Type III Environmental Product Declaration No. 877/2025

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Fire resistant rolling shutter type Marc-Ok+

Owner of the EPD:

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ITB is the verified member of The European Platform for EPD program operators and LCA practitioner www.eco-platform.org

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, A4-A5, C1-C4 and D modules in accordance with EN 15804+A2 (Cradle-to-Gate with options)

The year of preparing the EPD: 2025

Product standard: EN 16034, EN 12101, EN 13241:2003+A2:2016

Service Life: 20 years

PCR: ITB-PCR A

Declared unit: 1 m^2

Reasons for performing LCA: B2B

Representativeness: Poland, Europe, 2024

MANUFACTURER

“Małkowski-Martech” S.A. is a company with over twenty years of experience in the field of passive fire protection and is also an integral part of ASSA ABLOY, an international group specializing in the field of security. The manufacturing plant is located in Czołowo, Poland (Figure 1). This combination enables the creation of a comprehensive organisation that meets the highest standards of building security worldwide. The company delivers a wide range of certified products, including Marc-Ok+ fire protection curtain, horizontal sliding and overhead doors, smoke control curtains, theatre doors, special-purpose transport system closures, and incinerator bunker opening protections. These products are used in a variety of industrial, commercial, and public facilities both in Poland and abroad.

Figure 1 The view of MAŁKOWSKI – MARTECH S.A. manufacturing plant

The ability to combine functionality with high quality means that the company provides comprehensive and modern solutions for customers seeking the highest standards in fire protection devices, which also feature timeless aesthetics.

“Małkowski-Martech” S.A. stands out by its ability to tailoring the majority of the projects to the requirements of each Customer. This approach means that the company meets the expectations of the most demanding architects and investors, providing an end-to-end service at every stage of the project, from consultancy, design, production, to installation and maintenance.

The company's commitment to innovative solutions and extensive partnership with numerous facilities confirm its credibility and flexibility as a supplier of high-quality products. The company not only provides top-tier security but also actively contributes to shaping a variety of public spaces.

PRODUCTS DESCRIPTION

The Marc-Ok+ fire resistant fabric curtain represents a new generation of passive fire protection systems, designed to meet the growing demands of modern architecture while offering reliable, certified fire safety. Developed by Małkowski-Martech S.A., part of the international ASSA ABLOY group, this advanced system ensures top-tier building security combined with discreet, aesthetic integration.

Marc-Ok+ builds upon the proven performance of the original Marc-Ok curtains, offering enhanced functionality, improved installation options, and additional configuration flexibility. It is a compact, lightweight, and highly durable solution, designed to divide fire zones and limit smoke and heat spread in both commercial and industrial settings.

Its structure includes a multi-layered fire-resistant curtain fabric reinforced with glass fibre and stainless-steel wire, complemented by precision-engineered guides, a discreet winding shaft, and a high-performance VIC+ drive unit. The Marc-Ok+ system is distinguished by its minimal installation space requirements, allowing it to blend seamlessly into contemporary interiors and façade structures, whether in new developments, renovations, or historic buildings.

A key advantage of Marc-Ok+ is its broad range of control and safety options, including integration with fire alarm systems, position monitoring, and access control. The curtain is concealed within an aesthetically designed box, with flush-mounted guides that enhance visual harmony without compromising performance.

Notably, Marc-Ok+ is available in multiple certified fire resistance classes: EI30, EI60, and higher configurations depending on project-specific demands. The curtain fabric meets the A2-s1, d0 reaction to fire classification according to EN 13501-1:2019. The system's flexible design also allows it to serve as a fireproof closure in specialized environments, such as transport systems and technical areas, providing comprehensive safety without detracting from the architectural concept.

With its innovative engineering, discreet form, and certified protection, Marc-Ok+ delivers a state-of-the-art solution that meets the highest standards of passive fire safety and architectural design.

Table 1 Technical parameters of the products

Technical parameters	Product type	
	Marc-Ok+ EI30	Marc-Ok+ EI60
Fire resistance acc. to EN 16034:2014	$EI_1$30, $EI_2$30, EW120	$EI_1$60, $EI_2$60, EW120
Ability to release acc. to EN 16034:2014	fulfils	fulfils
Self-closing acc. to EN 16034:2014	C	C
Durability to ability to release acc. to EN 16034:2014	fulfils	fulfils
Durability of self-closing against degradation acc. to EN 16034:2014	category of use 2	category of use 2
Resistance to wind load acc. to EN 13241:2003+A2:2016	class 2	class 2
Dimension [mm] W: width H: height	W: max 18000 H: max 10000	W: max 18000 H: max 10000

All additional technical information about the product is available on the https://www.malkowski.pl/ and catalogues.

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Unit

The declared unit is 1 m^2 of products: Marc-Ok+ (reference size 3000x3000). Directly used material flows are determined using reference size and assigned to the declared unit. All other inputs and outputs in the production are scaled to the declared unit.

System boundary

The life cycle analysis of the declared products covers “Product Stage” A1-A3, A4-A5, C1-C4+D modules in accordance with EN 15804+A2 and ITB PCR A v1.6. (cradle to gate with options). Energy and water consumption, emissions as well as information on generated wastes were inventoried and were included in the calculation. It can be assumed that the total sum of omitted processes does not exceed 2% 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.

Allocation

The allocation rules used for this EPD are based on general ITB ’s document PCR A. Production of the fire resistant rolling shutter type Marc-Ok products is a line process (as presented in Figure 2) conducted in the manufacturing plant located in Czołowo (Poland). In the modules A1-A3, material losses in the assembly of the products in the factory are defined on the averaged specific values for the site. Input and output data from the production is inventoried and allocated to the production on the mass basis The declaration covers a wide range of products (averaged). Their production resources and processing stages are basically similar, so it is possible to average the production by product volume.

System limits

100% materials and 100% energy consumption were inventoried in a factory and were included in calculation. In the assessment, all significant parameters from gathered production data are considered, utilized energy, and electric power consumption, direct production waste, and available emission measurements. The total of neglected input flows per module A1-A3 does not exceed the permitted maximum of 1 % of energy usage and product mass. Tires consumption for transport was not taken into account. It is assumed that the total sum of omitted processes does not exceed 2% of all impact categories. In accordance with EN 15804+A2 machines and facilities (capital goods) required for and during production are excluded, as is transportation of employees.

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

The modules A1 and A2 represent the extraction and processing of raw materials/elements (mainly steel and curtain elements) and transport to the production site. For A2 module (transport) European averages for fuel data are applied. All input material transport’s distances from supplier were considered and included into calculation.

Module A3: *Production*

The product specific manufacturing process line is presented in Figure 2, the input products are processed by: CNC, welding and sewing processes and finally assembled. Electricity are consumed in the process. The products are painted. In the production process, technical gases and materials for welding elements are used. The production process is depicted schematically as can be seen below.

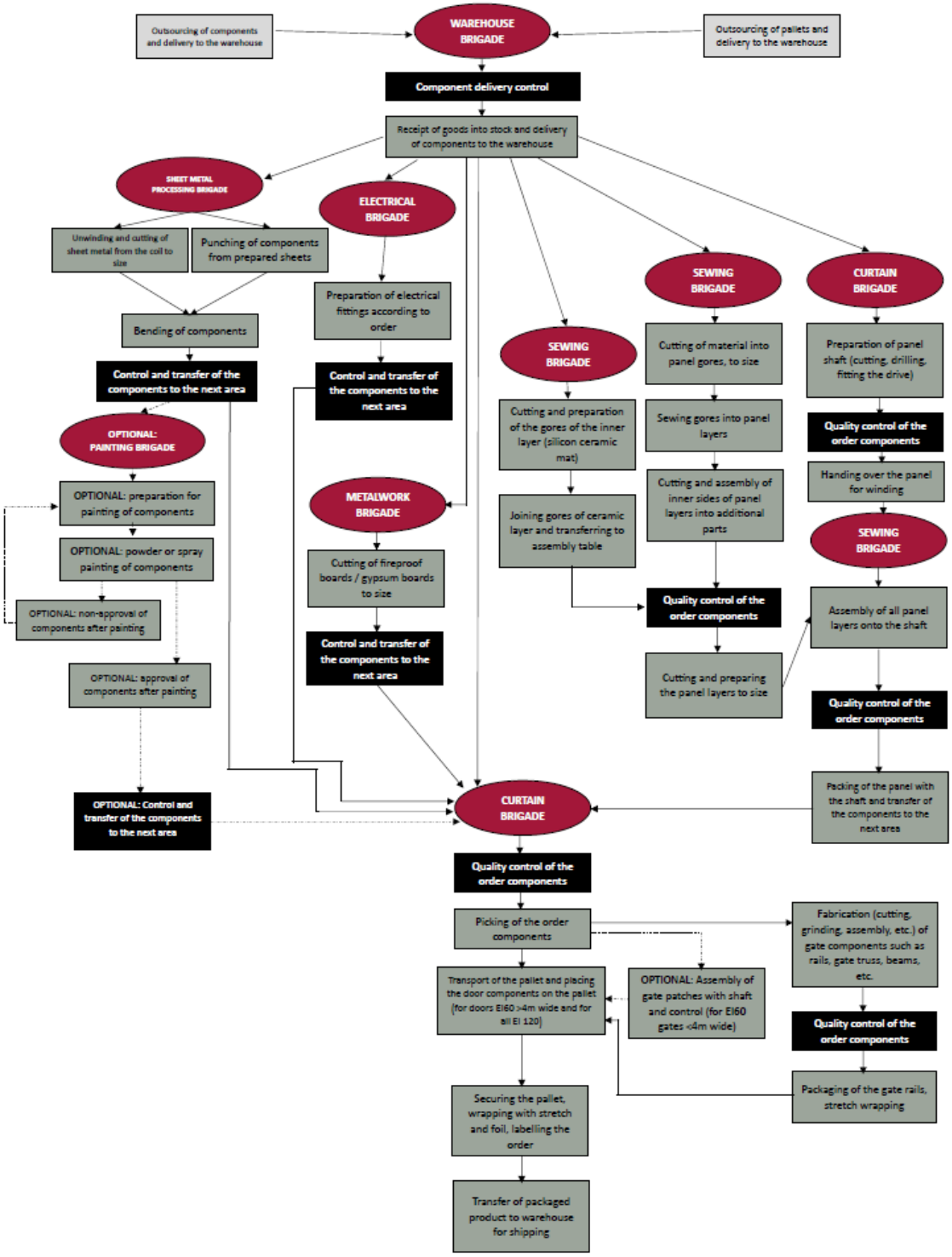

Figure 2 Manufacturing process scheme (A3)

Module A4: transport to consumer

Vehicle transport at distance 500 km is considered (emission standard: Euro 5) with 100% load capacity. It was estimated that approximately 3 kWh of electricity would be required for installation.

Modules *C and D: End-of-life (EOL)*

The system boundaries of the Smoke and Fire curtains were set following their disposal, reaching their end-of-waste status. Due to the fact that the declaration covers a wide range of products for various purposes and usage scenarios, it is not possible to directly specify the de-construction

technology and the amount of energy for disassembly in C1 module (so this module was based on assumption, 3 kWh). In the adapted end-of-life scenario, the de-constructed products are transported to a mill distant by 50 km on > 16t lorry EURO 5 where are used as metal scrap to produce a new metals. It is assumed that all elements other than metal ones shall go to a landfill. The recycling potential of C3 module is for metals is 100%. All other material in C4 module are located in disposal landfill (Table 1). Module D presents credits resulting from the recycling of the metal scrap (used for new production), calculated in accordance with the approach developed by World Steel Association.

Table 2 End-of-life scenario for the *Fire resistant rolling shutter type Marc-Ok+*

Material	Material recovery	Recycling	Landfilling
Metals	100%	100%	0%
All other materials	100%	0%	100%

Electricity at end-of-life (module C) has been modelled using an average Polish electricity mix as the location where the product reaches end-of-life is unknown.

Data collection period

The data for manufacture of the declared products refer to period between 01.01.2024 – 31.12.2024 (1 year). The life cycle assessments were prepared for Poland and Europe as reference area.

Data quality

The data selected for LCA originate from ITB-LCI questionnaires completed by MAŁKOWSKI – MARTECH S.A. and verified during LCI data audit. No data collected is older than five years and no generic datasets used are older than ten years. The representativeness, completeness, reliability, and consistency is judged as good. The background data for the processes come from the following resources database Ecoinvent v.3.11 (steel, sheet metal, aluminium, welding, paints, textile, silica fibre, foils, EUR-flat pallet). Specific (LCI) data quality analysis was a part of the input data verification. Where no background data is available, data gaps were complemented by manufacturer information and literature research.

Assumptions and estimates

The impacts of the representative products were aggregated using weighted average.

Calculation rules

LCA was performed using ITB-LCA tool developed in accordance with EN15804+A2. Emission of greenhouse gases was calculated using the IPCC GWP method with a 100-year horizon and all other with the EF 3.1. method. No mass balance approach was used. The biogenic C content in product (including packing) is less than 5%.

Additional information

Polish electricity (Ecoinvent v 3.11 supplemented by actual national KOBiZE data) emission factor used is 0.597 kg CO_2/kWh and 0.0186 kg CO_2/kWh for wind electricty. As a general rule, no particular environmental or health protection measures other than those specified by law are necessary. The company uses renewable energy for which it has presented the necessary certificates.

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to declared unit (DU) – 1 m^2 of Fire resistant rolling shutter type Marc-Ok+ following life cycle modules (Table 3) were included in the analysis. The following tables 4-7 show the environmental impacts of the life cycle of selected modules (A1-A5+C1-C4+D).

Table 3 System boundaries for the environmental characteristic of the product.

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**	**MD**	**MD**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MD**	**MD**	**MD**	**MD**	**MD**

Table 4 Life cycle assessment (LCA) results for specific product Marc-Ok+ 3000x3000 – environmental impacts (DU: 1 m^2)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO_2	6.32E+01	3.06E+00	4.57E+00	7.08E+01	2.41E+00	2.10E-01	2.10E-01	2.41E-01	1.85E+00	9.22E-02	-2.18E+01
Greenhouse potential - fossil	eq. kg CO_2	7.37E+01	3.05E+00	4.56E+00	8.13E+01	2.40E+00	2.03E-01	2.03E-01	2.40E-01	1.84E+00	9.12E-02	-2.18E+01
Greenhouse potential - biogenic	eq. kg CO_2	-1.06E+01	9.34E-03	9.94E-03	-1.05E+01	8.21E-03	7.02E-03	7.02E-03	8.21E-04	3.84E-04	9.20E-04	-8.11E-02
Global warming potential - land use and land use change	eq. kg CO_2	9.53E-02	1.31E-03	2.76E-04	9.69E-02	9.42E-04	8.42E-05	8.42E-05	9.42E-05	2.91E-04	9.24E-05	-1.37E-03
Stratospheric ozone depletion potential	eq. kg CFC 11	4.08E-05	6.94E-07	2.82E-07	4.18E-06	5.56E-07	4.91E-09	4.91E-09	5.56E-08	2.25E+01	2.78E-08	-7.68E-07
Soil and water acidification potential	eq. mol H+	5.89E-01	1.11E+02	4.30E-03	1.12E+02	9.74E-03	2.67E-03	2.67E-03	9.74E-04	1.54E-02	7.70E-04	-8.64E-02
Eutrophication potential - freshwater	eq. kg P	3.14E-02	1.93E-04	1.56E-04	3.17E-02	1.61E-04	4.56E-04	4.56E-04	1.61E-05	1.25E-05	2.65E-05	-9.28E-03
Eutrophication potential - seawater	eq. kg N	7.96E-02	6.10E-03	1.41E-03	8.72E-02	2.94E-03	3.86E-04	3.86E-04	2.94E-04	5.22E-02	2.66E-04	-1.89E-02
Eutrophication potential - terrestrial	eq. mol N	1.66E+00	6.69E-02	7.90E-03	1.73E+00	3.21E-02	3.26E-03	3.26E-03	3.21E-03	9.88E-02	2.89E-03	-2.06E-01
Potential for photochemical ozone synthesis	eq. kg NMVOC	3.64E-01	1.88E-02	3.17E-03	3.86E-01	9.83E-03	9.12E-04	9.12E-04	9.83E-04	2.15E-02	8.36E-04	-1.09E-01
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	3.50E-03	1.00E-05	7.20E-06	3.51E-03	8.51E-06	1.17E-06	1.17E-06	8.51E-07	4.18E-07	3.09E-07	-4.15E-04
Abiotic depletion potential - fossil fuels	MJ	1.11E+03	4.44E+01	2.99E+01	1.19E+03	3.56E+01	4.07E+00	4.07E+00	3.56E+00	1.75E+00	2.11E+00	-1.79E+02
Water deprivation potential	eq. m^3	3.50E+01	1.98E-01	2.67E-01	3.54E+01	1.65E-01	8.42E-02	8.42E-02	1.65E-02	4.10E-02	1.22E-02	-2.93E+00

Table 5 Life cycle assessment (LCA) results for specific product Marc-Ok+ 3000x3000 – additional impacts indicators (DU: 1 m^2)

Indicator	Unit	A1-A3	A4-A5	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA	INA

Table 6 Life cycle assessment (LCA) results for specific product Marc-Ok+ 3000x3000 - the resource use (DU: 1 m²)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.57E+02	6.05E-01	4.64E+01	2.04E+02	5.11E-01	3.02E-01	3.02E-01	5.11E-02	3.21E-02	3.70E-02	-1.50E+01
Consumption of renewable primary energy resources used as raw materials	MJ	1.07E+02	0.00E+00	0.00E+00	1.07E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	2.72E+02	6.05E-01	4.64E+01	3.19E+02	5.11E-01	3.02E-01	3.02E-01	5.11E-02	3.21E-02	3.70E-02	-1.50E+01
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	9.50E+02	4.44E+01	3.00E+00	9.98E+02	3.56E+01	4.08E+00	4.08E+00	3.56E+00	-8.51E+01	2.28E+00	-1.71E+02
Consumption of non-renewable primary energy resources used as raw materials	MJ	5.22E+01	0.00E+00	0.00E+00	5.22E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.68E+01	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	1.16E+03	4.44E+01	3.26E+01	1.23E+03	3.56E+01	4.08E+00	4.08E+00	3.56E+00	1.75E+00	2.28E+00	-1.71E+02
Consumption of secondary materials	kg	9.76E+00	1.54E-02	1.92E-02	9.79E+00	1.19E-02	3.72E-04	3.72E-04	1.19E-03	7.91E-04	0.00E+00	-2.89E+00
Consumption of renew. secondary fuels	MJ	3.66E+00	1.53E-04	5.45E-05	3.66E+00	1.32E-04	2.07E-06	2.07E-06	1.32E-05	1.07E-05	0.00E+00	-3.84E-03
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.29E-03	3.29E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater	m^3	1.28E+00	5.32E-03	7.24E-02	1.36E+00	4.48E-03	1.11E-03	1.11E-03	4.48E-04	1.55E-03	3.29E-04	-1.56E-01

Table 7 Life cycle assessment (LCA) results for specific product Marc-Ok+ 3000x3000 – waste categories (DU: 1 m²)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	5.09E+00	5.09E-02	5.78E-02	5.20E+00	4.00E-02	4.21E-05	4.21E-05	4.00E-03	1.26E-07	3.32E-06	-2.20E-03
Non-hazardous waste	kg	7.22E+01	8.46E-01	6.80E-01	7.37E+01	7.10E-01	2.19E-03	2.19E-03	7.10E-02	3.28E-01	8.69E+00	3.33E+00
Radioactive waste	kg	4.85E-03	3.10E-06	7.08E-05	4.92E-03	2.66E-06	3.05E-06	3.05E-06	2.66E-07	9.34E-06	1.28E-05	3.70E-04
Components for re-use	kg	2.65E-01	0.00E+00	0.00E+00	2.65E-01	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	2.06E-01	6.18E-04	1.33E-02	2.20E-01	1.10E-04	4.21E-06	4.21E-06	1.10E-05	1.17E-05	0.00E+00	0.00E+00
Materials for energy recovery	kg	6.69E-05	1.11E-06	4.68E-03	4.75E-03	8.92E-07	3.68E-08	3.68E-08	8.92E-08	1.46E-07	0.00E+00	0.00E+00
Exported Energy	MJ	1.22E+00	5.57E-03	2.04E-02	1.24E+00	0.00E+00	1.21E-02	1.21E-02	0.00E+00	1.78E+00	0.00E+00	0.00E+00

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 and ITB PCR A
Independent verification corresponding to ISO 14025 (sub clause 8.1.3.) ☒ external ☐ internal
External verification of EPD: Halina Prejzner, PhD. eng. LCI verification: Michał Chwedaczuk, M.Sc. Eng. LCA, data verification: Michał Piasecki, PhD., D.Sc., eng.

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 (see 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
- EN 16034:2014-11 Pedestrian doorsets, industrial,commercial, garage doors and openable windows – Product standard, performance characteristics - Fire resistance and/or smoke control characteristics.
- PN-EN 1090-1+A1:2012 - Wykonanie konstrukcji stalowych i aluminiowych -- Część 1: Zasady oceny zgodności elementów konstrukcyjnych
- 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
- PN-EN 15942:2012 Sustainability of construction works – Environmental product declarations – Communication format business-to-business
- ISO 20915:2018 Life cycle inventory calculation methodology for steel products
- KOBiZE Wskaźniki emisyjności CO_2, SO_2, NO_x, CO i pyłu całkowitego dla energii elektrycznej. December 2024
- World Steel Association 2017 Life Cycle inventory methodology report for steel products

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CERTIFICATE № 877/2025
of TYPE III ENVIRONMENTAL DECLARATION

Products:

Fire resistant rolling shutter type Marc-Ok+

Manufacturer:

MAŁKOWSKI - MARTECH S.A.
Leśna 57, 62-035 Czołowo, 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 19th November 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, November 2025