Type III Environmental Product Declaration No. 891/2026

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Kit of steel elements for rock bolts

Owner of the EPD:

Minova Ekochem Sp. z o.o.
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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: 2026

Product standard: EN 14490:2010, EN 14199:2015

Service Life: Under normal conditions, Minova kit of steel elements for rock bolts have reference service life (RSL) of 100 years

PCR: ITB PCR A

Declared unit: 1 Mg of Minova kit of steel elements for rock bolts

Representativeness: B2B, Polish, European

MANUFACTURER

Minova is one of the largest manufacturers of ground control systems, with a European manufacturing base in Golce, Poland, specialising in the production of high-quality steel products for the mining and construction sectors, exporting across EU and non-EU markets.

Products include resin bolts, expansion shell bolts, cable bolts, injection bolts, micropiles, soil nails, rock anchors, drilling and bolting equipment, monitoring equipment, tooling and bolting accessories. Various services including bolting installation & operation training, bolt design and application consultancy are also offered.

Minova Poland is part of Minova International Ltd, a global manufacturer of ground support products and a part of the Orica Group.

Figure 1. Manufacturing plant in Golce

PRODUCTS DESCRIPTION

The rock bolt is a special bolt for supporting the rock and fractured rock. This type of product could also hold the mesh to avoid falling the rock. The ribbed bars are the base of the bolts and special plates and nuts equipped with spherical washer proide the best support on the rock. Rock bolts can be manufacture in black version, hot-dip galvanized and Twin Coat version. Additional corrosion protection provide the longer life-time of bolts. The rock bolts are install with the cement grout with dedicated w/c ratio.
This product is available in DN20mm, DN25mm, DN32mm and DN40mm diameter with metric thread and different plates depending on construction side requirements.

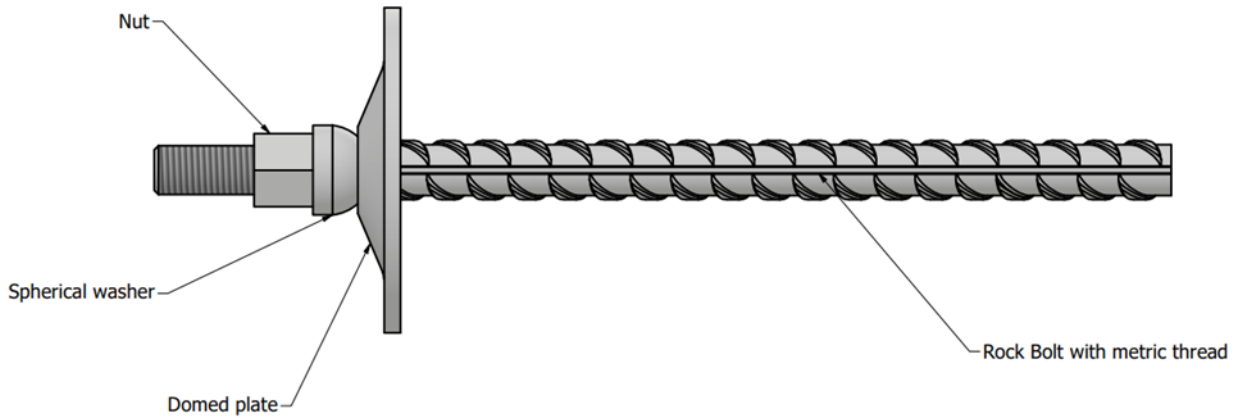

Figure 2. Rock bolt scheme

The Twin Coat system is the special anti-corrosion system provide the longer life-time for goods. The example of the system is show on the picture below:

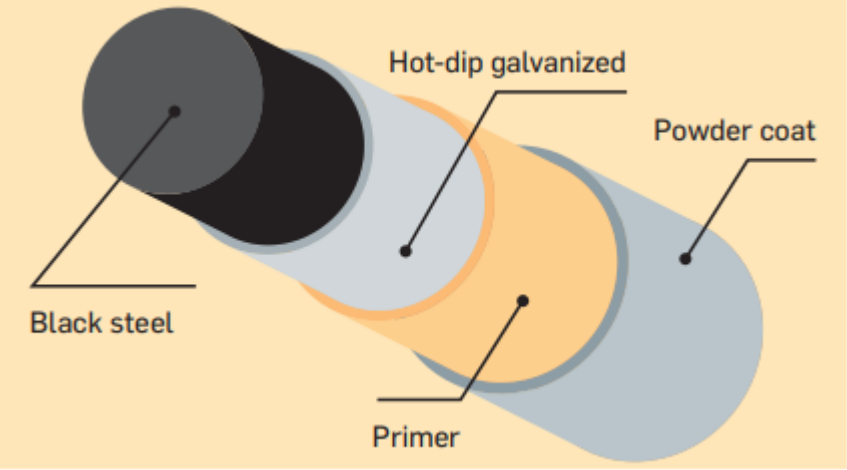

Figure 3. Twin Coat system

- Hot-dip galvanizing (thickness ≥85 µm) - the first of the corrosion protection layers. The coating formed during the hot-dip galvanizing process is characterized by high mechanical strength. The process of hotdip galvanizing is made according to the standard ISO 1461.
- Primer - prepares the surface for painting and increases the adhesion of the top coat.
- Top coat - barrier function and inhibiting effect, protects of the zinc coating from corrosive environment. The process of painting is made according to the ISO 12944 standard.

Table 1. Selected characteristics

Products	Description	Diameter	Thread type
Rock Bolt M16	The rock bolt made of rebar DN16mm with metric thread M16 equipped with nut, spherical washer, plate and additionally centralizers	DN16	M16
Rock Bolt M20	The rock bolt made of rebar DN20mm with metric thread M20 equipped with nut, spherical washer, plate and additionally centralizers	DN20	M20
Rock Bolt M24	The rock bolt made of rebar DN25mm with metric thread M24 equipped with nut, spherical washer, plate and additionally centralizers	DN25	M24
Rock Bolt M30	The rock bolt made of rebar DN32mm with metric thread M30 equipped with nut, spherical washer, plate and additionally centralizers	DN32	M30

The Rock Bolts of Minova includes:

- Steel rod with metric thread acc. to table above
- Hexagonal nut
- Spherical washer
- Domed plate
- Technological element: centralizer

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Unit

The declared unit is 1 ton of product.

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 (cradle to gate with options). Energy and water consumption, emissions as well as information on generated wastes were inventoried in manufacturing plant 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 the elements of system is a line process in one factory of Minova Ekochem Sp. z o.o. in Golce (Poland). Allocation was done on product mass basis. All impacts from raw materials extraction are allocated in A1 module of EPD. 100% of impacts from line production were inventoried and 18% were allocated to elements of Minova kit of steel elements for rock bolts production. Municipal waste and waste water of whole factory were allocated to module A3. Electricity was inventoried for whole production process. Emissions are measured separately as well and presented in A3 module.

System limits

The life cycle analysis of the examined products covers A1-A3, C1-C4, D modules (Cradle to Gate with options) in accordance with EN 15804+A1 and ITB-PCR A. Details on systems limits are provided in product specific report. All materials and energy consumption inventoried in factory were included in calculation. Office impacts were also taken into consideration. In the assessment. all significant parameters from gathered production data are considered, i.e. all material used per formulation, utilized thermal energy, internal fuel and electric power consumption, direct production waste, and all available emission measurements. This study also takes into account some material flows of less than 1% and energy flows with a proportion of less than 1 %. It can be assumed that the total sum of omitted processes does not exceed 5% of all impact categories. In accordance with EN 15804. 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 (mainly steel elements) and transport to the production site. Raw materials for elements of Minova kit of steel elements for rock bolts come from specific supplier. Data on transport of products to the manufacturing plant is collected and modelled for factory by assessor. Means of transport include road transport and Polish and European fuel averages are applied.

Module A3: *Production*

The Fig. 4 shows the working process during the production of elements of Minova kit of steel elements for rock bolts. Manufacture covers all processes linked to production, which comprises various related operations besides onsite activities, including Minova components production

process, packaging and internal transportation. The manufacturing process also yields data on the combustion of refinery products, such as diesel and gasoline, related to the production process. Use of electricity, fuels and auxiliary materials in the production is taken into account using national data. The environmental profile of these energy carriers is Figure 4 Production scheme of Minova modelled by ITB for average Polish and European Arnall at plant in Golce. Packaging-related flows in the production process and all upstream packaging are included in the manufacturing module. Apart from production of packaging material, the supply and transport of packaging material are also considered in the LCA model. It is assumed that packaging waste generated in the course of production and up-stream processes is 100% collected based on a multi-input and multi-output process specific to the elementary composition of the waste. Energy (e.g. electricity) are credited using national production averages. The steel rebars are basic raw material to produce the rock bolts. This material is delivered to production plant directly from steel mill. Bars are cut to require length in first stage of production. Then the bars are move to thread preparation. Metric thread is made in cold rolling process. On the next stage of production, prepared bars and accesories are send to hot-dip galvanization process acc. to ISO 1461 standard. From zinc plant, bars and accessories are delivery to powder coating company, where are painting acc. to factory and ISO 12944 standard requirements. This type of product and accessories are delivery back to production plant and assembly to sets of rock bolts.

Figure 4. A basic scheme of the steel product manufacturing process

Module A4-A5: Transport to construction site, installation

Transport to the customer over a distance of 100 km was assumed, > 16t lorry, EURO 5, with a 100% load capacity (35 l/100 km oil consumption). Installation is carried out using electrical equipment.

C1-C4: End of Life

Disposal and recycling scenario for used and demolished product including transport to disposal or recycling facility is covered.

Assumptions and estimates C1: Demolition

According to the intended use of the Minova kit of steel elements for rock bolts, it is permanently built-up in building structures.

Nevertheless, it is assumed that at the end of life 10% of the product - shallow construction - is recovered by excavation. Fuel use for a hydraulic excavator has been included in relation to exhuming bolts. It is assumed that the lifting of 1 Mg of anchors requires as much energy as moving 1 m^3 of material with an excavator. This module takes into account 1% of losses resulting from the collection of mixed construction wastes.

C2: Transport to waste processing

Transport from a demolition site to a waste processing plant is estimated to an average 50 km on a 24 Mg loaded lorry and fuel consumption of 35 l per 100 km.

C3: Waste processing

This module takes into account sorting, shredding and pressing of the waste bolts at the end-of-life.

C4: Disposal

Steel is 100% recyclable, thus it is estimated that at the end-of-life only 1% of the declared product is disposed to landfill in the form of mixed construction wastes. Utilization of products such as steel mounting elements or packaging tape which constitute less than 1% of the total system flows was not taken into consideration.

D: Re-use, recovery, recycling potential

Benefits and loads beyond the system boundary were calculated using a net scrap formulation proposed by World Steel Association in Life cycle inventory methodology report (2023) where the net scrap is determined as a difference between the amount of steel recycled at end-of-life and the scrap input from previous product life cycle (assumed 50%).

Table 2. Re-use, recovery and recycling potential – scenario information

Parameter	Value
Collection	10%
Loss (mixed construction waste)/landfill	1%
Recycling	9%

Data collection period

The data for manufacture of the declared products refer to period between 01.01.2025 – 01.12.2025 (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 Minova Ekochem Sp. z o.o. using the inventory data, ITB and Ecoinvent v. 3.11. database. 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. The background data for the processes comes from the following databases: Ecoinvent v.3.11 (welding process, galvanizing process, transport, energy carriers, heat, diesel, paints, other) and KOBiZE (Polish electricity mix and combustion factors for fuels). KOBiZE data is supplemented with Ecoinvent data on the national electricity mix impact where no specific indicator data is provided. Specific (LCI) data quality analysis was a part of the input data verification. The time related quality of the data used is valid (5 years).

Assumptions and estimates

The impacts of the representative Minova Ekochem Sp. z o.o. products were aggregated using weighted average. The weighted average method was used according to the mass per meter of each product in rock bolts and soil nails based on the relation to whole production quantity. Impacts for each product were inventoried and calculated.

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 approach was used. Biogenic content 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. As a general rule, no particular environmental or health protection measures other than those specified by law are necessary.

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to 1 Mg (ton) of Minova kit of steel elements for rock bolts.

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

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 of the products manufactured by Minova – environmental impacts (DU: 1 ton)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO_2	1.27E+03	4.84E+01	5.24E+02	1.84E+03	1.67E+01	3.09E+00	2.78E-01	1.50E+01	5.87E+00	5.28E-02	-1.01E+02
Greenhouse gas potential - fossil	eq. kg CO_2	1.26E+03	4.82E+01	5.11E+02	1.82E+03	1.66E+01	2.99E+00	2.69E-01	1.50E+01	5.86E+00	5.27E-02	-1.01E+02
Greenhouse gas potential - biogenic	eq. kg CO_2	7.49E-01	1.65E-01	1.34E+01	1.43E+01	5.68E-02	1.00E-01	9.00E-03	5.11E-02	1.22E-03	1.34E-04	-9.51E-02
Global warming potential - land use and land use change	eq. kg CO_2	7.02E-01	1.89E-02	2.68E-01	9.89E-01	6.52E-03	1.20E-03	1.08E-04	5.87E-03	9.26E-04	4.97E-05	-6.16E-02
Stratospheric ozone depletion potential	eq. kg CFC 11	3.73E-05	1.12E-05	2.13E-05	6.97E-05	3.85E-06	7.00E-08	6.30E-09	3.46E-06	7.16E+01	2.13E-08	-2.89E-06
Soil and water acidification potential	eq. mol H+	8.13E+00	1.96E-01	1.05E+01	1.88E+01	6.75E-02	3.80E-02	3.42E-03	6.07E-02	4.89E-02	4.95E-04	-6.83E-01
Eutrophication potential - freshwater	eq. kg P	1.04E+00	3.24E-03	8.75E-01	1.92E+00	1.12E-03	6.50E-03	5.85E-04	1.01E-03	3.97E-05	4.91E-06	-8.84E-02
Eutrophication potential - seawater	eq. kg N	1.26E+00	5.91E-02	1.10E+00	2.42E+00	2.04E-02	5.50E-03	4.95E-04	1.83E-02	1.66E-01	1.72E-04	-1.03E-01
Eutrophication potential - terrestrial	eq. mol N	1.45E+01	6.44E-01	2.69E+01	4.21E+01	2.22E-01	4.65E-02	4.19E-03	2.00E-01	3.14E-01	1.89E-03	-1.19E+00
Potential for photochemical ozone synthesis	eq. kg NMVOC	4.55E+00	1.97E-01	2.31E+00	7.05E+00	6.80E-02	1.30E-02	1.17E-03	6.12E-02	6.85E-02	5.48E-04	-3.48E-01
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	1.25E-01	1.71E-04	1.56E-02	1.41E-01	5.89E-05	1.67E-05	1.50E-06	5.30E-05	1.33E-06	1.21E-07	-1.11E-02
Abiotic depletion - fossil fuels	MJ	1.55E+04	7.15E+02	9.45E+03	2.57E+04	2.47E+02	5.80E+01	5.22E+00	2.22E+02	5.56E+00	1.44E+00	-1.29E+03
Water deprivation potential	eq. m^3	3.63E+02	3.31E+00	1.99E+02	5.65E+02	1.14E+00	1.20E+00	1.08E-01	1.03E+00	1.30E-01	4.58E-03	-3.04E+01

Table 5. Life cycle assessment (LCA) results of the steel products manufactured by Minova – additional impacts indicators (DU: 1 ton)

Indicator	Unit	A1	A2	A3	A4-A5	C1-C2	C3	C4	D
Particulate matter	disease incidence	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
Potential comparative toxic unit for ecosystems	CTUe	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
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA	INA	INA	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA	INA	INA	INA	INA	INA

Table 6. Life cycle assessment (LCA) results of the steel products manufactured by Minova – the resource use (DU: 1 ton)

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	1.38E+03	1.03E+01	5.22E+02	1.91E+03	3.54E+00	4.30E+00	3.87E-01	3.19E+00	1.02E-01	1.25E-02	2.59E+02
Consumption of renewable primary energy resources used as raw materials	MJ	1.60E+03	0.00E+00	0.00E+00	1.60E+03	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	2.97E+03	1.03E+01	5.95E+02	3.51E+03	3.54E+00	4.30E+00	3.87E-01	3.19E+00	1.02E-01	1.25E-02	2.59E+02
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.31E+04	7.15E+02	8.33E+03	2.22E+04	2.47E+02	5.82E+01	5.24E+00	2.22E+02	-2.70E+02	1.44E+00	1.39E+03
Consumption of non-renewable primary energy resources used as raw materials	MJ	3.46E+03	0.00E+00	0.00E+00	3.46E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.76E+02	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	1.66E+04	7.15E+02	9.56E+03	2.61E+04	2.47E+02	5.82E+01	5.24E+00	2.22E+02	5.57E+00	1.44E+00	1.39E+03
Consumption of secondary materials	kg	8.67E+02	2.40E-01	7.95E-01	8.68E+02	8.27E-02	5.30E-03	4.77E-04	7.44E-02	2.51E-03	3.03E-04	7.64E+01
Consumption of renewable secondary fuels	MJ	1.56E+00	2.64E-03	4.47E-03	1.57E+00	9.11E-04	2.95E-05	2.66E-06	8.20E-04	3.41E-05	7.93E-06	1.39E-01
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	5.35E+00	5.35E+00	0.00E+00	4.70E-02	4.23E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater resources	m^3	9.37E+00	9.00E-02	6.55E+00	1.55E+01	3.10E-02	1.58E-02	1.42E-03	2.79E-02	4.92E-03	1.58E-03	7.57E-01

Table 7. Life cycle assessment (LCA) results of the steel products manufactured by Minova – waste categories (DU: 1 ton)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A4	C1	C2	C3	C4	D
Hazardous waste	kg	4.27E+02	8.03E-01	2.10E+01	4.48E+02	2.77E-01	6.00E-04	5.40E-05	2.49E-01	3.99E-07	1.53E-03	3.10E+01
Non-hazardous waste	kg	3.58E+03	1.43E+01	4.69E+02	4.06E+03	4.92E+00	3.12E-02	2.81E-03	4.42E+00	1.04E+00	2.16E-02	2.94E+02
Radioactive waste	kg	3.70E-02	5.34E-05	1.17E-02	4.88E-02	1.84E-05	4.35E-05	3.92E-06	1.66E-05	2.97E-05	9.59E-06	3.38E-03
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	0.00E+00	0.00E+00
Materials for recycling	kg	1.24E+02	2.22E-03	1.80E+02	3.04E+02	7.64E-04	6.00E-05	5.40E-06	6.87E-04	3.71E-05	2.89E-06	0.00E+00
Materials for energy recovery	kg	4.90E-03	1.79E-05	2.20E+02	2.20E+02	6.18E-06	5.25E-07	4.73E-08	5.56E-06	4.63E-07	3.42E-08	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 (subclause 8.1.3.) ☒ external ☐ internal
External verification of EPD: Halina Prejzner, PhD. Eng. LCI data, 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 (ISO 17025/17065/17029). ITB-EPD program is recognized and registered member of The European Platform - Association of EPD program operators and ITB-EPD declarations are registered and stored in the international ECO-PORTAL.

Normative references

- ITB PCR A General Product Category Rules for Construction Products
- ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services
- ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines
- 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 2023
- World Steel Association 2023 Life Cycle inventory methodology report for steel products

LCA,LCI, input data verification
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CERTIFICATE № 891/2026
of TYPE III ENVIRONMENTAL DECLARATION

Products:

Kit of steel elements for rock bolts

Manufacturer:

Minova Ekochem Sp. z o.o.
Budowlana 10, 41-100 Siemianowice Śląskie, 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 30th January 2026 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, January 2026