data quality can be described as good. The primary data collection has been done thoroughly.

Description of system boundaries: the EPD cover the cradle to gate with options scope with following modules: A1 (Raw material supply), A2 (Transport), A3 (Manufacturing), C1 (Deconstruction), C2

(Transport at end-of-life), C3 (Waste processing), C4 (Disposal) and D - benefits and loads beyond the system boundary in accordance with EN 15804.

System diagram:



Note: This EPD does not cover the transportation module (A4) and the use stage (B1-B7). Module A5 is declared only for "balancing-out reporting" since part of the product packaging contains more than 5% biogenic carbon.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

| | Product stage | | | Construction process stage | | Use stage | | | | | | | End of life stage | | | Resource recovery stage | |
|----------------------|---------------------|-----------|---------------|----------------------------|---------------------------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-----------|------------------|-------------------------|----------|
| | Raw material supply | Transport | Manufacturing | Transport | Construction installation | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | | Disposal |
| Module | A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| Modules declared | x | x | x | MND | *MND | MND | MND | MND | MND | MND | MND | MND | x | x | x | x | x |
| Geography | GL | GL | GL | - | - | - | - | - | - | - | - | - | GL | GL | GL | GL | GL |
| Specific data used | 68.61% | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation – products | >10% | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation – sites | 0 % | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Description of the system boundary (X = Included in LCA; MND = Module Not declared; MNR = Module Not relevant)

*Module A5 is declared only for "balancing-out reporting" since part of the product packaging contains more than 5% biogenic carbon

Cut-off criteria: The study does not exclude any modules or processes which are stated mandatory in the Standards and PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. The cut-off criteria were applied in the study for part of product packaging (PE foam, fastening tape, screws etc.). These materials have minimal contribution and account to 0.9% of the mass of the declared unit. The total excluded input and output flows do not exceed 5% of energy usage or mass.

Allocation, estimates and assumptions: Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. In this study, as per EN 15804, allocation is conducted in the following order:

1. Allocation should be avoided
2. Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small
3. Allocation should be based on economic values

The allocations in the Ecoinvent 3.10.1 datasets used in this study follow the Ecoinvent system model 'Allocation, cut-off, EN15804'. The methodological choices for allocation for reuse, recycling and recovery have been set according to the polluter pays principle (PPP).

Scenarios included in the LCA are based on realistic scenarios which are currently in use and are representative for one of the most likely scenario alternatives.

Calculation rules for averaging data: The EPD is an EPD of multiple products from a company based on "worst-case" product. The grouped products are with identical or similar functions, manufactured by a single company at several manufacturing sites, with the same major steps in the A3/core processes. For each indicator and module A-C, the highest result of the included products is declared, and for module D, the lowest benefit of avoided processes and the highest load of included processes is declared.

The result presented in the EPD is the result of the "worst-case" product – aluminium-glass structure consisting of an aluminium frame (fire-rated profile reinforced with a specialized fire-resistant filling) with triple glazing (fire-resistant laminated glass + uncoated flat glass + fire-resistant laminated glass), due to the highest amount of glass content in the product (compared to other group products) and the highest GWP value of glass type supplied to the company.

Product life cycle

Product stage (A1-A3)

A1: This module considers the extraction and processing of raw materials.

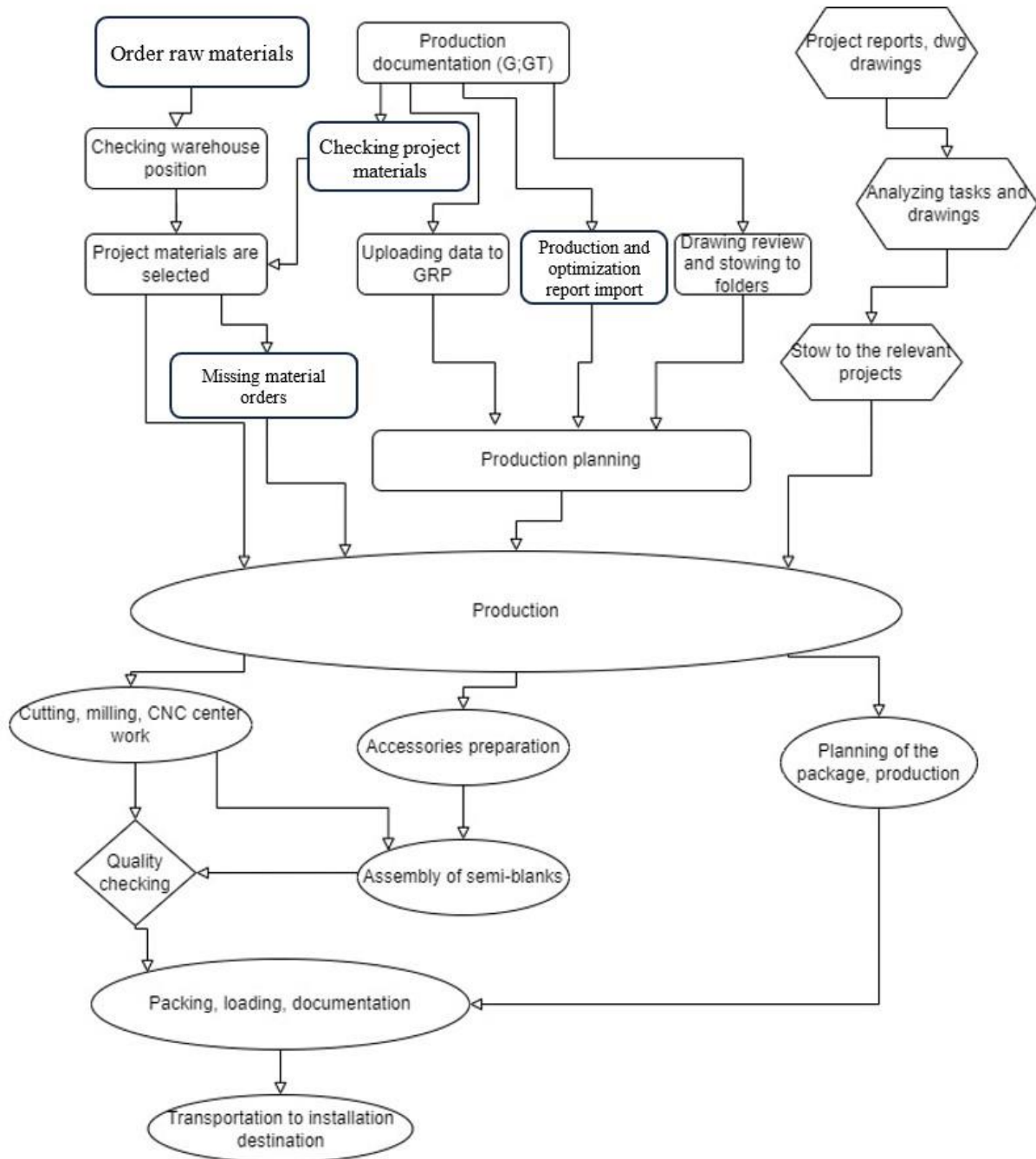
A2: The raw materials are transported to the manufacturing plant. In this case the model includes road transportation of each raw material.

A3: This module includes the manufacture of products and packaging. It has considered all the energy consumption and waste generated in the production plant.

Manufacturing process

Aluminium profiles or their systems are cut, followed by milling and drilling as per the drawings. The edges of the profiles are then coated with glue and silicone, and the corners are pressed using pressing machines. Next, embedded parts and fittings are installed in line with the project documentation. The production process concludes with glazing, inspection, and packaging.

The manufacturing diagram is presented below.



Construction process stage (A4-A5)

A4: This EPD does not cover the transport and installation stage.

A5: This EPD does not cover the Installation phase. However, module A5 is declared for “balancing-out reporting” since part of the packaging of products contains more than 5% biogenic carbon. The uptake of this biogenic carbon, as biogenic CO₂, in module A1 shall be balanced out by an equal amount of emission of biogenic CO₂ in module A5.

Use stage (B1-B7)

This EPD does not cover the use phase.

Product end of life (C1-C4, D)

C1: Deconstruction, dismantling, demolition

Demolition is assumed to be done by mobile machinery (10 kWh/t)¹ and that that 100% of the waste is collected and treated.

C2: Transport of the discarded product to the processing site

It is estimated that there is no mass loss during the use of the product, therefore the end-of-life product is assumed to have the same weight as the declared product. All the end-of-life products are assumed to be sent to the closest facilities such as recycling and landfill. Transportation distance to the closest disposal area is estimated as 50 km and the transportation method is assumed as lorry which is the most common option.

C3: Waste processing for reuse, recovery, and/or recycling

In end-of-life, a portion of recyclable materials such as glass, aluminium, steel, and stainless steel is sent directly to recycling facilities with specific recycling rates applied. Recycling rate of 95% for aluminium and 30 % for glass is well documented in construction sector and included as default value in EN 17213. It is assumed that 90% of steel is transformed into secondary material in a recycling plant, based on Europe average².

C4: Discharge (disposal)

It is assumed that the remaining part of materials are non-recyclable, hence sent to disposal in landfill.

Benefits and loads beyond the system boundary (D):

In the context of end-of-life scenario D, the aluminium, steel, stainless steel and glass waste is recovered, subsequently fully recycled into post-consumer waste and has been modelled to avoid use of primary materials. Only the mass of primary materials in the product provides the benefit to avoid double counting.

¹ O. Bozdag and M. Secer. (2007, September). *Energy Consumption of RC Buildings during Their Life Cycle*. Sustainable Construction, Materials and Practices: Challenge of the Industry for the New Millennium.

² EuRIC. (2020, February). *Metal Recycling Factsheet*. European Circular Economy Stakeholder Platform. Retrieved from <https://circulareconomy.europa.eu/platform/en/knowledge/metal-recycling-factsheet-euric>

Content information

Since the product can be range of different designs, dimensions, weight and technical characteristics, the worst-case scenario is evaluated. Meaning, the product with the thickest glass (measured by weight) in the analysed period is considered as the worst-case product.

The values outside the parentheses are for the average product manufactured in the company, while the values inside the parentheses show worst-case product.

| Product components | Weight, kg | Post-consumer material, weight-% | Biogenic material, weight-% and kg C/kg |
|--|----------------------|----------------------------------|---|
| Glass | 43.88 (56.45) | 0 | 0 |
| Aluminium | 11.06 (10.66) | *25.45 | 0 |
| Aluflam profile filler | 1.28 (14.12) | 0 | 0 |
| Steel | 1.12 (1.30) | 0 | 0 |
| Ethylene propylene diene monomer rubber (EPDM) | 1.12 (0.97) | 0 | 0 |
| Polystyrene | 0.68 (0.00) | 0 | 0 |
| Graphite | <0.01 (0.77) | 0 | 0 |
| Calcium silicate | 0.38 (1.72) | 0 | 0 |
| Stainless steel | 0.38 (2.22) | 0 | 0 |
| Total | 59.90 (88.20) | 4.70 (3.08) | 0 |
| Packaging materials | Weight, kg | Weight-% (versus the product) | Weight biogenic carbon, kg C/kg |
| ¹ Wood | 8.26 | 13.79 (9.37) | ² 3.59 |
| Packaging film | 0.01 | 0.02 (0.01) | 0 |
| TOTAL | 8.27 | 13.80 (9.38) | 3.59 |

¹ Global Warming Potential biogenic: -733.0 kg CO_{2e} / m³ (density 460 kg/m³)

² Conversion factor for converting kg CO₂ to kg C: 44/12 = 3.68

*UAB ABC Nordic utilizes EN AW-6060 / EN AW-6063 aluminium, which consists of 70% recycled content, including 25.45% post-consumer material, in its production of aluminium profile systems. As part of the same Danish-owned Aluflam group, UAB ABC Nordic supplies aluminium profile systems to UAB Aluflam. Therefore, it is assumed that UAB Aluflam uses the same aluminium with identical properties in its manufacturing.

Since the packaging contains more than 5% biogenic carbon, “balancing-out” of biogenic carbon is done in module A5.

All EPDs products do not contain any REACH SVHC substances in amounts greater than 0.1% (1000 ppm).

Results of the environmental performance indicators

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Usage of results from A1-A3 without considering the results of module C is not encouraged.

The declared unit of the study is 1 m². The mass of the product per declared unit is 88.20 kg.

Mandatory impact category indicators according to EN 15804+A2 (Reference package EF 3.1)

| Results per functional or declared unit | | | | | | | | |
|---|---|-----------|----------|----------|----------|----------|----------|-----------|
| Indicator | Unit | A1-A3 | A5 | C1 | C2 | C3 | C4 | D |
| GWP-total | kg CO ₂ eq. | 1,75E+02 | 1,32E+01 | 3,18E-01 | 2,62E-01 | 2,29E+00 | 1,48E+00 | -2,54E+01 |
| GWP-fossil | kg CO ₂ eq. | 1,87E+02 | 0,00E+00 | 3,18E-01 | 2,62E-01 | 2,29E+00 | 1,48E+00 | -2,49E+01 |
| GWP-biogenic | kg CO ₂ eq. | -1,32E+01 | 1,32E+01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| GWP-luluc | kg CO ₂ eq. | 5,94E-01 | 0,00E+00 | 3,26E-05 | 1,17E-04 | 1,26E-03 | 1,17E-03 | -4,94E-01 |
| ODP | kg CFC 11 eq. | 2,64E-05 | 0,00E+00 | 4,87E-09 | 3,87E-09 | 2,34E-08 | 3,00E-08 | -1,77E-07 |
| AP | mol H ⁺ eq. | 8,54E-01 | 0,00E+00 | 2,87E-03 | 8,93E-04 | 9,01E-03 | 7,88E-03 | -1,74E-01 |
| EP-freshwater | kg P eq. | 9,17E-03 | 0,00E+00 | 9,18E-06 | 2,04E-05 | 6,80E-04 | 1,21E-04 | -6,65E-03 |
| EP-marine | kg N eq. | 1,67E-01 | 0,00E+00 | 1,33E-03 | 2,94E-04 | 1,35E-03 | 3,09E-03 | -2,50E-02 |
| EP-terrestrial | mol N eq. | 1,96E+00 | 0,00E+00 | 1,46E-02 | 3,19E-03 | 1,50E-02 | 3,36E-02 | -2,54E-01 |
| POCP | kg NMVOC eq. | 7,66E-01 | 0,00E+00 | 4,35E-03 | 1,32E-03 | 5,04E-03 | 1,39E-02 | -9,33E-02 |
| ADP-minerals&metals* | kg Sb eq. | 9,13E-04 | 0,00E+00 | 1,14E-07 | 7,31E-07 | 5,97E-05 | 3,97E-06 | 2,08E-04 |
| ADP-fossil* | MJ | 2,47E+03 | 0,00E+00 | 4,16E+00 | 3,80E+00 | 1,66E+01 | 2,38E+01 | -2,37E+02 |
| WDP* | m ³ | 3,64E+01 | 0,00E+00 | 1,04E-02 | 1,88E-02 | 3,46E-01 | 1,25E-01 | -1,93E+01 |
| Acronyms | GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption | | | | | | | |

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Additional mandatory and voluntary impact category indicators

| Results per functional or declared unit | | | | | | | | |
|---|------------------------|----------|----------|----------|----------|----------|----------|-----------|
| Indicator | Unit | A1-A3 | A5 | C1 | C2 | C3 | C4 | D |
| GWP-GHG | kg CO ₂ eq. | 1,88E+02 | 0,00E+00 | 3,18E-01 | 2,62E-01 | 2,29E+00 | 1,48E+00 | -2,54E+01 |
| Particulate matter | Incidence | 8,76E-06 | 0,00E+00 | 8,16E-08 | 2,62E-08 | 1,52E-07 | 1,83E-07 | -2,70E-06 |
| Ionizing radiation | kBq U235e | 1,06E+01 | 0,00E+00 | 1,84E-03 | 3,31E-03 | 1,54E-01 | 2,54E-02 | -2,09E+00 |
| Ecotoxicity (freshwater) | CTUe | 2,60E+03 | 0,00E+00 | 2,29E-01 | 5,38E-01 | 9,36E+00 | 5,17E+00 | -3,97E+01 |
| Human toxicity, cancer | CTUh | 1,36E-07 | 0,00E+00 | 3,27E-11 | 4,32E-11 | 8,09E-10 | 9,66E-10 | -3,29E-08 |
| Human tox. non-cancer | CTUh | 2,63E-06 | 0,00E+00 | 5,18E-10 | 2,46E-09 | 5,35E-08 | 1,20E-08 | -1,19E-08 |
| SQP | - | 6,74E+02 | 0,00E+00 | 2,91E-01 | 3,83E+00 | 1,76E+01 | 3,64E+01 | -2,61E+01 |

Resource use indicators

| Results per functional or declared unit | | | | | | | | |
|---|---|----------|-----------|----------|----------|----------|-----------|-----------|
| Indicator | Unit | A1-A3 | A5 | C1 | C2 | C3 | C4 | D |
| PERE | MJ | 4,39E+02 | 0,00E+00 | 2,63E-02 | 5,21E-02 | 2,48E+00 | 3,83E-01 | -1,72E+02 |
| PERM | MJ | 1,36E+02 | -1,36E+02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| PERT | MJ | 5,75E+02 | -1,36E+02 | 2,63E-02 | 5,21E-02 | 2,48E+00 | 3,83E-01 | -1,72E+02 |
| PENRE | MJ | 2,40E+03 | 0,00E+00 | 4,16E+00 | 3,80E+00 | 1,66E+01 | 2,19E+01 | -2,37E+02 |
| PENRM | MJ | 4,70E-01 | -4,70E-01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| PENRT | MJ | 2,40E+03 | -4,70E-01 | 4,16E+00 | 3,80E+00 | 1,66E+01 | 2,19E+01 | -2,37E+02 |
| SM | kg | 9,32E+00 | 0,00E+00 | 1,73E-03 | 1,62E-03 | 1,18E-02 | 1,99E-02 | 2,08E+01 |
| RSF | MJ | 4,76E-02 | 0,00E+00 | 4,52E-06 | 2,06E-05 | 3,85E-04 | 2,53E-04 | -1,02E-03 |
| NRSF | MJ | 8,42E-10 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| FW | m ³ | 9,98E-01 | 0,00E+00 | 2,75E-04 | 5,62E-04 | 1,71E-03 | -6,08E-02 | -3,89E-01 |
| Acronyms | PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water | | | | | | | |

Note: Option A was chosen for the calculations of the primary energy indicators, according to on Annex 3 of PCR 2019:14

Waste indicators

| Results per functional or declared unit | | | | | | | | |
|---|------|----------|----------|----------|----------|----------|----------|-----------|
| Indicator | Unit | A1-A3 | A5 | C1 | C2 | C3 | C4 | D |
| Hazardous waste disposed | kg | 2,25E+01 | 0,00E+00 | 4,63E-03 | 6,44E-03 | 2,17E-01 | 4,48E-02 | -8,95E+00 |
| Non-hazardous waste disposed | kg | 1,46E+02 | 0,00E+00 | 6,31E-02 | 1,19E-01 | 1,65E+01 | 1,34E+02 | -3,01E+01 |
| Radioactive waste disposed | kg | 5,11E-02 | 0,00E+00 | 4,57E-07 | 8,24E-07 | 3,95E-05 | 6,35E-06 | -4,60E-04 |

Output flow indicators

| Results per functional or declared unit | | | | | | | | |
|---|------|----------|----------|----------|----------|----------|----------|----------|
| Indicator | Unit | A1-A3 | A5 | C1 | C2 | C3 | C4 | D |
| Components for re-use | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Material for recycling | kg | 1,28E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 3,02E+01 | 0,00E+00 | 0,00E+00 |
| Materials for energy recovery | kg | 9,89E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported energy, electricity | MJ | 2,03E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported energy, thermal | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

Additional environmental information

Manufacturing energy scenario documentation

| Scenario parameter | Global warming potential (A1-A3) value | Source |
|--|--|--|
| Electricity, low voltage, residual mix | 0.65 kg CO ₂ e / kWh | Data sources: ecoinvent 3.10.1 Country: Lithuania |
| Electricity production, photovoltaic, 3kWp slanted-roof installation, multi-Si, panel, mounted | 0.0993 kg CO ₂ e / kWh | Data sources: ecoinvent 3.10.1 Country: Lithuania |
| Heat production, natural gas, at industrial furnace >100kW | 0.0773 kg CO ₂ e / MJ | Data sources: ecoinvent 3.10.1 Country: Lithuania |
| Propane, burned in building machine | 0.0946 kg CO ₂ e / MJ | Data sources: ecoinvent 3.10.1 Country: World |

End-of-life scenario documentation

It is estimated that there is no mass loss during the use of the product, therefore the end-of-life product is assumed to have the same weight as the declared product. The declared unit of the study is 1 m² of aluminium-glass structure weighing 88.20 kg.

| Material in end-of-life after demolition | Amount in declared unit, kg / % | Module C3 (recycling) | Module C4 (disposal) |
|---|---------------------------------|-----------------------|----------------------|
| Glass | 56.45 kg / 64 % | 30 % | 70 % |
| Aluminium | 10.66 kg / 12 % | 95 % | 5% |
| Steel | 1.30 kg / 2 % | 90 % | 10 % |
| Stainless steel | 2.22 kg / 2 % | 90 % | 10 % |
| Other materials that cannot be separated, hence treated as mixed construction waste | 17.57 kg / 20 % | 0 | 100% |

Note: scenario assumptions e.g. transportation – dismantled product is transported 50 km

References

Standards and PCR

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3. PCR 2019:14 Construction Products (EN 15804:A2) version 1.3.4, published on 2024-04-30
4. C-PCR-007 (to PCR 2019:14) "Windows and doors (EN 17213:2020), Version 2024-04-30.
5. EN 15804+A2 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.
6. ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations Principles and procedures.
7. ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.
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1. EuRIC. (2020, February). *Metal Recycling Factsheet*. European Circular Economy Stakeholder Platform. Retrieved from <https://circulareconomy.europa.eu/platform/en/knowledge/metal-recycling-factsheet-euric>
2. Aluminium-glass structures LCA background report.

Data references:

1. One Click LCA tool
2. Ecoinvent database v3.10.1 (2024), One Click LCA database

