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External accessories for windows



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Basic information

This declaration is the Type III Environmental Product Declaration (EPD) based on EN 15804+A2 and verified according to ISO 14025 by an external auditor. It contains the information on the impacts of the declared construction materials on the environment and their aspects verified by the independent body according to ISO 14025. Basically, comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804+A2.

Life cycle analysis (LCA): A1-A3, C1-C4 and D modules in accordance with EN 15804 (Cradle-to-Gate with options)

The year of preparing the EPD: 2025

Product standard: EN 13659:2004+A1:2008; EN 13561:2004+A1:2008

Service Life: 10 years

PCR: ITB-PCR A, v. 1.6

Functional unit: 1 m^2

Reasons for performing LCA: B2B

Representativeness: Poland, European

MANUFACTURER

FAKRO is a private company established in Poland in 1991. The company is manufacturer of wooden and aluminium-clad plastic roof windows of different designs and opening methods, flat roof windows, flashings, automatic control, access roof lights, light tunnels, smoke ventilation, vertical windows, loft ladders, accessories for roof windows: venetian blinds, pleated blinds, internal and external roller shutters, external awning blinds, installation accessories and roofing membranes and underlays. The company employs approximately 4 000 employees. The company has 11 manufacturing companies and 17 distribution companies all over the world. FAKRO has an extended distribution network in over 60 countries where there is a demand for this type of product. Export sales account for 70% of total sales.

Fig. 1. FAKRO PP Sp. z o.o. manufacturing plant located in Nowy Sącz, Poland.

PRODUCTS DESCRIPTION AND APPLICATION

FAKRO window accessories are wide range of accessories improves the operational quality of the window by creating possibility to control light, reduce heat and save energy. External accessories protect against heat by stopping solar radiation already in front of the glass. They reflect heat to the outside and prevent the room interior from overheating.

External accessories for roof windows include awning blinds and roller shutters.

The AMZ awning blind (e.g. AMZ Komfort, AMZ Z-Wave, AMZ Komfort Z-Wave Solar, AMZ Komfort Electro 230, AMZ WiFi Tuya, AMZ/C Z-Wave, AMK, AME, AMZ/F Z-Wave Solar) is made of durable, weather-resistant fibre glass fabric which is wrapped on a roller and inserted into an aluminium cassette mounted above the window. This solution does not limit window glazing area.

The ARZ roller shutters (e.g. ARZ-H, ARZ Z-Wave Solar, ARZ Electro 24, ARZ WiFi BleBox, ARZ Komfort WiFi Tuya, ARZ Komfort Z-Wave, ARZ Komfort Electro 230) is made of aluminium profiles connected to each other by means of a special rubber connector that increases the durability of the armor. It allows for complete room darkening.

External accessories for vertical windows include only awning blinds.

The VM_ awning blinds are installed externally on windows and doors (terrace and balcony) made of PVC, aluminium or wood.

- **VMZ awning blind** (e.g. VMZ Z-Wave Solar, VMZ WiFi Tuya, VMZ ZIP) is constructed of an aluminium frame and weather-resistant material.
- **VMU awning blind** (e.g. VMU Z-Wave, VMU Electro 230, VMU Thermo WiFi Tuya) makes it possible to hide most of the awning components under the building façade. When the fabric is rolled up, the product is practically invisible.
- **VML awning blind** (e.g. VML Z-Wave Solar, VML WiFi Tuya Solar, VML Electro 230) is equipped with cords to operate the fabric rolled up on the shaft. The absence of standard side guide rails enhances the aesthetics.
- **VMB awning blind** (e.g. VMB Z-Wave, VMB WiFi Tuya, VMB WiFi Blebox) comes with a special tilting bar which creates a small roof over part of the window. This solution enables easy access to the outside view.

Detailed parameters of external accessories for windows are specified in their Declarations of Performance, which can be downloaded from the website: *www.fakro.com*

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Declared Unit

The declaration refers to declared unit (DU) – 1 m^2 of external accessories for vertical and roof windows

Allocation

The allocation rules used for this EPD are based on general ITB PCR A v. 1 .6. Production of external accessories for windows is conducted in the manufacturing plans located in Nowy Sącz, Poland (FAKRO PP Sp. z o.o.) and in Mielec, Poland (FAKRO WDF Sp. z o.o.). All impacts from raw materials extraction and processing are allocated in A1 module of EPD. Impacts from the FAKRO productions were inventoried on the annual production volume expressed in kg from both plants. Water and energy consumption, associated emissions and generated wastes are allocated to module A3. Energy supply was inventoried for whole production process. Packaging materials were taken into consideration.

System limits

The life cycle analysis (LCA) of the declared products covers: product stage – modules A1-A3, end of life – modules C1-C4 and benefits and loads beyond the system boundary – module D (cradle-to-gate with options) in accordance with EN 15804 + A2 and ITB PCR A v. 1.6. Energy and water consumption, emissions as well as information on generated wastes were inventoried and were included in the calculations. It can be assumed that the total sum of omitted processes does not exceed 5% of all impact categories. In accordance with EN 15804 + A2, machines and facilities (capital goods) required for the production as well as transportation of employees were not included in LCA.

System limits

Minimum 99.0% input materials and energy consumption (electricity, sawdust, gas or LPG) were inventoried in both of production plants (FAKRO PP Sp. z o.o. and FAKRO WDF Sp. z o.o.) and were included in the calculation. In the assessment, all significant parameters from gathered production data are considered. Substances with a percentage share of less than 0.1% of total mass were excluded from the calculations. The packaging products (PE, paper or cardboards) are included. It can be assumed that the total sum of omitted processes does not exceed 5% of all impact categories. In accordance with EN 15804 + A2, machines and facilities (capital goods) required for the production as well as transportation of employees were not included in LCA.

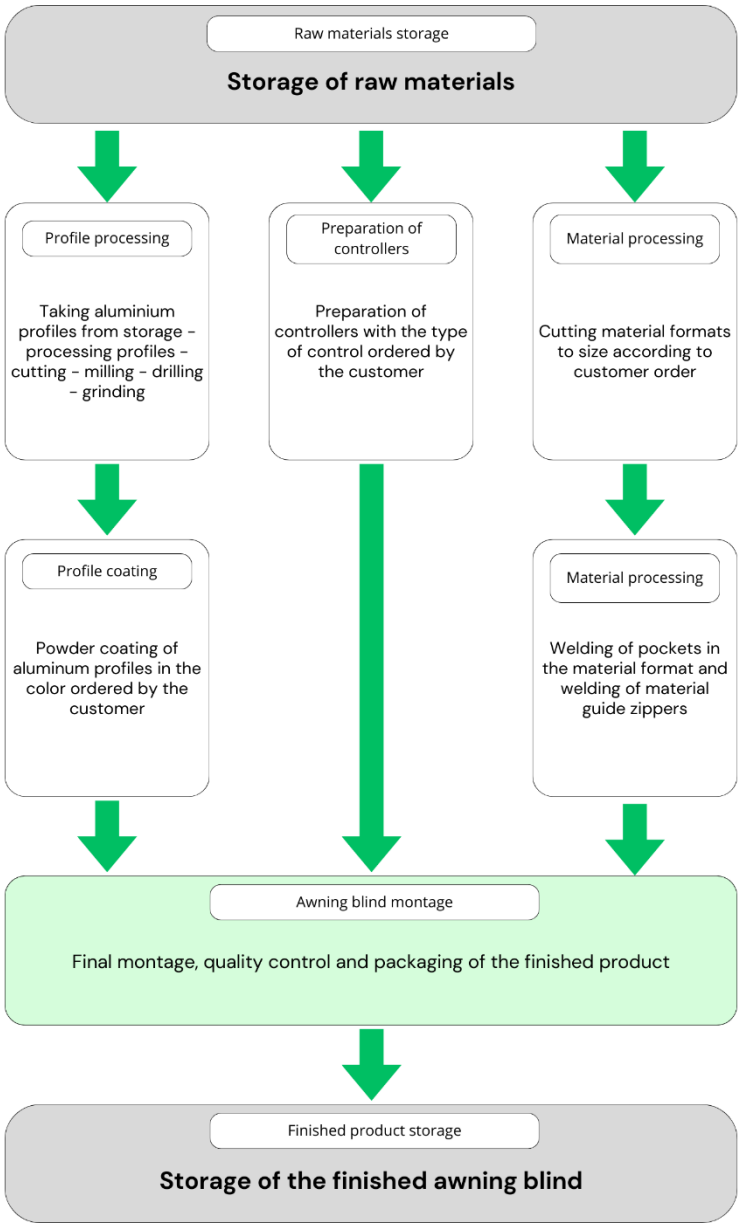

Fig.2. A scheme of external accessories for vertical windows (VMZ) process production by FAKRO PP

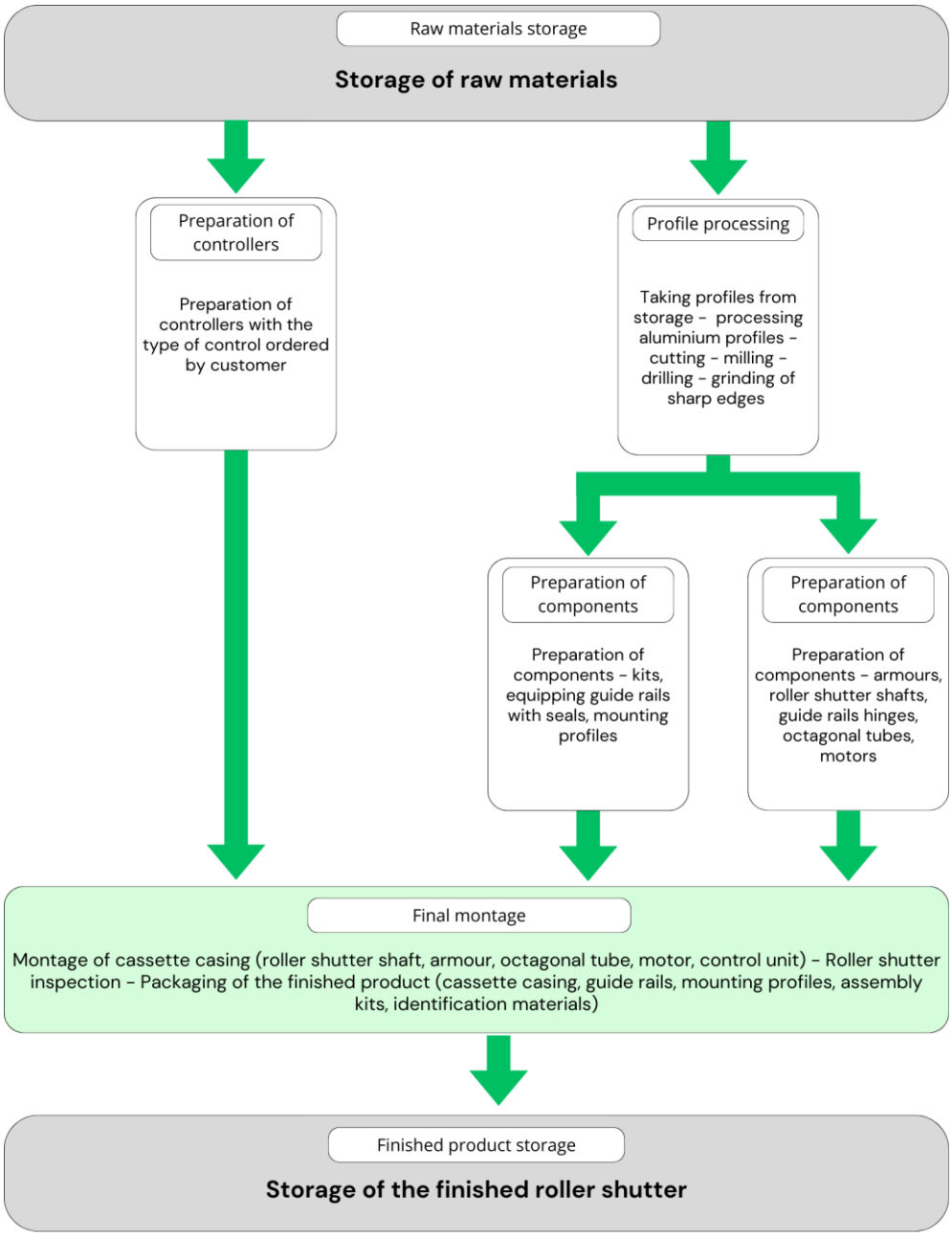

Fig.3. A scheme of external accessories for roof windows (ARZ Komfort) process production by FAKRO WDF.

Modules A1 and A2: *Raw materials supply and transport*

Raw materials such as aluminium, steel, plastics or polymers are produced in Poland and others European plants of leading chemical manufacturers whereas other ancillary items come from both local and foreign suppliers. Data on transport of the different products to the manufacturing plants is collected and modelled for factory by assessor. Means of transport include small truck (< 10 t e.g. couriers), average (10 – 16 t) and big (> 16 t) trucks are applied. Based on data provided by the

manufacturer, all input of transport resources was inventoried in details. European standards for average combustion were used for calculations.

Module A3: *Production*

The schemes of external accessories for verical and roof windows are presented in Fig. 2 and Fig. 3.

Modules *C1-C4 and D: End-of-life (EoL)*

It is assumed that at the end-of-life, 100% of external accessories for windows are demounted using electric tools (module C1) and it is transported to waste processing plant distant by 60 km, on 16-32 t lorry (Euro 6) (module C2). Materials recovered from dismantled products are prepared to recycling, incineration (module C3) and landfilling (module C4) according to a realistic treatment practice for industrial waste what is presented in Table 1.
It is assumed that 95 % of aluminium and steel undergo recycling after sorting and cutting while the remaining 5 % is forwarded to landfill as mixed construction and demolition wastes. In turn, 20 % of synthetic materials are waste processing for recycling and 20 % are energy recovery (incineration). 60 % remaining plastics waste materials are forwarded to landfill in the form of mixed construction and demolition wastes. A potential credit resulting from the recycling of aluminium and steel are presented in module D. Utilization of packaging material was not taken into consideration.

Table 1. End-of-life scenario for external accessories for windows manufactured by FAKRO Sp. z o. o.

Material	Waste processing		Landfilling
	Material recovery (reuse, recycling)	Energy recovery (incineration)	
aluminium, steel	95 %	0 %	5 %
synthetic materials	20 %	20 %	60 %

Data quality

The data selected for LCA analysis originates from ITB-LCI questionnaires completed by FAKRO Sp. z o. o. using the inventory data, ITB and Ecoinvent database v. 3.10 and KOBiZE. KOBiZE data is supplemented with Ecoinvent v. 3.10 data on the national electricity mix impact where no specific indicator data is provided. No specific data collected is older than five years and no generic datasets used are older than ten years. The representativeness, completeness, reliability, and consistency are judged as good.

Data collection period

The data for manufacture of the declared products refers to period between 01.01.2024 – 01.01.2025 (1 year). The life cycle assessments were prepared for Poland and Europe as reference area.

Assumptions and estimates

Impacts were inventoried and calculated for external accessories for vertical windows VMZ Z-Wave awning blind with dimensions of 100 x 100 cm (1 m^2) and external accessories for roof windows ARZ

Komfort Z-Wave roller shutter with dimensions of 78 x 118 cm (0.92 m^2) which were adopted as representative products. The area of a representative external accessories for roof windows was converted from representative unit to 1 m^2. The results for 1 m^2 of external accessories for vertical windows are presented in Tables 3-6 and for 1 m^2 of external accessories for roof windows in Tables 7-10. Biogenic content of product for external accessories for vertical windows is 11.4% (packaging materials) and for roof windows is 12.1% (packaging materials). Biogenic carbon content in product is 8.5% for external accessories for vertical windows and 3.7% for roof accessories for vertical windows.

Calculation rules

LCA was performed using ITB-LCA tool developed in accordance with EN 15804 + A2. The biogenic carbon content in product is marginal. BMB (biomass balance) method was not used

Databases

The data for the processes comes from Ecoinvent v. 3.10 and ITB-Database. Specific data quality analysis was a part of external audit. Polish electricity mix used (production) is 0.597 kg CO_2/kWh (KOBiZE 2023).

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to declared unit (DU) – 1 m^2 of external accessories for vertical and roof windows manufactured by FAKRO Sp. z o. o.

Table 2. System boundaries for the environmental characteristic of external accessories for windows.

Environmental assessment information (MD – Module Declared, MND – Module Not Declared, INA – Indicator Not Assessed)																
Product stage			Construction process		Use stage							End of life				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse-recovery-recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
MD	MD	MD	MND	MND	MND	MND	MND	MND	MND	MND	MND	MD	MD	MD	MD	MD

Table 3. LCA results of external accessories for vertical windows – environmental impacts (DU: 1 m^2)

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Global Warming Potential - total	eq. kg CO_2	7.80E+01	2.31E+00	8.05E+00	8.83E+01	8.24E-02	1.63E-01	7.33E+00	4.59E-01	-2.67E+00
Greenhouse gas potential - fossil	eq. kg CO_2	8.48E+01	2.31E+00	7.98E+00	9.51E+01	8.18E-02	1.63E-01	3.00E-01	8.51E-02	-2.66E+00
Greenhouse gas potential - biogenic	eq. kg CO_2	-6.66E+00	1.39E-03	6.54E-02	-6.59E+00	5.24E-04	1.07E-04	7.03E+00	3.74E-01	-1.08E-02
Global warming potential - land use and land use change	eq. kg CO_2	4.99E-01	7.47E-04	5.62E-03	5.05E-01	2.88E-05	5.42E-05	2.43E-04	2.66E-05	-2.18E-03
Stratospheric ozone depletion potential	eq. kg CFC 11	5.65E-06	4.60E-08	2.44E-07	5.94E-06	1.81E-09	3.24E-09	9.74E-09	2.30E-09	-1.85E-08
Soil and water acidification potential	eq. mol H+	1.78E+00	4.66E-03	1.02E-01	1.89E+00	1.00E-03	3.39E-04	1.32E-03	4.07E-04	-1.12E-02
Eutrophication potential - freshwater	eq. kg P	3.52E-02	1.54E-04	1.42E-02	4.95E-02	1.72E-04	1.10E-05	9.09E-05	2.59E-06	-6.36E-04
Eutrophication potential - seawater	eq. kg N	1.25E-01	1.11E-03	1.96E-02	1.45E-01	1.43E-04	8.15E-05	4.71E-04	3.56E-04	-2.10E-03
Eutrophication potential - terrestrial	eq. mol N	1.96E+00	1.20E-02	1.86E-01	2.16E+00	1.22E-03	8.79E-04	3.59E-03	1.96E-03	-2.31E-02
Potential for photochemical ozone synthesis	eq. kg NMVOC	4.26E-01	7.81E-03	5.01E-02	4.84E-01	3.43E-04	5.64E-04	1.05E-03	6.02E-04	-7.36E-03
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	3.02E-02	7.62E-06	1.68E-05	3.02E-02	1.36E-07	5.42E-07	7.37E-06	5.59E-08	-5.65E-05
Abiotic depletion potential - fossil fuels	MJ	5.49E+02	3.24E+01	1.40E+02	7.22E+02	1.54E+00	2.29E+00	1.79E+00	7.43E-01	-1.87E+01
Water deprivation potential	eq. m^3	2.86E+01	1.57E-01	2.99E+00	3.17E+01	3.14E-02	1.12E-02	5.56E-02	2.50E-03	-3.23E-01

Table 4. LCA results of external accessories for vertical windows – additional impacts indicators (DU: 1 m^2)

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Particulate matter	disease incidence	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA	INA	INA	INA	INA	INA	INA

INA – Indicator Not Assessed

Table 5. LCA results of external accessories for vertical windows - the resource use (DU: 1 m^2)

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	2.15E+02	5.93E-01	1.22E+02	3.38E+02	1.12E-01	3.93E-02	-1.24E+00	7.09E-03	-2.03E+00
Consumption of renewable primary energy resources used as raw materials	MJ	4.93E+01	0.00E+00	0.00E+00	4.93E+01	0.00E+00	0.00E+00	1.49E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	2.65E+02	5.93E-01	1.22E+02	3.87E+021	1.12E-01	3.93E-02	2.57E-01	7.09E-03	-2.03E+00
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	9.55E+02	3.24E+01	1.46E+02	.13E+03	1.63E+00	2.29E+00	-6.07E+00	7.43E-01	-1.87E+01
Consumption of non-renewable primary energy resources used as raw materials	MJ	3.82E+01	0.00E+00	1.59E+00	3.98E+01	0.00E+00	0.00E+00	7.87E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	9.95E+02	3.24E+01	1.47E+02	1.17E+03	1.63E+00	2.29E+00	1.79E+00	7.43E-01	-1.87E+01
Consumption of secondary materials	kg	3.38E+00	1.46E-02	1.84E-02	3.42E+00	1.25E-04	1.06E-03	3.47E-03	3.01E-04	-1.52E-02
Consumption of renewable secondary fuels	MJ	3.44E-01	1.65E-04	1.37E-04	3.44E-01	6.81E-07	1.34E-05	2.56E-04	3.10E-06	-3.92E-04
Consumption of non-renewable secondary fuels	MJ	8.52E-02	0.00E+00	0.00E+00	8.52E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater resources	m^3	8.12E-01	4.37E-03	9.14E-02	9.08E-01	5.02E-04	3.08E-04	1.26E-03	2.57E-04	-9.03E-03

Table 6. LCA results of external accessories for vertical windows – waste categories (DU: 1 m^2)

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Hazardous waste neutralized	kg	1.55E+00	4.45E-02	2.43E-01	1.84E+00	3.19E-07	3.34E-03	2.77E-02	9.94E-04	-2.00E-01
Non-hazardous waste neutralised	kg	4.94E+01	9.95E-01	4.20E+00	5.46E+01	9.11E-03	7.06E-02	5.75E-01	5.08E-01	-5.40E+00
Radioactive waste	kg	8.53E-03	1.15E-05	1.09E-04	8.65E-03	1.33E-06	7.39E-07	5.84E-06	8.07E-07	-2.13E-05
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	0.00E+00	0.00E+00
Materials for recycling	kg	1.82E+00	2.47E-04	1.44E+00	3.26E+00	9.37E-06	1.74E-05	1.03E+01	1.61E-03	-8.88E+00
Materials for energy recovery	kg	1.88E-04	1.35E-06	4.33E-01	4.34E-01	1.31E-08	1.48E-07	3.21E-07	1.70E-08	-4.91E-06
Energy exported	MJ	8.03E-01	3.16E-02	3.72E-01	1.21E+00	4.48E-03	9.65E-04	2.46E-01	1.90E-03	-4.18E-01

Table 7. LCA results of external accessories for roof windows – environmental impacts (DU: 1 m^2)

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Global Warming Potential - total	eq. kg CO_2	1.13E+02	1.17E+00	1.65E+00	1.16E+02	8.95E-02	1.77E-01	5.53E+00	9.50E-01	-2.74E+00
Greenhouse gas potential - fossil	eq. kg CO_2	1.17E+02	1.16E+00	1.64E+00	1.20E+02	8.89E-02	1.77E-01	6.82E-01	2.08E-01	-2.72E+00
Greenhouse gas potential - biogenic	eq. kg CO_2	-4.11E+00	7.34E-04	7.11E-03	-4.10E+00	5.69E-04	1.16E-04	4.85E+00	7.42E-01	-1.10E-02
Global warming potential - land use and land use change	eq. kg CO_2	7.17E-01	3.82E-04	3.39E-04	7.17E-01	3.13E-05	5.89E-05	2.94E-04	4.31E-05	-2.23E-03
Stratospheric ozone depletion potential	eq. kg CFC 11	1.29E-05	2.32E-08	1.39E-07	1.31E-05	1.97E-09	3.52E-09	1.23E-08	6.97E-09	-1.89E-08
Soil and water acidification potential	eq. mol H+	9.26E-01	2.39E-03	1.13E-02	9.39E-01	1.09E-03	3.69E-04	1.65E-03	5.49E-04	-1.14E-02
Eutrophication potential - freshwater	eq. kg P	4.49E-02	7.82E-05	1.78E-03	4.67E-02	1.87E-04	1.20E-05	1.24E-04	4.91E-06	-6.51E-04
Eutrophication potential - seawater	eq. kg N	1.09E-01	5.71E-04	1.79E-03	1.11E-01	1.55E-04	8.85E-05	6.15E-04	9.34E-04	-2.15E-03
Eutrophication potential - terrestrial	eq. mol N	1.09E+00	6.16E-03	1.51E-02	1.12E+00	1.33E-03	9.55E-04	4.87E-03	2.49E-03	-2.37E-02
Potential for photochemical ozone synthesis	eq. kg NMVOC	4.25E-01	3.98E-03	6.94E-03	4.35E-01	3.72E-04	6.13E-04	1.40E-03	7.82E-04	-7.54E-03
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	4.55E-03	3.86E-06	1.71E-06	4.56E-03	1.48E-07	5.89E-07	8.31E-06	1.09E-07	-5.79E-05
Abiotic depletion potential - fossil fuels	MJ	7.66E+02	1.63E+01	3.16E+01	8.14E+02	1.68E+00	2.49E+00	2.28E+00	1.11E+00	-1.92E+01
Water deprivation potential	eq. m^3	2.45E+01	7.96E-02	3.70E-01	2.49E+01	3.41E-02	1.22E-02	1.12E-01	4.66E-03	-3.31E-01

Table 8. LCA results of external accessories for roof windows – additional impacts indicators (DU: 1 m^2)

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Particulate matter	disease incidence	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA	INA	INA	INA	INA	INA	INA

INA – Indicator Not Assessed

Table 9. LCA results of external accessories for roof windows - the resource use (DU: 1 m^2)

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	2.61E+02	2.90E-01	1.20E+00	2.62E+02	1.22E-01	4.27E-02	-5.58E+00	1.37E-02	-2.08E+00
Consumption of renewable primary energy resources used as raw materials	MJ	3.71E+01	0.00E+00	0.00E+00	3.71E+01	0.00E+00	0.00E+00	5.94E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	2.98E+02	2.90E-01	1.20E+00	3.00E+02	1.22E-01	4.27E-02	3.57E-01	1.37E-02	-2.08E+00
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.29E+03	1.63E+01	3.01E+01	1.34E+03	1.78E+00	2.49E+00	-2.90E+01	1.11E+00	-1.92E+01
Consumption of non-renewable primary energy resources used as raw materials	MJ	1.55E+02	0.00E+00	2.42E+00	1.58E+02	0.00E+00	0.00E+00	3.13E+01	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	1.49E+03	1.63E+01	3.26E+01	1.53E+03	1.78E+00	2.49E+00	2.28E+00	1.11E+00	-1.92E+01
Consumption of secondary materials	kg	2.49E+00	7.48E-03	2.26E-03	2.50E+00	1.35E-04	1.16E-03	5.04E-03	4.34E-04	-1.56E-02
Consumption of renewable secondary fuels	MJ	5.38E-01	8.99E-05	8.48E-06	5.38E-01	7.40E-07	1.46E-05	2.90E-04	8.03E-06	-4.02E-04
Consumption of non-renewable secondary fuels	MJ	1.38E-01	0.00E+00	0.00E+00	1.38E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater resources	m^3	1.64E+00	2.20E-03	6.21E-03	1.65E+00	5.45E-04	3.35E-04	2.25E-03	6.42E-04	-9.25E-03

Table 10. LCA results of external accessories for roof windows – waste categories (DU: 1 m^2)

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Hazardous waste neutralized	kg	1.71E+00	2.32E-02	3.69E-03	1.74E+00	3.47E-07	3.63E-03	6.19E-02	1.73E-03	-2.05E-01
Non-hazardous waste neutralised	kg	5.29E+01	5.03E-01	1.50E-01	5.36E+01	9.90E-03	7.67E-02	1.39E+00	1.97E+00	-5.53E+00
Radioactive waste	kg	1.12E-02	5.53E-06	1.41E-05	1.12E-02	1.44E-06	8.03E-07	7.76E-06	2.96E-06	-2.18E-05
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	0.00E+00	0.00E+00
Materials for recycling	kg	2.54E+00	1.25E-04	1.04E+00	3.58E+00	1.02E-05	1.89E-05	1.13E+01	1.65E-03	-9.10E+00
Materials for energy recovery	kg	3.05E-04	8.73E-07	2.04E-07	3.07E-04	1.42E-08	1.60E-07	4.68E-07	2.88E-08	-5.04E-06
Energy exported	MJ	1.38E+00	1.13E-02	5.14E-02	1.44E+00	4.86E-03	1.05E-03	7.82E-01	2.80E-03	-4.29E-01

Verification

The process of verification of this EPD is in accordance with ISO 14025 and ISO 21930. After verification. this EPD is valid for a 5-year-period. EPD does not have to be recalculated after 5 years. if the underlying data have not changed significantly.

The basis for LCA analysis was EN 15804 + A2 and ITB PCR A
Independent verification corresponding to ISO 14025 (subclause 8.1.3) [x] external [ ] internal
External verification of EPD: Halina Prejzner, PhD Eng LCA, LCI audit and input data verification: Mateusz Kozicki, PhD Verification of LCA: Michał Piasecki, PhD. DSc. Eng

Note 1: The declaration owner has the sole ownership. liability and responsibility for the information provided and contained in EPD. Declarations within the same product category but from different programs may not be comparable. 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. Depending on the application. a corresponding conversion factor such as the specific weight per surface area must be taken into consideration.

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 (17065/17025 certified). 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 v. 1.6 General Product Category Rules for Construction Products
- EN 13659:2004+A1:2008 Shutters - Performance requirements including safety
- EN 13561:2004+A1:2008 External blinds - Performance requirements including safety
- 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
- ISO 15686-1:2011 Buildings and constructed assets – Service life planning – Part 1: General principles and framework
- ISO 15686-8:2008 Buildings and constructed assets – Service life planning – Part 8: Reference service life and service-life estimation
- EN 15804:2012+A2:2019 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- ISO 14067:2018 Greenhouse gases - Carbon footprint of products - Requirements and guidelines for quantification
- EN 15942:2012 Sustainability of construction works – Environmental product declarations – Communication format business-to-business
- KOBiZE Emissions (CO_2, SO_2, NO_x, CO and total dust) from electricity, 2023

LCA, LCI audit and input data verification
Mateusz Kozicki, PhD

qualified electronic signature

Head of the Thermal Physic, Acoustics and Environment Department
Agnieszka Winkler-Skalna, PhD

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CERTIFICATE № 876/2025
of TYPE III ENVIRONMENTAL DECLARATION

Products:
External accessories for windows

Manufacturer:
FAKRO Sp. z o.o.
Węgierska 144A, 33-300 Nowy Sącz, Poland

confirms the correctness of the data included in the development of
Type III Environmental Declaration and accordance with the requirements of the standard

EN 15804+A2

Sustainability of construction works.
Environmental product declarations.
Core rules for the product category of construction products.

This certificate, issued on 12th December 2025 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Head of the Thermal Physic, Acoustics and Environment Department
Agnieszka Winkler-Skalna, PhD

INSTYTUT TECHNIKI BUDOWLANEJ

Deputy Director
for Research and Innovation
Krzysztof Kuczyński, PhD

Warsaw, December 2025