Type III Environmental Product Declaration No. 824/2025

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Silicate blocks

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 771-2:2011+A1:2015

Service Life: 150 years for standard product

PCR: ITB-PCR A

Declared unit: 1 m^3

Reasons for performing LCA: B2B

Representativeness: Poland, Europe, 2024

MANUFACTURER

The company **SIL-PRO Bloczki Silikatowe Sp. z o.o.** appeared on the market of silicate products in 2009 in Godzikowice near Oława. Thus one of the most modern factories was established, which started production and sales of the highest quality silicate blocks. In response to the ever-growing demand as well as interest in the SIL-PRO brand, the company set its sights on its development and in 2019 a second **SIL-PRO Warsaw Sp. z o.o.** production plant was established located in Nowy Modlin near Warsaw. As a result, SIL-PRO has become a nationwide supplier of silicate blocks capable of handling even more construction investments.

Figure 1 The view of SIL-PRO Warszawa Sp. z o.o. manufacturing plant

Both plants are distinguished by a fully automated process line and state-of-the-art machinery, enabling them to produce around 600,000 m^3 of silicate per year, or around 3,300,000 m^2 of walls.

The manufactured products have declarations of conformity with European standards and CE certificates. Each batch of blocks produced is subject to detailed factory quality control (including, among other things, tests for dimensional stability, density, moisture content and strength tests. The products meet stringent acoustic insulation requirements).

The quality of SIL-PRO silicate blocks is guaranteed by a control system. In order to ensure that product is of the highest quality, manufacturer carry out a permanent internal production control, as a goal is to produce the blocks in accordance with strictly defined standards. Products introduced to the market are first subjected to a number of laboratory tests to ensure that they meet customer expectations. To ensure high product quality, the raw materials required for the production process are also periodically subjected to detailed laboratory tests. Each batch of blocks produced undergoes multi-stage testing in our laboratory. In addition, the blocks produced in our plants have been inspected by the most prestigious certification bodies in Europe, the Qualitätsgemeinschaft Mauerwerksprodukte EV and the Institute for Building Technology.

With a wide range of SIL-PRO products, producer enables the customers to use the blocks in single-family and multi-family housing, industrial, agricultural, public utility and so-called small architecture.

PRODUCTS DESCRIPTION

Silicates block are a building material made from materials of natural origin: quartz sand (approx. 90% by weight), lime (7%) and water (3%). They are free of chemical contaminants and remain a highly ecological product at every stage of their life. Silicate, or lime and sand products, is an extremely versatile material that is used in various types of construction. Thanks to properties such as high strength, very good sound insulation, thermal insulation and high fire resistance, silicate can be used to bring in buildings for various purposes. These include single-family and multi-family housing, industrial, agricultural, public buildings, as well as so-called “small architecture”. They are used to make almost all types of walls: internal, partition, structural, external. They are also used for basement walls, chimneys and fences.

Types of walls in the construction of which silicates can be used:

- foundation and basement wall

- construction wall
- external wall
- cavity wall (three-layer)
- partition wall
- fire wall
- wall with improved acoustic parameters

Very high durability and strength, increasing over time, the strength of silicate blocks is comparable to that of natural stone (12-40 MPa). This feature makes it possible to build even several storeys high without a frame structure. Below is a table showing the silicates produced by the company.

Table 1 Technical parameters of the products

Product	Sizes	Class
Block U8L	248x80x220	15
Block U12L	248x120x220	15
Block U15L	248x150x220	15
Block U18L	248x180x220	15
Block U18L	248x180x220	20
Block U18V	248x180x220	20
Block U18V	248x180x220	25
Block U18V	248x180x220	30
Block U18V(A)	248x180x220	35
Block U18V(A)	248x180x220	40
Block U18V(P)	248x180x220	20
Block U24L	248x240x220	12
Block U24L	248x240x220	15
Block U24L	248x240x220	20
Block U24V	248x240x220	20
Block U24V	248x240x220	25
Block U25V(A)	180x248x220	35
Block U25V(A)	180x248x220	40
Block UPSW	250x240x220	15
Block U12/2V	250x120x65	20
Block U24/2V	248x240x98	20

All additional technical information about the product is available on the www.sil-pro.warszawa.pl and catalogues.

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Unit

Declared unit is 1 m^3 of silicate blocks products manufactured in Nowy Modlin (near Warsaw).

Note: A weighted average of 1400 kg/m^3 was used for all products. To convert to a different product density, use a conversion factor equal to the ratio of the new density to the density of 1400 kg/m^3; for example, for a density of 1600 kg/m^3 multiply the results by a factor of 1.14.

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 and ITB PCR A (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 PCR A. Production of silicate blocks is a line process executed by of SIL-PRO Warszawa Sp. z o.o. in plant located in Nowy Modlin (Poland). Allocation was done on product volumes basis. All impacts from raw materials extraction and processing are allocated in module A1 of the LCA . Impacts from the global line production of SIL-PRO Warszawa Sp. z o.o. Water and energy consumption, associated emissions and generated wastes are allocated to module A3. Packaging materials were taken into consideration.

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 product includes sand, lime, water and packaging materials mainly from local suppliers. The means of transport are trucks. Polish and European fuel averages were used for calculations. Polish and European standards for average combustion were used for calculations. Data on mode of transport and distances, as reported by suppliers were used for those materials and parts contributing more than 0.1 % of total product mass.

Module A3: *Production*

The production of silicate blocks begins with the extraction of calcium, sand, aggregates as the main production raw materials. Delivered materials are stored in silos. They then go into the mixer in the correct quantity. The next stage is forming the blocks and drying them. After drying the blocks, they are tempered. In the production process, constant quality checks are carried out at all stages, and the company has its own research laboratory. Ready blocks that have passed quality control are packed and sent to storage area. The diagram of the production process is shown in Fig. 2.

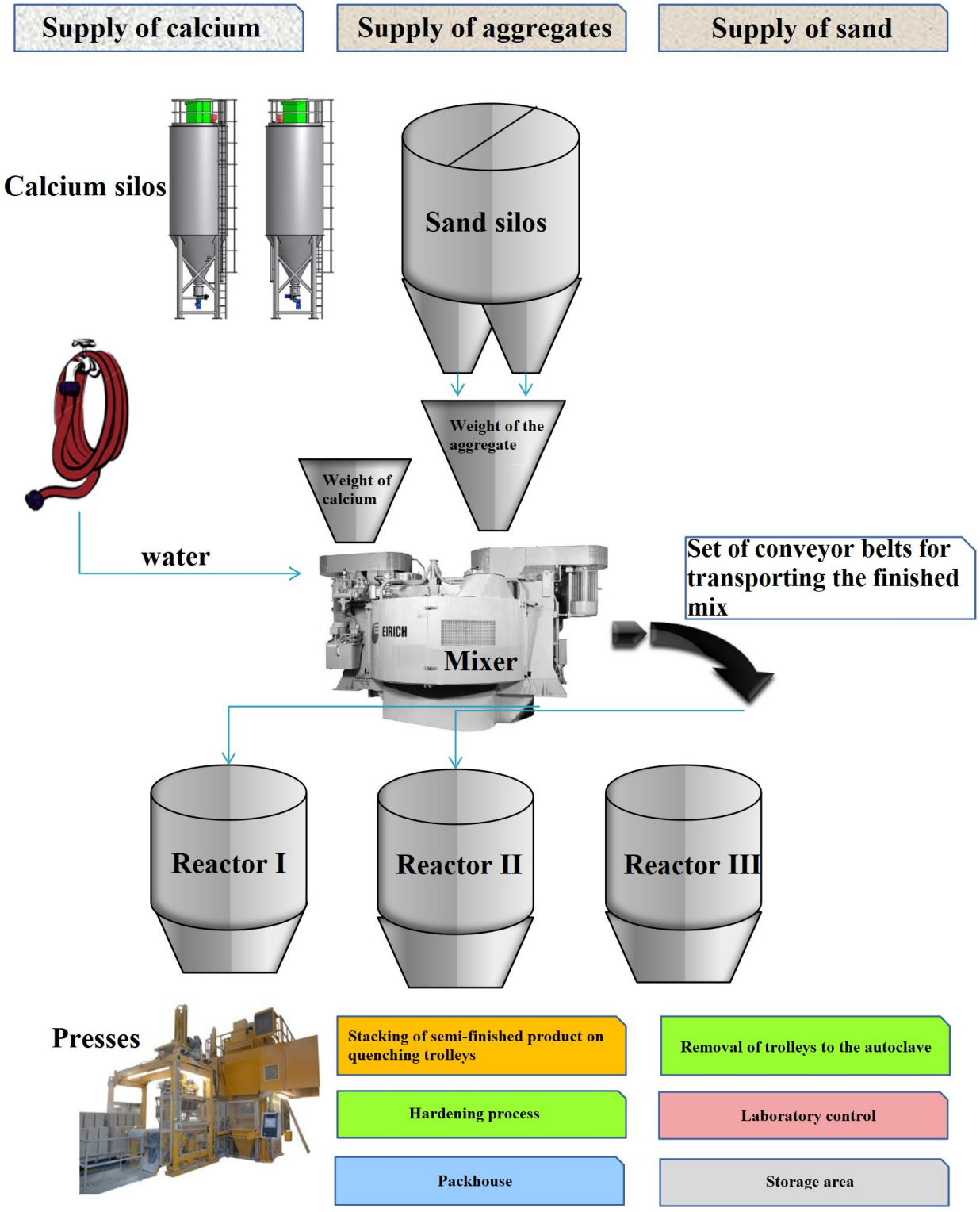

Figure 2 Manufacturing process scheme (A3)

Module A4: ***Transport to a construction site***

The blocks produced are delivered to Polish as well as foreign customers. In the adapted scenario an average distance of 100 km from the factory gate to a recipient is assumed. Means of transport include 16 - 32 t lorry (EURO 5) with fuel consumption of 35 l per 100 km.

Module A5: Installation

The blocks are installed as predefined elements using auxiliary materials or machinery. The calcium silicate products are installed in Europe.

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

In the adapted scenario, dismantling of silicate blocks and elements (C1) is performed as part of building renovation or demolition processes, where environmental impacts from declared products can be considered as minor (<1%). There are no specific deconstruction methods, applied in Poland, in regards with the silicate blocks and elements so the electric tools impact was assumed. During the demolition process the major amount of the products contribute to the construction and demolition wastes which can be processed on site or in a waste processing plant. It is assumed that 100% of silicate blocks and elements are recovered at the EoL cycle. Recovered material is transported to either to landfill or construction site distant by 100 km, on 16 32t lorry (EURO 5) with fuel consumption of 35 l per 100 km. In the adapted scenario 90% of the silicate blocks and elements is recycled and further used as aggregate for road foundation or ballast (credits presented in module D) while remaining 10% is forwarded to landfill in the form of mixed construction and demolition wastes. Environmental burdens declared in module C4 are associated with waste specific emissions to air, soil and groundwater. Regarding the recycling material of metals, the metal parts in the EoL are declared a send of waste status. Electricity at end of life (module D) has been modelled using an average EU27 electricity mix as the location where the product reaches end of life is unknown.

Table 2 End-of-life scenario for the Silicate blocks

Material	Material recovery	Recycling	Landfilling
Silicate waste	100%	90%	10%

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 SIL-PRO Warszawa Sp. z o.o. 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. 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. Emission of acidifying substances, emission of substances to water contributing to oxygen depletion, emission of gases that contribute to the creation of ground-level ozone, abiotic depletion, and ozone depletion emissions where all calculated with the EF 3.1. method. No mass balance method used. Biogenic carbon was balanced.

Additional information

Polish electricity (Ecoinvent v 3.11 supplemented by actual national KOBiZE data) emission factor used is 0.685 kg CO_2/kWh. As a general rule, no particular environmental or health protection measures other than those specified by law are necessary. European electricity mix used is 0.430 kg CO2/kWh for the end of life (Ecoinvent, RER).

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to declared unit (DU) – 1 m^3 of Silicate blocks 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 – environmental impacts (DU: 1 m^3)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO_2	1.07E+02	1.19E+01	3.14E+01	1.50E+02	2.34E+01	3.08E+06	4.81E+00	2.34E+01	6.62E+01	1.49E+00	-1.27E+01
Greenhouse potential - fossil	eq. kg CO_2	1.53E+02	1.19E+01	3.14E+01	1.97E+02	2.33E+01	1.67E+06	4.80E+00	2.33E+01	2.09E+01	1.47E+00	-1.26E+01
Greenhouse potential - biogenic	eq. kg CO_2	-4.52E+01	7.60E-03	2.15E-02	-4.52E+01	7.95E-02	9.10E+05	1.29E-02	7.95E-02	4.52E+01	1.49E-02	-7.56E-04
Global warming potential - land use and land use change	eq. kg CO_2	6.50E-02	3.95E-03	4.81E-03	7.38E-02	9.13E-03	4.95E+05	7.50E-04	9.13E-03	8.22E-03	1.49E-03	-5.78E-02
Stratospheric ozone depletion potential	eq. kg CFC 11	4.54E-06	2.59E-07	1.70E-06	6.49E-06	5.39E-06	2.69E+05	2.64E-08	5.39E-06	4.85E-06	4.48E-07	-2.37E-06
Soil and water acidification potential	eq. mol H+	3.07E-01	3.82E-02	9.68E-02	4.42E-01	9.45E-02	1.46E+05	5.07E-02	9.45E-02	8.50E-02	1.24E-02	-5.29E-01
Eutrophication potential - freshwater	eq. kg P	9.21E-03	8.12E-04	1.07E-02	2.07E-02	1.56E-03	7.95E+04	8.27E-03	1.56E-03	1.41E-03	4.28E-04	-1.92E-02
Eutrophication potential - seawater	eq. kg N	8.12E-02	1.29E-02	1.86E-02	1.13E-01	2.85E-02	4.32E+04	7.18E-03	2.85E-02	2.57E-02	4.29E-03	-4.70E-02
Eutrophication potential - terrestrial	eq. mol N	9.15E-01	1.40E-01	1.81E-01	1.24E+00	3.11E-01	2.35E+04	6.26E-02	3.11E-01	2.80E-01	4.66E-02	-6.32E-01
Potential for photochemical ozone synthesis	eq. kg NMVOC	4.18E-01	5.79E-02	1.11E-01	5.87E-01	9.52E-02	1.28E+04	1.80E-02	9.52E-02	8.57E-02	1.35E-02	-1.52E-01
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	1.83E-04	4.10E-05	1.97E-05	2.44E-04	8.25E-05	6.95E+03	1.81E-06	8.25E-05	7.42E-05	4.99E-06	-3.76E-03
Abiotic depletion potential - fossil fuels	MJ	1.02E+03	1.69E+02	8.87E+02	2.07E+03	3.45E+02	3.78E+03	7.57E+01	3.45E+02	3.11E+02	3.40E+01	-4.43E+02
Water deprivation potential	eq. m^3	3.00E+01	8.84E-01	3.82E+00	3.47E+01	1.60E+00	2.05E+03	1.45E+00	1.60E+00	1.44E+00	1.98E-01	-3.28E+01

Table 5 Life cycle assessment (LCA) results for specific product – additional impacts indicators (DU: 1 m^3)

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 - the resource use (DU: 1 m³)

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	4.00E+02	2.74E+00	1.10E+01	4.14E+02	4.95E+00	1.12E+03	6.23E+00	4.95E+00	4.46E+00	5.98E-01	-5.09E+01
Consumption of renewable primary energy resources used as raw materials	MJ	4.59E+02	0.00E+00	0.00E+00	4.59E+02	0.00E+00	6.01E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	8.60E+02	2.74E+00	1.10E+01	8.73E+02	4.95E+00	3.30E+02	6.23E+00	4.95E+00	4.46E+00	5.98E-01	-5.09E+01
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	9.75E+02	1.69E+02	6.98E+02	1.84E+03	3.45E+02	1.79E+02	7.57E+01	3.45E+02	3.11E+02	3.68E+01	-4.43E+02
Consumption of non-renewable primary energy resources used as raw materials	MJ	4.35E+01	0.00E+00	1.89E+02	2.32E+02	0.00E+00	8.68E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	1.02E+03	1.69E+02	8.87E+02	2.07E+03	3.45E+02	5.55E+01	7.57E+01	3.45E+02	3.11E+02	3.68E+01	-4.43E+02
Consumption of secondary materials	kg	2.02E+00	7.53E-02	1.09E-01	2.21E+00	1.16E-01	1.88E+01	6.58E-03	1.16E-01	1.04E-01	0.00E+00	-2.68E-01
Consumption of renew. secondary fuels	MJ	1.57E+01	9.89E-04	1.57E-04	1.57E+01	1.28E-03	1.02E+01	3.32E-05	1.28E-03	1.15E-03	0.00E+00	-1.63E-02
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.69E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater	m^3	7.31E-01	2.04E-02	3.65E-01	1.12E+00	4.35E-02	2.88E+00	2.17E-01	4.35E-02	3.91E-02	5.31E-03	-8.03E-01

Table 7 Life cycle assessment (LCA) results for specific product – waste categories (DU: 1 m³)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	2.45E+00	2.42E-01	1.21E+00	3.90E+00	3.88E-01	1.48E+00	5.87E-01	3.88E-01	3.49E-01	5.36E-05	-3.09E+00
Non-hazardous waste	kg	5.81E+01	5.18E+00	5.80E+01	1.21E+02	6.88E+00	1.33E+00	3.95E+01	6.88E+00	6.19E+00	1.40E+02	-8.62E+01
Radioactive waste	kg	8.34E-04	4.96E-05	8.20E-05	9.65E-04	2.58E-05	6.53E-02	1.14E-05	2.58E-05	2.32E-05	2.07E-04	-1.17E-03
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.72E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	2.88E-02	2.02E-03	6.01E-03	3.69E-02	1.07E-03	1.88E-02	5.08E-04	1.07E-03	9.62E-04	0.00E+00	-6.00E-03
Materials for energy recovery	kg	4.40E-05	1.07E-05	1.04E-05	6.50E-05	8.65E-06	9.22E-03	8.17E-07	8.65E-06	7.78E-06	0.00E+00	-5.57E-04
Exported Energy	MJ	7.66E-01	7.38E-02	8.17E-02	9.21E-01	0.00E+00	9.21E-03	2.42E-01	0.00E+00	0.00E+00	0.00E+00	-1.20E+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.) [x] external [ ] internal
External verification of EPD: Halina Prejzner, PhD. Eng. LCI audit and verification: Michał Chwedaczuk, M.Sc. Eng. LCA, LCI audit and input 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, V1.6 General Product Category Rules for Construction Products (2023)
- 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
- PN-EN 15942:2012 Sustainability of construction works – Environmental product declarations – Communication format business-to-business
- EN 771-2:2011+A1:2015 Requirements for masonry units. Calcium silicate masonry units
- KOBiZE Wskaźniki emisyjności CO_2, SO_2, NO_x, CO i pyłu całkowitego dla energii elektrycznej, grudzień 2024
- https://ecoinvent.org/

LCA,LCI, input data verification
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CERTIFICATE № 824/2025
of TYPE III ENVIRONMENTAL DECLARATION

Products:

Silicate blocks

Manufacturer:

SIL-PRO Warszawa Sp. z o.o.

Usługowa 5, Nowy Modlin, 05-180 Pomiechówek, 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 8th August 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, August 2025