



Issuance date: 09.08.2024

Validity date: 09.08.2029

## Silicate resins



### Owner of the EPD:

MINOVA EKOCHEM Sp. z o. o.

Address: Budowlana 10

41-100 Siemianowice Śląskie, Poland

Contact: [minova.ekochem@minovaglobal.com](mailto:minova.ekochem@minovaglobal.com)

Website: <http://www.minovaglobal.com>

### EPD Program Operator:

Instytut Techniki Budowlanej (ITB)

Address: Filtrowa 1

00-611 Warsaw, Poland

Website: [www.itb.pl](http://www.itb.pl)

Contact: [energia@itb.pl](mailto:energia@itb.pl)

ITB is the verified member of The European Platform for EPD program operators and LCA practitioner [www.eco-platform.org](http://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. Their aspects were verified by the independent body according to ISO 14025. Basically, a 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 modules in accordance with EN 15804+A2 (Cradle-to-Gate)

**The year of preparing the EPD:** 2024

**Service Life:** 100 years

**PCR:** ITB-PCR A

**Declared unit:** 1 kg

**Reasons for performing LCA:** B2B

**Representativeness:** Polish, European

## MANUFACTURER

Minova is a global producer of ground support materials used in the underground mining and infrastructure sectors, specializing in injection and capsule resins and powders for anchoring, grouting, ground engineering and water and void/crack control steel bolts, nails, anchors and micropiles.

Production site MINOVA EKOCHYM Sp. z o. o. is located in Siemianowice Śląskie (Fig. 1).

The main application of Minova's portfolio comprises:

- **Sealing and water control** - prevention or reduction of inflow into underground structures, to stop structural instability.
- **Strengthening** - increases the original rock and soil parameters: compressive strength, shear resistance, tensile strength, cohesion.
- **Securing** - stabilizes rock and/or soil by increasing the safety factor of the rock/soil mass
- **Filling** - filling of empty spaces including cavities or over-breaks to control rock movement, annulus grouting, and air movement.
- **Consolidation** - consolidation by grouting rock mass discontinuities, reducing the compressibility of the soil matrix in construction applications.



Fig. 1. A view of the MINOVA EKOCHYM Sp. z o. o. production plant located in Siemianowice Śląskie (Poland)

## **PRODUCTS DESCRIPTION AND APPLICATION**

Silicate systems are two components systems pumped by a dual component gear pump, designed for manual and automated processing, no foaming even on contact with water, load transfer and sealing effect in one material. Resin system ensures constant mechanical properties of the injected resin, it can be handled over long distances improving operational flexibility, water resistant product- it will not mix with water or be diluted in wet holes, improved operator safety and ease of handling.

The range of silicate resin systems consists of :

### **- GEOFLEX / KRZEMOPUR series**

Silicate injection resins for mining and civil engineering.

These products are widely used in various applications of the construction industry, such as stabilising fragile zones, grouting of injection bolts and other specialised applications. Characterized by high adhesion and good mechanical performance.

### **- GEOFOAM series**

Specialistic foam system for cavity filling and fragile zones stabilization. After mixing in a volumetric ratio 1: 1 the resin starts foaming up within a few seconds.

### **- CARBOLITH series**

Silicate systems, which are combined with a liner for trenchless, in-situ repair of short lengths of sewer pipes and pipework.

Part of the Carbolith series products are designed to be used for grout and uplift slabs in road construction, grout and repair of road structures, stabilisation and consolidation of loose rock and soil and filling of minor cavities.

### **- TEKBLAST series**

Silicate system for securing blast holes in hardrock mining.

### **- EasyPur series**

Silicate systems for sewer repairs.

### **- CARBOTHIX series**

Typical applications of CarboThix include grouting of cable bolts, solid steel or GFRP bolts, self-drilling anchors and one-step bolting operations in automated mode or for consolidation injection works in direct overburden.

### **- Carbo SIL series**

Two-component silicate repair resin. It has a form of interpenetrating network, once the components are mixed adequately, the resulting viscous emulsion will not take up any more water. The cured product is resistant to acids, alkalis, salt solutions and many organic solvents.

Silicate resin systems are mainly two-component systems, but may be also delivered as a three component version, where component C is used to adjust and regulate the reaction time of the mixture at the jobsite.

## Type III Environmental Product Declaration No. 655/2024

They are used in civil engineering structures (buildings, tunnels, underground structures, geological, hydrological structures) for:

- strengthening of rock mass and construction structures;
- point repair of sewage systems;
- stabilization, reinforcement and waterproofing of surfaces and protection against erosion;
- sealing against water;
- consolidation of loose material, soil;
- grouting of anchors (injection anchors, self-drilling anchors, cable bolts, etc.);
- filling fractures, cracks, cavities and voids.



Fig. 2. A pallet with silicate components in packages (left) and a pallet with isocyanate components in packages (right).



Fig. 3. Production hall for isocyanate components (left) and production hall for polyol components (right).

More information about silicate resins can be found on the MINOVA EKOCEM Sp. z o. o. website [www.minovaglobal.com](http://www.minovaglobal.com)

**LIFE CYCLE ASSESSMENT (LCA) – general rules applied**

**Unit**

The declared unit is 1 kg of product of silicate resins.

**System boundary**

Modules A1-A3 are taken into consideration in the LCA: A1 Production of preliminary products, A2 Transport to plant, A3 Production (incl. provision of energy, production of auxiliaries and consumables or waste treatment). Silicate resins products were identified as physically integrated with other products during installation so they cannot be physically separated from them at the end of life and no longer identifiable at the end of life as a result of a physical or chemical transformation process. Therefore, they may omit the declaration of modules C1-C4 and D. This type of EPD declaration is called "cradle to gate".

**Allocation**

The allocation rules used for this EPD are based on general ITB-PCR A v. 1.6. Production of silicate resins is a line process (Fig. 4 and 5) conducted in the factory of MINOVA EKOCEM Sp. z o. o., located in Siemianowice Śląskie (Poland). Allocation was done on product mass basis. All impacts from raw materials extraction and processing are allocated in module A1 of the LCA. Impacts from the on-site line production MINOVA EKOCEM Sp. z o. o. were inventoried and 16.36 % were allocated to the production of silicate resins based on the annual production volume expressed in kg. Water and energy consumption, associated emissions and generated wastes are allocated to module A3. Packaging materials were taken into consideration.

**System limits**

According to the standard EN 15804+A2, products used for the production of other products should be declared at the production stage. 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.

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

Sodium silicate, isocyanates, catalysts and additives used to produce silicate resins, auxiliary materials and packaging materials come from external suppliers. Raw materials come from Polish and international suppliers. Data on transport of the different products to the manufacturing plant is collected and modelled for factory by assessor. Means of transport include small (<10 t) and big trucks (>16 t) are applied. Based on data provided by the manufacturer, all input of transport resources was inventoried in details.

**Module A3: *Production***

The production is done by MINOVA EKOCEM Sp. z o. o. plants in Siemianowice Śląskie, Poland. A scheme of silicate resins production process is presented in Fig. 4 and 5. The facility is ISO 9001 certified.

### **Data quality**

The data selected for LCA analysis originate from ITB-LCI questionnaires completed by MINOVA EKOCHÉM Sp. z o. o. using the inventory data, ITB database, 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**

Primary data provided by MINOVA EKOCHÉM Sp. z o. o. covers a period of 01.2023 – 12.2023 (1 year). The life cycle assessments were prepared for Poland and Europe as reference area.

### **Assumptions and estimates**

The impacts of the representative of silicate resins were aggregated using average weights. Impacts were inventoried and calculated for all products of silicate resins and they were presented in Tables 2-5.

### **Calculation rules**

LCA was performed using ITB-LCA tool developed in accordance with EN 15804 + A2.

### **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 0.685 kg CO<sub>2</sub>/kWh (KOBiZE 2023).

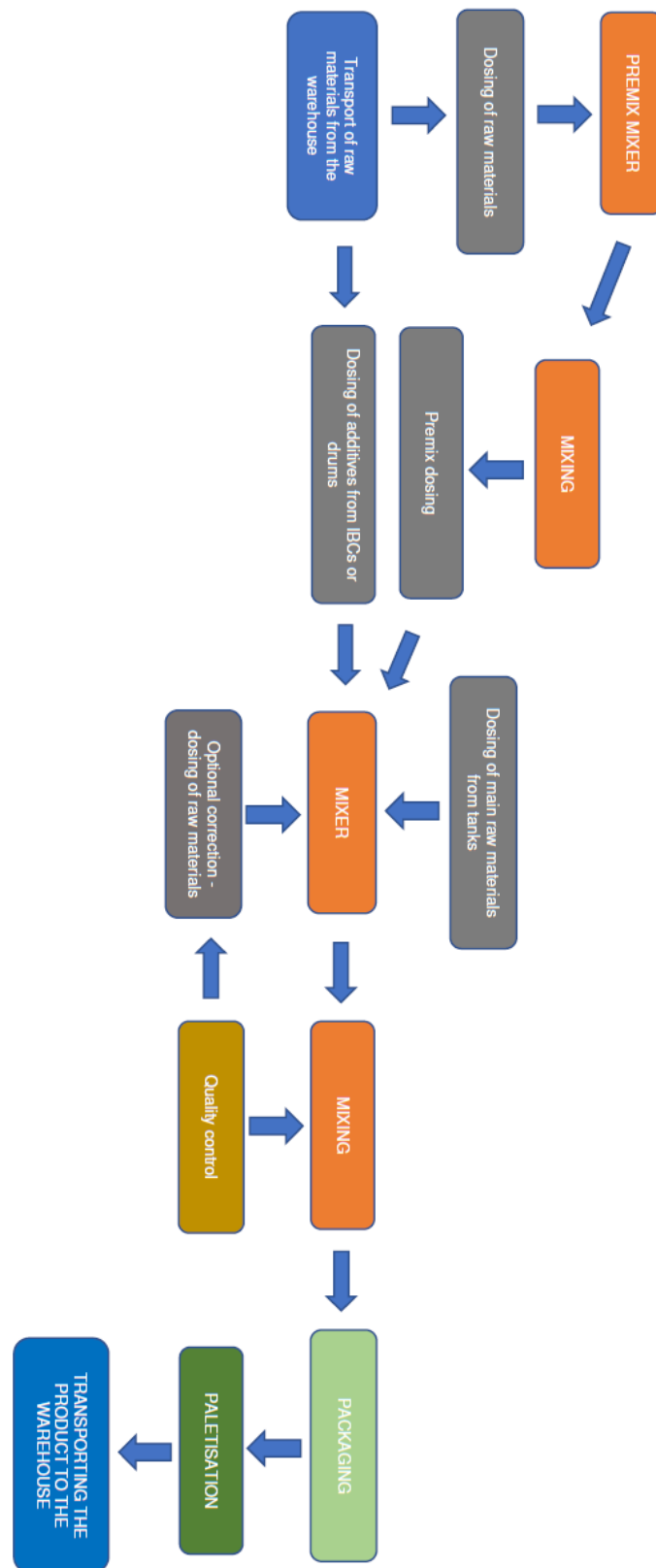


Figure 4. The scheme of the silicate resins A - silicate components industrial process by MINOVA EKOCEM Sp. z o. o.

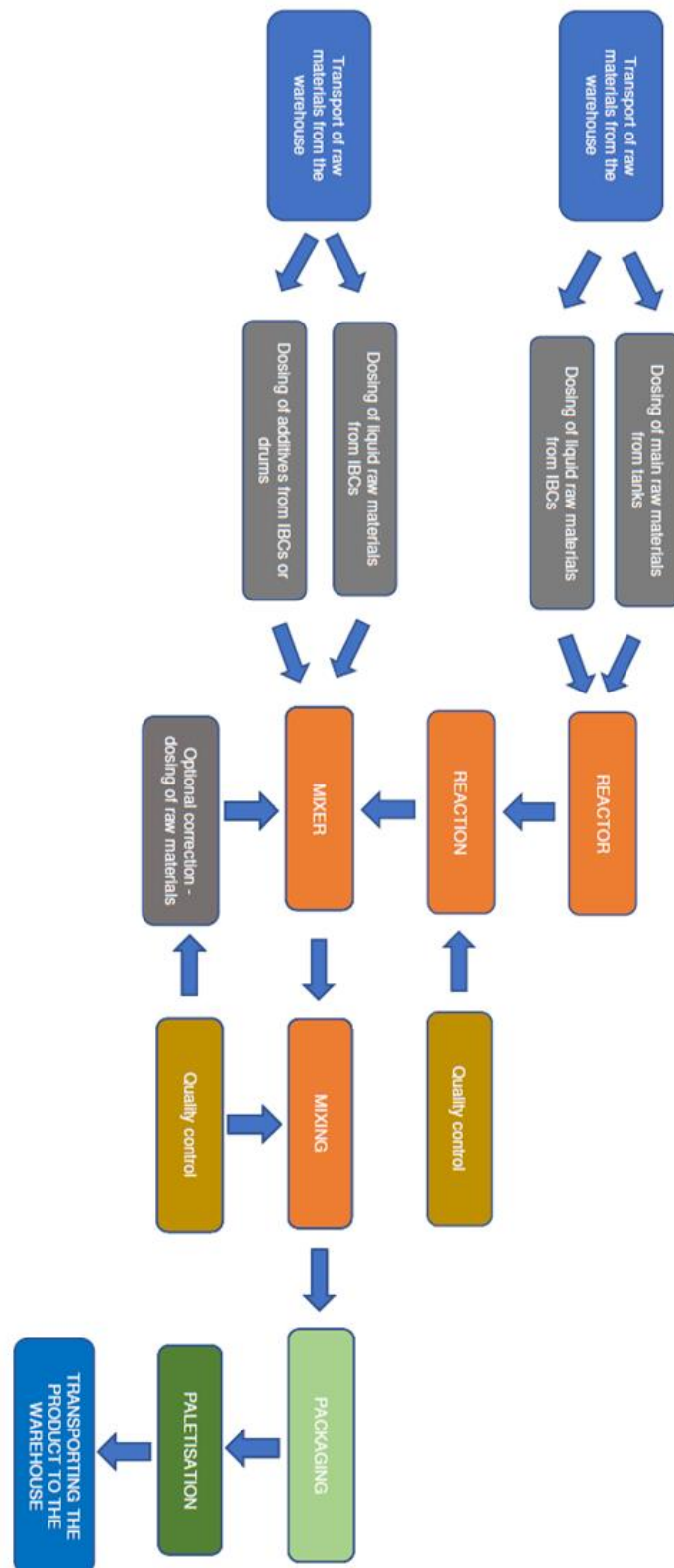


Figure 5. The scheme of the silicate resins B - isocyanate components, industrial process by MINOVA EKOCEM Sp. z o. o.



**LIFE CYCLE ASSESSMENT (LCA) – Results**

**Declared unit**

The declaration refers to declared unit (DU) – 1 kg of silicate resins manufactured by MINOVA EKOCEM Sp. z o. o.

*Table 1. System boundaries for the environmental characteristic of silicate resins production process by MINOVA EKOCEM Sp. z o. o.*

<b>Environmental assessment information (MD – Module Declared, MND – Module Not Declared, INA – Indicator Not Assessed)</b>																
Product stage			Construction process		Use stage							End of life				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction	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	MND	MND	MND	MND	MND

## Type III Environmental Product Declaration No. 655/2024

Table 2. Life cycle assessment (LCA) results of silicate resins manufactured by MINOVA EKOCEM Sp. z o.o. – environmental impacts (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3
Global Warming Potential	eq. kg CO <sub>2</sub>	2.45E+00	6.86E-02	1.02E-01	2.62E+00
Greenhouse gas potential - fossil	eq. kg CO <sub>2</sub>	2.48E+00	6.85E-02	1.01E-01	2.65E+00
Greenhouse gas potential - biogenic	eq. kg CO <sub>2</sub>	-4.14E-02	5.89E-05	2.10E-04	-4.11E-02
Global warming potential - land use and land use change	eq. kg CO <sub>2</sub>	1.23E-02	3.51E-05	7.14E-06	1.24E-02
Stratospheric ozone depletion potential	eq. kg CFC 11	2.04E-07	1.49E-09	1.92E-08	2.25E-07
Soil and water acidification potential	eq. mol H <sup>+</sup>	1.65E-02	1.49E-04	6.72E-04	1.73E-02
Eutrophication potential - freshwater	eq. kg P	1.09E-03	5.06E-06	1.69E-05	1.11E-03
Eutrophication potential - seawater	eq. kg N	4.15E-03	3.69E-05	1.21E-04	4.31E-03
Eutrophication potential - terrestrial	eq. mol N	2.81E-02	3.75E-04	1.15E-03	2.97E-02
Potential for photochemical ozone synthesis	eq. kg NMVOC	1.12E-02	2.29E-04	3.31E-04	1.18E-02
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	3.70E-05	2.45E-07	4.25E-08	3.73E-05
Abiotic depletion potential - fossil fuels	MJ	5.20E+01	9.78E-01	1.35E+00	5.44E+01
Water deprivation potential	eq. m <sup>3</sup>	1.82E+00	5.00E-03	6.24E-03	1.83E+00

## Type III Environmental Product Declaration No. 655/2024

Table 3. Life cycle assessment (LCA) results of silicate resins manufactured by MINOVA EKOCHÉM Sp. z o.o.– additional impacts indicators (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3
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 4. Life cycle assessment (LCA) results of silicate resins manufactured by MINOVA EKOCHÉM Sp. z o.o.- environmental information describing waste categories (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3
Hazardous waste neutralized	kg	7.21E-02	6.79E-04	2.40E-04	7.31E-02
Non-hazardous waste neutralised	kg	2.22E+00	2.14E-02	2.32E-03	2.25E+00
Radioactive waste	kg	3.86E-05	3.52E-07	7.54E-06	4.65E-05
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	2.00E-02	7.57E-06	2.13E-06	2.00E-02
Materials for energy recovery	kg	5.85E-03	5.32E-08	5.05E-03	1.09E-02
Energy exported	MJ	3.12E-01	6.81E-04	1.39E-03	3.14E-01

## Type III Environmental Product Declaration No. 655/2024

Table 5. Life cycle assessment (LCA) results of silicate resins manufactured by MINOVA EKOCHÉM Sp. z o.o. - environmental aspects related to resource use (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	3.96E+00	1.64E-02	1.39E-02	3.99E+00
Consumption of renewable primary energy resources used as raw materials	MJ	4.66E-01	0.00E+00	0.00E+00	4.66E-01
Total consumption of renewable primary energy resources	MJ	4.42E+00	1.64E-02	1.39E-02	4.45E+00
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	3.90E+01	9.78E-01	1.44E+00	4.14E+01
Consumption of non-renewable primary energy resources used as raw materials	MJ	1.17E+01	0.00E+00	0.00E+00	1.17E+01
Total consumption of non-renewable primary energy resources	MJ	5.07E+01	9.78E-01	1.44E+00	5.32E+01
Consumption of secondary materials	kg	3.26E-02	4.63E-04	8.66E-05	3.31E-02
Consumption of renewable secondary fuels	MJ	2.10E-02	5.69E-06	6.26E-07	2.10E-02
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater resources	m <sup>3</sup>	4.52E-02	1.22E-04	-1.52E-04	4.52E-02

## Type III Environmental Product Declaration No. 655/2024

### 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.)	
<input checked="" type="checkbox"/> external	<input type="checkbox"/> 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 programmes 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
- 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
- ISO 20915:2018 Life cycle inventory calculation methodology for steel products
- 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<sub>2</sub>, SO<sub>2</sub>, NO<sub>x</sub>, CO and total dust) from electricity, 2023



**Instytut Techniki Budowlanej**

00-611 Warsaw, Filtrowa 1

**Thermal Physics, Acoustics and Environment Department**

02-656 Warsaw, Ksawerów 21

# **CERTIFICATE No 655/2024**

## **of TYPE III ENVIRONMENTAL DECLARATION**

Products:

**Silicate resins**

Manufacturer:

**MINOVA EKOCHEM Sp. z o.o.**

Budowlana 10, 41-100 Siemianowice, 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**

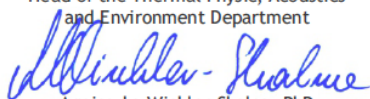
**Sustainability of construction works.**

**Environmental product declarations.**

**Core rules for the product category of construction products.**

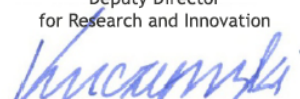
This certificate, issued on 9<sup>th</sup> August 2024 is valid for 5 years  
or until amendment of mentioned Environmental Declaration

Head of the Thermal Physic, Acoustics  
and Environment Department

  
Agnieszka Winkler-Skalna, PhD



Deputy Director  
for Research and Innovation

  
Krzysztof Kuczyński, PhD

Warsaw, August 2024