

Environmental Product Declaration Type III (EPD) ITB number 525/2023



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# ALURON aluminium window and door systems

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# Basic Information



The declaration is a Type III Environmental Product Declaration (EPD) based on EN 15804 and verified in accordance with ISO 14025 by an independent auditor.

It contains information on the environmental impact of the declared building materials. Their aspects have been verified by an independent entity in accordance with ISO 14025. Basically, a comparison or evaluation of EPD data is only possible if all the comparable data have been created in accordance with EN 15804 (see clause 5.3 of the standard).

LCA analysis: A1 - A3, A4, C1 - C4 and D according to EN 15804 (from cradle to grave with options) Year of development of the EPD: 2023 Declared product lifetime: 30 years Product standard: EN 573, EN 755, EN 12020 PCR: ITB-PCR A (based on EN 15804) Declared unit: 1 kg of product Reason for implementation: B2B Representativeness: Polish products, 2022



## Manufacturer

ALURON creates innovative solutions and technologies in the field of windows, doors and complex aluminium systems. Investors, architects and joinery manufacturers appreciate the diversity of construction solutions, material, aesthetics, functionality and wide arrangement possibilities of the ALURON brand which is the only manufacturer of aluminium systems for each segment of the window joinery market in Poland.



Aluminium systems offered by ALURON include profiles (structural, drip, mouldings, sills), accessories (gaskets, screws, clips, caps) and additional materials (templates, assembly elements, adhesives). All systems are interconnected which allows the use of many common components and accessories.

ALURON has a state-of-the-art production facility with machinery based on energy-saving and efficient production lines, which reduces the negative impact on the environment. System solutions meet stringent energy-saving requirements and ensure comfort, functionality and safety. ALURON performs curved and bent structures, welded and crimped connections and offers a range of possibilities for non-standard and unusual solutions. ALURON carries out its activities based on global management and production standards, including: ISO 9001, Qualicoat certificate.





# Product description and application



The ALURON company has been setting trends on the joinery market in Poland and abroad since 2002. Its offer includes aluminium, aluminium-wood and PVC-aluminium systems. The EPD environmental declaration developed as part of this document covers aluminium window and door systems. An aluminium frame construction, without glazing between profiles, is included in the study.

### Aluminium window and door systems

Window and door systems enable various types of window and door structures that can be used on the outside or inside of buildings. The main materials of window and door systems are aluminium profiles and glass filling the spaces between the profiles. This EPD covers the aluminium structure manufactured by ALURON; glazing which can be co-produced in window or door elements is not included. Aluminium window and door systems are characterised by a high level of aesthetics and great freedom in the arrangement of interior space. Such systems are used in various types of cubature objects, most often in office or service buildings, but they are also used among others in residential buildings or social and office parts of industrial and storage facilities.

In the development of ALURON systems, many years of design experience were used. The company's solutions are distinguished by original utility models and patent applications. Aluminium systems offered by ALURON consist of profiles (constructional, drip caps, slats, sills), accessories (gaskets, screws, clips, plugs) and additional materials (templates, assembly elements). All systems are interlinked which allows the use of many common components and accessories. Aluron aluminium systems present excellent technical properties in terms of thermal insulation, water tightness, wind resistance, fire resistance or smoke tightness. Products from the ALURON ALU series are multisystem and innovative aluminium building systems, developed in line with current architectural trends. They are characterised by original design, emphasising the design and aesthetics of the building in space. The durability of aluminium guarantees many years of durability and aesthetics. Systems that meet the requirements of zero-energy and energy-efficient buildings are also produced.



## Overview of ALURON aluminium window and door systems:

Photo	Product code	Product name	Product description
	AS 75	Window and door system	Modern window and door structure with thermal break. The system is intended for making aluminium window and door constructions with high utility properties. The system is constructed from three-chamber profiles made from high quality aluminium sections bonded with thermal breaks made from polyamide reinforced fibreglass-reinforced polyamide. The use of specially shaped dividers increases the rigidity of the combined sections.
	AS 75EI	Fire door system	It complements the fire protection structures of the AS 75 system with which it is fully compatible. The system is intended for making external and internal aluminium door and window constructions in the EI 30 and EI 60 fire resistance classes while guaranteeing highly economical solutions. The system is constructed from three-chamber profiles made from high-quality aluminium sections bonded with thermal breaks made from glass fibre-reinforced polyamide. The use of specially shaped dividers increases the rigidity of the combined sections.
	AS 75P	Panel door system	Modern door structure with thermal break. The system is designed to make aluminium door constructions with high performance properties. The system is made of three-chamber profiles made of high-quality aluminium sections bonded with thermal breaks made of glass fibre-reinforced polyamide. The use of specially shaped dividers increases the rigidity of the combined sections.
	AS 75V	Window system	Modern window structure with thermal break. The system is intended for making aluminium ventilating window constructions with high utility properties. The system is constructed from three-chamber profiles made from high quality aluminium sections bonded with thermal breaks made from ABS and glass fibre reinforced polyamide. The use of specially shaped dividers increases the rigidity of the combined sections.
	AS 110	Five-chamber passive aluminium windows	Modern window structure with thermal break. This system is designed to make aluminium window constructions with high utility properties. The system is constructed from five-chamber profiles made from high-quality aluminium sections bonded with thermal breaks made from glass fibre-reinforced polyamide. The use of specially shaped dividers increases the rigidity of the combined sections.
	AS 100	Door system with above-average thermal insulation properties	A modern door structure with a thermal break designed to meet a wide range of customer needs, expectations and requirements. The system is designed to make aluminium constructions with high performance properties. The system is built of three-chamber profiles made of high-quality aluminium sections bonded with thermal breaks made of polyamide reinforced with fibreglass-reinforced polyamide. The use of specially shaped spacers increases the rigidity of the combined sections.
UÇ.	AS 178HS	Lift and slide doors	A modern system intended for the construction of top-class lift and slide doors. The basis of the system are aluminium sections with a thermal break ensuring, along with other elements, excellent thermal insulation of the entire structure. The profiles used in the system are of three-chamber (casement) or multi-chamber (frames) construction.
	ASC 38	Acoustic partition walls	Modern construction of non-thermally insulated walls and showcases. The system is intended for making aluminium interior buildings with high performance properties. The system is built of high-quality aluminium sections without thermal barriers made of plastic materials.



ASC 50	Window and door system for interior installation	Modern non-thermally insulated window and door construction. The system is intended for making aluminium internal structures with high utility properties. The system is built of high quality aluminium sections without thermal barriers made of plastic materials.
ASC 50 Cold Side	Window and door system for interior installation	Modern sliding window and door construction without thermal break. The system is designed to make aluminium sliding window and door constructions with high performance properties. It is built of high-quality aluminium sections without thermal barriers made of plastic materials made of plastic materials.
AS 52	Window and door system for external installation	Modern window and door structure with thermal break. The system is intended for making aluminium window and door constructions with high utility properties. The system is constructed from three-chamber profiles made from high quality aluminium sections bonded with thermal breaks made from polyamide reinforced with fibreglass. The use of specially shaped dividers increases the rigidity of the combined sections.
AS 80US	Concealed sash window system	Modern window construction with thermal break. The system is designed to make aluminium window structures with high utility properties. The system is constructed from three-chamber profiles made from high quality aluminium sections bonded with thermal breaks made from glass fibre reinforced polyamide. The use of specially shaped dividers increases the rigidity of the combined sections.
AS AD	Automatic door system	Modern system of energy-efficient sliding doors (manual or automatic opening) that meets the increasingly higher expectations and requirements of customers. The system is characterised by its versatility and very high performance properties. The thermally insulated profiles used in the AS AD system have a three-chamber structure.
AS M	Mosquito screens	Modern mosquito screen system that meets the increasingly higher expectations and requirements of customers. The system is characterised by its versatility and very high performance properties. The window frame mosquito screen is mounted with system-included swivel catches. This solution ensures fast assembly and disassembly of the structure. The brush seal, with which the aluminium profile is equipped, effectively protects against insects. The use of a frame mosquito screen with hooks ensures full functionality of the window. It can also be directly screwed to the window frame. This solution guarantees full illumination of the room while maintaining maximum protection against insects.
AS VGB	Glass balustrade system	Modern glass balustrade system known as French balconies. It is characterised by its versatility and very high performance properties. Balustrades of the ALURON VGB system can be used with aluminium, wooden, wooden-aluminium and PVC windows. Dedicated aluminium sections enable the assembly of balustrades on ALURON system facades. An additional advantage is the possibility of using a French balcony on a steel structure.
GEMINI	Aluminium overlay for timber -aluminium windows	Classic timber-aluminium system whose characteristic element is the central frame seal. The gasket is made of TPE material, welded at the corners, allows high air-tightness parameters to be achieved and is responsible for the controlled outflow of water to the outside of the structure. GEMINI is a whole family of products differing from one another mainly in terms of design, i.e. the way the structure is viewed from the outside. Installation of the timber elements is on the window manufacturer's side. By assembling the timber elements and the glazing, a timber-aluminium window is created, on the original Aluron model.



Window sills	Aluminium window sills	Aluminium window sills and systems for wooden windows Soft Line and Classic are manufactured by drawing aluminium from structural alloys meeting the highest quality standards. The products are distinguished by: high rigidity, excellent durability, leak-tightness and solid workmanship. Sof Line and Classic sills have a complete range of accessories: end caps, gaskets, system screws in stainless steel, sealed clips to match the screws, as well as drip caps and end caps.
Drip caps and trims	Aluminium drip caps and glazing beads	Complete systems for timber windows, which include: gutter drips, glazing beads. The systems for timber windows also include a wide range of additional accessories, such as system caps, in straight and bevelled versions, for different window frame shapes, fasteners for mounting drip caps, glazing beads, gaskets, sub-threshold profiles, adapters for mounting door thresholds, fasteners, screws and more. All of these components are distinguished by their extraordinary attention to workmanship. They are manufactured from the highest quality materials, providing protection against UV radiation.
Door thresholds	Aluminium door thresholds	The company's offer includes door thresholds in aluminium spacer and all-aluminium versions, fitted with gaskets to increase the tightness of door structures. In addition, the range includes a wide selection of installation accessories.





# Life Cycle Assessment (LCA) - general principles



#### Declared unit

The declared unit is the production of 1 kg of aluminium window and door systems (without glazing), described in the section "Product description and application".

#### Allocation

Allocation in this study was created in accordance with ITB PCR A guidelines. Production takes place at the Zawiercie plant, for which input data have been inventoried. The results obtained are representative average for all aluminium window and door systems produced in Zawiercie. All revenues from the extraction of raw materials used in production are allocated to module A1. Production of products is based on raw and recycled materials. The content of recycled aluminium is assumed to be 20%. Module A2 is the transport of raw materials to the production plant in Zawiercie. The electrical energy, gas, fuel and waste consumption for the entire production process has been inventoried and included in module A3.

#### System Boundaries

The life cycle analysis of the declared products includes the production stage (modules A1 - A3), A4, C1-C4+D ("from cradle to grave with options") according to EN 15804 and ITB PCR A.

#### System Limits

100% of the input materials and 100% of the electricity and fuel consumption were inventoried at the Zawiercie plant. The assessment takes into account all relevant parameters from the collected production data, i. e. all materials used for production, electricity, gas and fuels used during production and direct production waste. Packaging materials were inventoried: finished products are packed in foil and cardboard boxes.

### Modules A1 and A2 Extraction and transport of raw materials

Raw materials for production such as aluminium sections, plastics, insulators, steel components and packaging materials are transported from various European countries: Poland, Germany, Austria, Switzerland, Turkey, Serbia, Italy. Module A1 presents the impact of production and extraction of raw materials further used in the production of window and door systems. Data on the transport of raw materials shall be recorded by the plant. Means of transport include trucks. European fuel averages have been used for the calculation of module A2.

#### Module A3 Production

The production process of window and door systems is illustrated in the diagrams on page 10. Depending on the type of product ordered, the profiles are routed along one of the paths shown in the diagram. Profiles are crimped with thermal breaks, varnished, cut, welded or ground. After the main and auxiliary processes, the orders are completed and packed for shipping. Electricity and gas are consumed in the production process. Internal transport includes forklifts powered by LPG gas and electricity.

#### Modules A4 Transport

Finished products are transported to customers in Poland and abroad, the average transport distances are calculated in proportion to the quantity of transported products. Finished products are transported by trucks. Products are packed in boxes, cartons and foil.

The largest recipients of orders are in Poland, where they are transported by trucks. The fuel used is diesel. The average



kilometres for the largest customers over the last 12 months are summarised below:

Transport of window and door systems										
Country	Distance [km]	Type of transport								
Poland	425	lorry								
Poland	475	lorry								
Poland	80	lorry								
Poland	335	lorry								
Czech Republic	350	lorry								
Poland	400	lorry								

#### Module C1 Deconstruction and Demolition

The deconstruction of entire window and door elements is assumed to be done manually or the impact from the use of powered tools is assumed to be negligible. Therefore, no contribution in terms of impact of this module is reported and the module is equal to 0.

#### Module C2 Transport

It is assumed that the end-of-life product will be transported by truck to the nearest waste treatment plant (truck, diesel) within 100 km.

#### Module C3 Waste treatment

It was assumed that after the entire window and door elements were dismantled, 95% of the aluminium and 100% of the steel would be recycled.

#### Module C4 Disposal

After the end of use, 5% of the aluminium and 100% of the plastics would end up in landfill.

### Module D Benefits and Loads Outside the System Boundaries

Module D presents the burdens and benefits of recycling. Benefits are assessed at the functional equivalence point, i.e. where substitution of primary raw material takes place.

The benefits of aluminium and steel recycling have been taken into account. In order to obtain a net post-consumer scrap score from the product system, the contribution of post-consumer scrap present in the assessed product is

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subtracted from the post-consumer scrap to be recycled at the end of life.

#### Period of data collection

The input data for the calculation of declared products shall cover the period from January to December 2022. The Life Cycle Assessment has been prepared for Poland as a reference area.

#### Data Quality

The data for the calculation of modules A1-A4 are derived from verified LCI inventory data from each plant. According to Annex E of PN-EN 15804 + A2 data quality assessment was carried out. For technical representativeness, processes with "very good" quality represent 99% of the values for climate change indicators. For geographical and temporal representativeness, the process rating was "very good".

#### Assumptions and estimates

The impacts of representative products were aggregated using a weighted average. The results obtained for representative products can be related proportionally to all products within the scope of window and door systems.

#### **Calculation rules**

LCA was made in accordance with PN-EN 15804+A2 standard and ITB PCR A (v1.6, 2023) document.

#### Databases

The calculation data comes from the Ecoinvent v. 3.6, Ecoinvent v. 3.8 and from the databases available in the Bionova OneClickLCA software. Characteristic factors are CML ver. 4.2 based on EN 15804+A2.



Production schedules for ALURON window and door systems. Depending on the type of assortment ordered, the profiles are routed from the warehouse via one of the possible routes:





# Life Cycle Assessment (LCA) - results



Declared unit

The declared unit is 1 kg of ALURON window and door systems manufactured by Aluron K. Baran and Partners S.K.A. The following indicates which LCA assessment modules were included in the assessment:

	Information on system boundaries (MA = module assessed, MNA = module not assessed)															
Pro	duct sta	age	Const sta	ruction age		Use stage						End	Benefits and loads beyond the system boundaries			
Raw material supply	Transport	M an uf acturin g	Transport to construction site	Construction and installation process	Use	Maintenance	Repair	Replacement	Refurbishmentt	Operational energy use	Operational water use	Deconstruction / demolition	Transport	Waste processing	Disposal	Potential for reuse, recovery or recycling
A1	A2	A3	A4	A5	B1	B2	В3	Β4	B5	B6	B7	C1	C2	C3	C4	D
MA	MA	MA	MA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MA	MA	MA	MA	MA



## Results for window and door systems

#### Environmental impacts

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	С3	C4	D
Potential for creating a greenhouse effect - total	kg CO2 eq.	1.01E+01	3.60E-02	1.85E+00	1.20E+01	2.98E-02	2.14E-02	9.10E-03	-3.02E-02	4.20E-02	-8.19E+00
Potential for creating a greenhouse effect - resulting from the consumption of fossil fuels	kg CO2 eq.	9.99E+00	3.60E-02	1.98E+00	1.20E+01	2.98E-02	2.14E-02	9.09E-03	3.10E-02	4.20E-02	-8.14E+00
Potential for creating a greenhouse effect - biogenic	kg CO2 eq.	1.00E-01	2.69E-05	-1.21E-01	-2.08E-02	2.17E-05	6.77E-06	6.60E-06	-6.12E-02	8.15E-06	-9.70E-03
Potential for creating a greenhouse effect - land use and changes in land use	kg CO2 eq.	4.23E-03	1.09E-05	7.80E-04	5.02E-03	8.97E-06	3.14E-06	2.74E-06	2.29E-05	5.34E-06	-4.11E-02
Ozone-depleting potential of the stratosphere	kg CFC 11 eq.	6.51E-07	8.73E-09	1.15E-07	7.75E-07	7.01E-09	9.85E-09	2.14E-09	3.92E-09	1.24E-09	-2.25E-07
Acidification potential of soil and water	mol H+ eq.	4.98E-02	1.52E-04	1.73E-02	6.72E-02	1.25E-04	1.86E-04	3.82E-05	2.21E-04	4.04E-05	-5.43E-02
Freshwater eutrophication potential	kg Pe	4.76E-05	2.96E-07	1.03E-04	1.51E-04	2.43E-07	3.31E-07	7.39E-08	6.73E-07	1.02E-07	-1.22E-03
Eutrophication potential of marine waters	kg N eq.	7.81E-03	4.49E-05	2.30E-03	1.02E-02	3.77E-05	2.48E-05	1.15E-05	7.43E-05	5.49E-05	-6.72E-03
Potential for terrestrial eutrophication	kg N eq.	7.48E-02	4.96E-04	2.54E-02	1.01E-01	4.17E-04	2.65E-04	1.27E-04	7.87E-04	1.40E-04	-7.50E-02
Tropospheric ozone creation potential	kg NMVOC eq.	2.46E-02	1.61E-04	7.35E-03	3.21E-02	1.34E-04	8.68E-05	4.09E-05	2.23E-04	4.89E-05	-2.29E-02
Abiotic depletion potential of non-fossil resources	kg Sb eq.	7.22E-05	5.97E-07	2.74E-06	7.56E-05	5.09E-07	2.52E-08	1.55E-07	5.07E-08	1.52E-08	-1.14E-05
Abiotic depletion potential of fossil fuels	MJ	1.41E+02	6.17E-01	3.35E+01	1.75E+02	4.64E-01	6.99E-01	1.41E-01	3.88E-01	1.02E-01	-7.54E+01
Water consumption	m <sup>3</sup>	2.89E+00	2.08E-03	4.49E-01	3.34E+00	1.73E-03	1.59E-03	5.26E-04	6.85E-03	7.44E-04	-2.08E+00

#### Environmental aspects of resource use

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Renewable, primary energy as an energy carrier	MJ	5.72E+00	7.10E-03	2.16E+00	7.89E+00	5.84E-03	2.89E-03	1.78E-03	1.87E-02	2.77E-03	-7.28E+00
Renewable primary energy for material use	MJ	0.00E+00	0.00E+00	4.05E-01	4.05E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Completely renewable primary energy	MJ	5.72E+00	7.10E-03	2.57E+00	8.30E+00	5.84E-03	2.89E-03	1.78E-03	1.87E-02	2.77E-03	-7.28E+00
Non-renewable primary energy as a source of energy	MJ	1.36E+02	6.17E-01	2.16E+01	1.58E+02	4.64E-01	2.71E-01	1.41E-01	3.89E-01	1.02E-01	-7.54E+01
Non-renewable primary energy for material use	MJ	4.66E+00	0.00E+00	1.19E+01	1.66E+01	0.00E+00	4.28E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Completely non-renewable primary energy	MJ	1.41E+02	6.17E-01	3.35E+01	1.75E+02	4.64E-01	6.99E-01	1.41E-01	3.89E-01	1.02E-01	-7.54E+01
Use of secondary raw materials	kg	1.22E-01	8.90E-06	1.11E-03	1.23E-01	0.00E+00	3.87E-05	0.00E+00	1.23E-04	3.44E-05	-3.37E-02
Renewable secondary fuels	MJ	3.76E-03	0.00E+00	7.52E-04	4.52E-03	0.00E+00	4.87E-07	0.00E+00	4.71E-06	1.41E-06	-1.58E-04
Non-renewable secondary fuels	MJ	0.00E+00									
Use of fresh water resources	m <sup>3</sup>	9.48E-02	1.15E-04	1.01E-02	1.05E-01	9.65E-05	4.09E-04	2.94E-05	2.74E-04	1.04E-04	-4.80E-02

#### Other environmental information describing waste categories

Indicator	Unit	A1	A2	A3	A1-A3	Α4	C1	C2	C3	C4	D
Hazardous waste destined for landfill	kg	1.30E+00	5.53E-04	9.77E-02	1.40E+00	4.51E-04	4.64E-04	1.37E-04	0.00E+00	0.00E+00	-1.39E+00
Recycled non-hazardous waste	kg	7.10E+00	5.89E-02	4.37E+00	1.15E+01	4.98E-02	1.35E-02	1.52E-02	0.00E+00	3.76E-01	-5.52E+01
Radioactive waste disposed of	kg	4.57E-04	3.75E-06	5.54E-05	5.16E-04	3.18E-06	4.28E-06	9.70E-07	0.00E+00	0.00E+00	-8.26E-05
Components to be reused	kg	0.00E+00									
Recyclable materials	kg	0.00E+00	0.00E+00	1.10E-01	1.10E-01	0.00E+00	0.00E+00	0.00E+00	6.90E-01	2.60E-02	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	4.00E-02	4.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported electricity	MJ	0.00E+00									



#### Verification

The verification process of this EPD is in accordance with ISO 14025 and ISO 21930. After verification, this EPD is valid for a period of 5 years. There is no need for recalculation after 5 years if the input data has not changed significantly.

EN 15804 serves as the basis for ITB PCR-A Independent verification according to ISO 14025 (subsection 8.1.3.) [] internal [X] external

External verification of EPD: Michał Piasecki, Professor ITB, m.piasecki@itb.pl Input verification, LCI audit, LCA: Agnieszka Pikus, JW+A, a.pikus@jw-a.pl LCA verification: Michał Piasecki, Professor ITB, m.piasecki@itb.pl

Note 1: The declaration owner has the sole ownership, liability, and responsibility for the information provided and contained in EPD. Declarations of construction products may not be comparable if they do not comply with EN 15804+A2. For further information about comparability, see EN 15804+A2 and ISO 14025.

Note 2: ITB is a public Research Organization and Notified Body (EC Reg. no 1488) to the European Commission and to other Member States of the European Union designated for the tasks concerning the assessment of building products' performance. ITB acts as the independent, third-party verification organization (ISO 17025/17065/17029). ITB-EPD program is recognized and registered member of The European Platform - Association of EPD program operators and ITB-EPD declarations are registered and stored in the international ECO-PORTAL.

#### Normative references

- ITB PCR A General Product Category Rules for Construction Products
- ISO 14025:2006 Environmental labels and declarations Type III environmental declarations Principles and procedures
- ISO 21930:2017 Sustainability in buildings and civil engineering works Core rules for environmental product declarations of construction products and services
- · ISO 14044:2006 Environmental management Life cycle assessment Requirements and guidelines
- EN 15804 +A2 Sustainability of construction works Environmental product declarations Core rules for the product category of construction products
- EN 573-3:2019 Aluminium and aluminium alloys Chemical composition and form of wrought products Part 3: Chemical composition and form of products
- EN 755-2:2016 Aluminium and aluminium alloys Extruded rod/bar, tube and profiles Part 2: Mechanical properties
- EN 12020-2:2016 Aluminium and aluminium alloys Extruded precision profiles in alloys EN AW-6060 and EN AW-6063 Part 2: Tolerances on dimensions and form