Type III Environmental Product Declaration No. 629/2024

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Steel structures

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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-A5, B1-B6, C1-C4 and D modules in accordance with EN 15804 (Cradle-to-Grave)

Product standards: EN 1090-1, EN 1090-2, ISO 3834-2

The year of preparing the EPD: 2024

Service Life: 100 years for standard product

PCR: ITB-PCR A (PCR based on EN 15804+A2)

Declared unit: 1 ton

Reasons for performing LCA: B2B

Representativeness: Poland, European, 2023

MANUFACTURER

Figure 1 Bird's-eye view of manufacturing plant

Promostal Sp. z o.o. Sp. k. was established in 2008 by the managing and engineering team experienced in the field of steel structures. The company undertakes design, fabrication and erection of steelwork for all the forms of construction in industrial and commercial buildings, but also steel constructions for the technology in Czarna Białostocka, Poland. The production is executed in the workshop hall on the area of 4000 m^2, where also the designing department using TEKLA Structures software is situated. Promostal provides complete service including delivery and assembly of wall and roof claddings. Promostal has met all the procedure requirements and became a qualified supplier of steel structure in the German market The company's modern production base is equipped with specialized CNC equipment and automated production stations. The company has implemented and certified quality management systems in accordance with current European standards and produces structures in the highest class of workmanship - EXC4. The quality is supervised by a group of employees with full qualifications to conduct non-destructive testing. The company works based on its own ERP system - which facilitates the control and optimization of production processes.

PRODUCTS DESCRIPTION AND APPLICATION

EPD covers steel structures in execution classes from the lowest EXC1 to the highest EXC4 according to EN 1090-2. Maximum dimensions of manufactured structures: 6m x 6m x 50m. Maximum weight of shipping item: 50 tons. The structures are made of hot-formed and cold-bent open sections, hot-formed and cold-bent closed profiles, and bars. Types of manufactured structural elements: beams, columns, bracing, anchors. Promostal produces structures that are components of: bridge structures: bridges, footbridges, flyovers, etc., building structures: warehouses, industrial buildings, residential buildings. Steel structures can be hydrodynamically painted and hot-dip galvanized. Promostal produces structures that are components of: bridge structures: bridges, footbridges, flyovers, etc., building structures, including: warehouses, industrial, residential, commercial and office buildings. Steel semi-finished products used for the manufacturing of the steel structures have steel grade from S235 up to S500 and originate from various still mills (EAF and BOF).

Table 1. An average composition of a steel structure manufactured by Promostal Sp. z o.o. Sp.k.

Component	Contribution (mass based)
Steel	96%
Ancillary materials (i.a. welding wire, gases)	4%
Anticorrosive coverings/paints	1%

All additional technical information about the product is available on the manufacturer's website.

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Unit

The declared unit is 1 ton of product.

System boundary

The life cycle analysis (LCA) of the declared products covers: product stage – modules A1-A5, B1-B6 end of life – modules C1-C4 and benefits and loads beyond the system boundary – module D (cradle to grave) in accordance with EN 15804+A2 and ITB PCR A . 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.

Allocation

The allocation rules used for this EPD are based on general ITB ’s document PCR A (2023). Production of the covered steel structures is a line process (as presented in Figure 2) conducted in the manufacturing plant located in Czarna Białostocka (Poland). The declaration covers all steel structure products manufactured in the plant. Their production resources and processing stages are basically similar, so it is possible to average the production by product weight. Allocation was done on product mass basis. All impacts from raw materials extraction are allocated in A1 module of the EPD (including materials and energy consumption, transportation, emissions and wastes resulting from the production of steel semi-finished products in the steel mills). 100% of impacts from line production of Promostal Sp. z o.o. Sp.k were inventoried and were allocated to the steel structures production. Module A2 includes transport of the steel semi-finished products from their polish suppliers located in Poland to Promostal factory in Czarna Białostocka. Municipal waste and waste water of whole factory were allocated to module A3. Energy supply was inventoried for whole the production process. Emissions in the factory are measured and were allocated to module A3.

System limits

In the assessment, all available data from production have been considered, i.e. all raw materials/elements used as per formulation process, utilized thermal energy for heating, and electric power consumption. Thus, material and energy flows contributing less than 1 % of mass or energy have been considered. It can be assumed that the total sum of neglected processes does not exceed 1 % of energy usage and mass per modules A or D. Machines and facilities required during production are neglected.

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

Steel semi-finished products used for the production of the steel structures comes from various steel mills listed in Table 1 and are made of significant amount of recycled scrap (see Table 6). Ancillary materials such as welding wires, gases used for welding purposes, anticorrosive paints and packaging materials come from local Polish suppliers. Data on transport of the different products to the manufacturing plants is collected and modelled for factory by assessor. The steel used comes from domestic suppliers producing steel in both EAF and BOF technology. Data on transport of the different products to the manufacturing plants is collected and modelled for factory by assessor. Module A2 (transport) includes truck transport and uses European averages for fuel data.

Module A3: *Production*

At the beginning of the production process, the required metal materials are collected, such as: Rolled sheets, Cold-bent profiles, Hot rolled profiles Steel pipes. Preliminary shot blasting initiates the formation process of each steel structure. Such prepared steel semi-finished products are subjected to cutting, marking, drilling and bending. the component undergoes operations providing the proper quality of its edges and is assembled and welded according to a project. In the next steps such obtained structure is strengthened, shot blasted, painted and marked. The production processes carried out at PROMOSTAL Sp. z o.o. Sp. k. are shown in Figure 2.

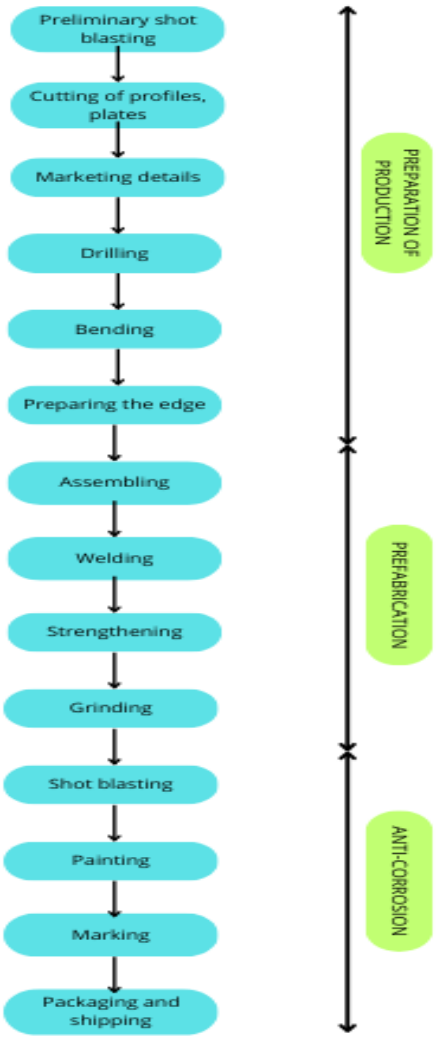

Figure 2. Diagram of the manufacturing process of steel structures

Module A4: *Transport to consumer*

Transport of the steel structure from the Factory to the construction site is carried out using specialized vehicles at our own or customer's request, depending on the terms of the contract. Loads on trucks are secured with belts with tensioners or chains. Anti-slip mats and/or pads will be used on the car under the structure elements and between the structure and the chains or belts to protect the anti-corrosion coating against damage. Repair of any damage resulting from transport will take place during assembly on the construction site. Vehicle transport at distance 100 km is considered (emission standard: Euro 5) with 100% load capacity.

A5: Installation process

Impacts from the use of cranes, service platforms, electric tools, welders and consumable such as welding wires, coatings, steel fitting elements and associated energy consumption were included in the calculations.

B1-B6 Use stage

When used in a building, the product does not require any maintenance costs and does not consume energy or water. It does not require replacement during its 50-year life span.

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

Due to the fact that the declaration covers a wide range of steel 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 is very generic based on literature). In the adapted end-of-life scenario, the de-constructed steel products are transported to a steel mill distant by 100 km on > 16t lorry EURO 5 where are used as steel scrap to produce a new steel. The recycling potential of C3 module is 98% and it is assumed that only 2% of the products will end up in a landfill – C4 module (Table 2). Module D presents credits resulting from the recycling of the steel scrap (used for steel production), calculated in accordance with the approach developed by World Steel Association.

Table 2. End-of-life scenario for the steel structures

Material	Material recovery	Recycling	Landfilling
Steel scrap	100%	98%	2%

Data collection period

The data for manufacture of the declared products refer to period between 01.01.2023 – 31.12.2023 (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 PROMOSTAL Sp. z o.o. Sp. k. and verified during 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.3.10 and specific suppliers (EPDs for steel). Specific (LCI) data quality analysis was a part of the input data verification.

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 2016 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 CML-IA baseline method

Additional information

Polish electricity (Ecoinvent v 3.10 supplemented by actual national KOBIZE data) emission factor used is 0.698 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 declared unit (DU) – 1 ton of the steel structures produced by Promostal Sp. z o.o. Sp.k in Poland. The 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-A3+B1-B6+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	MD	MD	MD	MD	MD	MD	MND	MD	MD	MD	MD	MD

Table 4 Life cycle assessment (LCA) results of the product – environmental impacts (DU: 1 ton)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B6	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO_2	1.44E+03	5.79E+01	1.45E+02	1.64E+03	1.67E+01	6.85E-01	0.00E+00	6.85E-01	8.34E+00	1.04E+01	2.13E-01	-3.35E+02
Greenhouse potential - fossil	eq. kg CO_2	1.43E+03	5.77E+01	1.45E+02	1.63E+03	1.66E+01	6.85E-01	0.00E+00	6.85E-01	8.31E+00	1.03E+01	2.10E-01	-3.37E+02
Greenhouse potential - biogenic	eq. kg CO_2	-2.33E-01	1.97E-01	3.78E+00	3.75E+00	5.68E-02	2.00E-02	0.00E+00	2.00E-02	2.84E-02	1.04E-01	2.12E-03	1.44E+00
Global warming potential - land use and use change	eq. kg CO_2	8.61E+00	2.26E-02	4.67E-02	8.68E+00	6.52E-03	2.40E-04	0.00E+00	2.40E-04	3.26E-03	1.05E-02	2.13E-04	-1.31E-02
Stratospheric ozone depletion potential	eq. kg CFC 11	2.38E-05	1.33E-05	4.26E-06	4.14E-05	3.85E-06	1.40E-08	0.00E+00	1.40E-08	1.92E-06	3.14E-06	6.40E-08	-1.16E-05
Soil and water acidification potential	eq. mol H+	6.50E+00	2.34E-01	1.50E+00	8.24E+00	6.75E-02	7.60E-03	0.00E+00	7.60E-03	3.37E-02	8.70E-02	1.78E-03	-1.34E+00
Eutrophication potential - freshwater	eq. kg P	6.93E-01	3.88E-03	2.42E-01	9.40E-01	1.12E-03	1.30E-03	0.00E+00	1.30E-03	5.59E-04	2.99E-03	6.11E-05	-1.42E-01
Eutrophication potential - seawater	eq. kg N	1.37E+00	7.06E-02	2.46E-01	1.68E+00	2.04E-02	1.10E-03	0.00E+00	1.10E-03	1.02E-02	3.00E-02	6.13E-04	-2.92E-01
Eutrophication potential - terrestrial	eq. mol N	1.40E+01	7.71E-01	2.14E+00	1.69E+01	2.22E-01	9.30E-03	0.00E+00	9.30E-03	1.11E-01	3.27E-01	6.66E-03	-3.20E+00
Potential for photochemical ozone synthesis	eq. kg NMVOC	4.63E+00	2.36E-01	5.93E-01	5.46E+00	6.80E-02	2.60E-03	0.00E+00	2.60E-03	3.40E-02	9.45E-02	1.93E-03	-1.70E+00
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	1.19E-02	2.04E-04	6.59E-04	1.27E-02	5.89E-05	3.34E-06	0.00E+00	3.34E-06	2.95E-05	3.49E-05	7.13E-07	-6.65E-03
Abiotic depletion potential - fossil fuels	MJ	1.63E+04	8.56E+02	2.28E+03	1.94E+04	2.47E+02	1.16E+01	0.00E+00	1.16E+01	1.23E+02	2.38E+02	4.86E+00	-2.72E+03
Water deprivation potential	eq. m^3	4.90E+02	3.96E+00	4.59E+01	5.40E+02	1.14E+00	2.40E-01	0.00E+00	2.40E-01	5.70E-01	1.38E+00	2.82E-02	-3.94E+01

Table 5 Life cycle assessment (LCA) results of the product – additional impacts indicators (DU: 1 ton)

Indicator	Unit	A1-A5	B1-B6	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 of the the product - the resource use (DU: 1 ton)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B6	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.81E+03	1.23E+01	1.60E+02	1.98E+03	3.54E+00	8.60E-01	0.00E+00	8.60E-01	1.77E+00	4.19E+00	8.54E-02	-2.30E+02
Consumption of renewable primary energy resources used as raw materials	MJ	5.93E+01	0.00E+00	0.00E+00	5.93E+01	0.00E+00	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	1.87E+03	1.23E+01	1.61E+02	2.04E+03	3.54E+00	8.60E-01	0.00E+00	8.60E-01	1.77E+00	4.19E+00	8.54E-02	-2.30E+02
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.64E+04	8.56E+02	2.18E+03	1.94E+04	2.47E+02	1.16E+01	0.00E+00	1.16E+01	1.23E+02	2.58E+02	5.26E+00	-2.60E+03
Consumption of non-renewable primary energy resources used as raw materials	MJ	1.80E+02	0.00E+00	0.00E+00	1.80E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	1.65E+04	8.56E+02	2.29E+03	1.97E+04	2.47E+02	1.16E+01	0.00E+00	1.16E+01	1.23E+02	2.58E+02	5.26E+00	-2.60E+03
Consumption of secondary materials	kg	5.70E+02	2.87E-01	2.06E-01	5.70E+02	8.27E-02	1.06E-03	0.00E+00	1.06E-03	4.14E-02	0.00E+00	0.00E+00	9.83E+02
Consumption of renew. secondary fuels	MJ	1.34E-01	3.16E-03	1.11E-03	1.38E-01	9.11E-04	5.91E-06	0.00E+00	5.91E-06	4.56E-04	0.00E+00	0.00E+00	-6.18E-02
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	1.75E+00	1.75E+00	0.00E+00	9.39E-03	0.00E+00	9.39E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater	m^3	8.98E+00	1.08E-01	9.92E-01	1.01E+01	3.10E-02	3.15E-03	0.00E+00	3.15E-03	1.55E-02	3.72E-02	7.59E-04	-2.45E+00

Table 7. Life cycle assessment (LCA) results of the product – waste categories (DU: 1 ton)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B6	C1	C2	C3	C4	D
Hazardous waste	kg	4.94E+02	9.60E-01	4.63E-02	4.95E+02	2.77E-01	1.20E-04	0.00E+00	1.20E-04	1.38E-01	3.75E-04	7.66E-06	-3.44E-02
Non-hazardous waste	kg	3.47E+03	1.71E+01	1.86E+00	3.49E+03	4.92E+00	6.24E-03	0.00E+00	6.24E-03	2.46E+00	9.82E+02	2.01E+01	-5.80E+01
Radioactive waste	kg	3.44E-02	6.39E-05	2.34E-03	3.68E-02	1.84E-05	8.70E-06	0.00E+00	8.70E-06	9.21E-06	1.45E-03	2.96E-05	-6.49E-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	0.00E+00
Materials for recycling	kg	3.63E-01	2.65E-03	3.00E+01	3.04E+01	7.64E-04	1.20E-05	0.00E+00	1.20E-05	3.82E-04	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	1.06E-02	2.14E-05	6.00E-01	6.11E-01	6.18E-06	1.05E-07	0.00E+00	1.05E-07	3.09E-06	0.00E+00	0.00E+00	0.00E+00
Exported Energy	MJ	4.06E+01	0.00E+00	6.49E+00	4.71E+01	0.00E+00	3.46E-02	0.00E+00	3.46E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Annex 1. The potential information on the environmental footprint of steel structures with specific raw material composition from known suppliers and based on specific EPDs: sheets from Dansteel, Vitkovice and Stomana, rolled sections from Peiner and hollow sections from Amenduni, Padana Tubi, Arvedi, Marcegaglia

Table A1. Life cycle assessment (LCA) results of the product – environmental impacts (DU: 1 ton)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B6	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO_2	8.40E+02	5.79E+01	1.45E+02	1.04E+03	1.67E+01	6.85E-01	0.00E+00	6.85E-01	8.34E+00	1.04E+01	2.13E-01	-3.35E+02
Greenhouse potential - fossil	eq. kg CO_2	8.47E+02	5.77E+01	1.45E+02	1.05E+03	1.66E+01	6.85E-01	0.00E+00	6.85E-01	8.31E+00	1.03E+01	2.10E-01	-3.37E+02
Greenhouse potential - biogenic	eq. kg CO_2	-7.19E+00	1.97E-01	3.78E+00	-3.21E+00	5.68E-02	2.00E-02	0.00E+00	2.00E-02	2.84E-02	1.04E-01	2.12E-03	1.44E+00
Global warming potential - land use and use change	eq. kg CO_2	3.20E-01	2.26E-02	4.67E-02	3.89E-01	6.52E-03	2.40E-04	0.00E+00	2.40E-04	3.26E-03	1.05E-02	2.13E-04	-1.31E-02
Stratospheric ozone depletion potential	eq. kg CFC 11	3.09E-05	1.33E-05	4.26E-06	4.85E-05	3.85E-06	1.40E-08	0.00E+00	1.40E-08	1.92E-06	3.14E-06	6.40E-08	-1.16E-05
Soil and water acidification potential	eq. mol H+	3.24E+00	2.34E-01	1.50E+00	4.98E+00	6.75E-02	7.60E-03	0.00E+00	7.60E-03	3.37E-02	8.70E-02	1.78E-03	-1.34E+00
Eutrophication potential - freshwater	eq. kg P	1.32E-01	3.88E-03	2.42E-01	3.78E-01	1.12E-03	1.30E-03	0.00E+00	1.30E-03	5.59E-04	2.99E-03	6.11E-05	-1.42E-01
Eutrophication potential - seawater	eq. kg N	7.35E-01	7.06E-02	2.46E-01	1.05E+00	2.04E-02	1.10E-03	0.00E+00	1.10E-03	1.02E-02	3.00E-02	6.13E-04	-2.92E-01
Eutrophication potential - terrestrial	eq. mol N	7.86E+00	7.71E-01	2.14E+00	1.08E+01	2.22E-01	9.30E-03	0.00E+00	9.30E-03	1.11E-01	3.27E-01	6.66E-03	-3.20E+00
Potential for photochemical ozone synthesis	eq. kg NMVOC	2.97E+00	2.36E-01	5.93E-01	3.80E+00	6.80E-02	2.60E-03	0.00E+00	2.60E-03	3.40E-02	9.45E-02	1.93E-03	-1.70E+00
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	2.32E-03	2.04E-04	6.59E-04	3.18E-03	5.89E-05	3.34E-06	0.00E+00	3.34E-06	2.95E-05	3.49E-05	7.13E-07	-6.65E-03
Abiotic depletion potential - fossil fuels	MJ	1.17E+04	8.56E+02	2.28E+03	1.48E+04	2.47E+02	1.16E+01	0.00E+00	1.16E+01	1.23E+02	2.38E+02	4.86E+00	-2.72E+03
Water deprivation potential	eq. m^3	2.39E+02	3.96E+00	4.59E+01	2.89E+02	1.14E+00	2.40E-01	0.00E+00	2.40E-01	5.70E-01	1.38E+00	2.82E-02	-3.94E+01

Table A2. Life cycle assessment (LCA) results of the product – additional impacts indicators (DU: 1 ton)

Indicator	Unit	A1-A5	B1-B6	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 A3 Life cycle assessment (LCA) results of the the product - the resource use (DU: 1 ton)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B6	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.84E+03	1.23E+01	1.60E+02	2.02E+03	3.54E+00	8.60E-01	0.00E+00	8.60E-01	1.77E+00	4.19E+00	8.54E-02	-2.30E+02
Consumption of renewable primary energy resources used as raw materials	MJ	3.71E+01	0.00E+00	0.00E+00	3.71E+01	0.00E+00	0.00E+00	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	1.88E+03	1.23E+01	1.61E+02	2.06E+03	3.54E+00	8.60E-01	0.00E+00	8.60E-01	1.77E+00	4.19E+00	8.54E-02	-2.30E+02
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	2.88E+04	8.56E+02	2.18E+03	3.18E+04	2.47E+02	1.16E+01	0.00E+00	1.16E+01	1.23E+02	2.58E+02	5.26E+00	-2.60E+03
Consumption of non-renewable primary energy resources used as raw materials	MJ	1.29E+01	0.00E+00	0.00E+00	1.29E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	2.88E+04	8.56E+02	2.29E+03	3.20E+04	2.47E+02	1.16E+01	0.00E+00	1.16E+01	1.23E+02	2.58E+02	5.26E+00	-2.60E+03
Consumption of secondary materials	kg	1.02E+03	2.87E-01	2.06E-01	1.02E+03	8.27E-02	1.06E-03	0.00E+00	1.06E-03	4.14E-02	0.00E+00	0.00E+00	-4.53E+01
Consumption of renew. secondary fuels	MJ	5.85E-03	3.16E-03	1.11E-03	1.01E-02	9.11E-04	5.91E-06	0.00E+00	5.91E-06	4.56E-04	0.00E+00	0.00E+00	-6.18E-02
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	1.75E+00	1.75E+00	0.00E+00	9.39E-03	0.00E+00	9.39E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater	m^3	1.84E+03	1.23E+01	1.60E+02	2.02E+03	3.54E+00	8.60E-01	0.00E+00	8.60E-01	1.77E+00	4.19E+00	8.54E-02	-2.30E+02

Table A4. Life cycle assessment (LCA) results of the product – waste categories (DU: 1 ton)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B6	C1	C2	C3	C4	D
Hazardous waste	kg	7.51E+00	1.08E-01	9.92E-01	8.61E+00	3.10E-02	3.15E-03	0.00E+00	3.15E-03	1.55E-02	3.72E-02	7.59E-04	-2.45E+00
Non-hazardous waste	kg	2.74E+01	9.60E-01	4.63E-02	2.84E+01	2.77E-01	1.20E-04	0.00E+00	1.20E-04	1.38E-01	3.75E-04	7.66E-06	-3.44E-02
Radioactive waste	kg	2.60E+02	1.71E+01	1.86E+00	2.79E+02	4.92E+00	6.24E-03	0.00E+00	6.24E-03	2.46E+00	9.82E+02	2.01E+01	5.80E+01
Components for re-use	kg	2.96E-02	6.39E-05	2.34E-03	3.20E-02	1.84E-05	8.70E-06	0.00E+00	8.70E-06	9.21E-06	1.45E-03	2.96E-05	6.49E-03
Materials for recycling	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	0.00E+00
Materials for energy recovery	kg	7.79E+00	2.65E-03	3.00E+01	3.78E+01	7.64E-04	1.20E-05	0.00E+00	1.20E-05	3.82E-04	0.00E+00	0.00E+00	0.00E+00
Exported Energy	MJ	2.00E-02	2.14E-05	6.00E-01	6.20E-01	6.18E-06	1.05E-07	0.00E+00	1.05E-07	3.09E-06	0.00E+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 (subclause 8.1.3.) [x] external [ ] internal
External verification of EPD: PhD. Eng. Halina Prejzner LCI audit and verification: Filip Poznański, 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 (2023)
- ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedure
- 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+A1:2013 Sustainability in 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
- KOBiZE Wskaźniki emisyjności CO_2, SO_2, NO_x, CO i pyłu całkowitego dla energii elektrycznej, grudzień 2023
- PN-EN 1090-1+A1:2012 Wykonanie konstrukcji stalowych i aluminiowych -- Część 1: Zasady oceny zgodności elementów konstrukcyjnych
- PN-EN 1090-2:2018-09 Wykonanie konstrukcji stalowych i aluminiowych - Część 2: Wymagania techniczne dotyczące konstrukcji stalowych
- PN-EN ISO 3834-2:2007 Wymagania jakości dotyczące spawania materiałów metalowych - Część 2: Pełne wymagania jakości

LCA,LCI, input data verification
Michał Piasecki, PhD. D.Sc.

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CERTIFICATE № 629/2024
of TYPE III ENVIRONMENTAL DECLARATION

Products:

Steel structures

Manufacturer:

PROMOSTAL Sp. z o.o. Sp.k.
ul. Fabryczna 7/29, 16-020 Czarna Białostocka, 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 26th April 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

INSTYTUT TECHNIKI BUDOWLANEJ

Deputy Director for Research and Innovation
Krzysztof Kuczyński, PhD

Warsaw, April 2024