Environmental Product Declaration Type III ITB No. 270/2021

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The cable route systems, underfloor duct systems, photovoltaic construction systems

EPD Program Operator:

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ITB is the verified member of The European Platform for EPD program operators and LCA practitioners.

Basic information

This declaration is the Type III Environmental Product Declaration (EPD) based on EN 15804 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 (see point 5.3 of the standard).

Life cycle analysis (LCA): A1-A4, C1-C4 and D modules in accordance with EN 15804.
(Cradle to Gate with options)

The year of preparing the EPD: 2021

Service Life: depending on application type

PCR: ITB-PCR A (PCR based on EN 15804+A1)

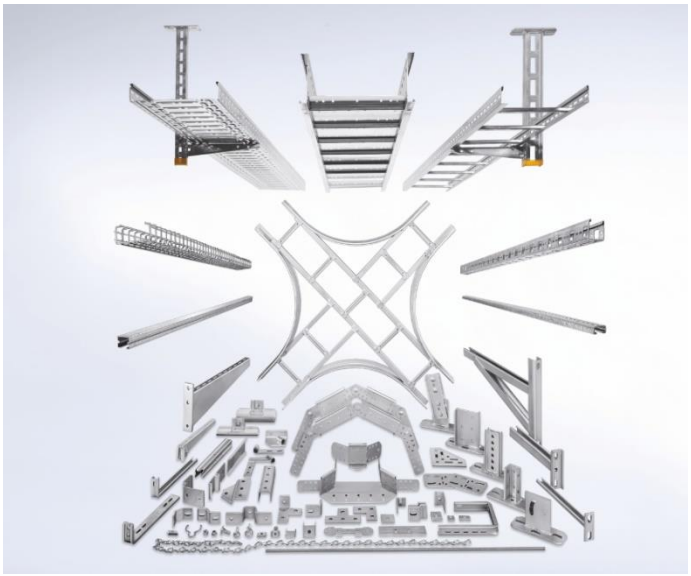
Declared unit: 1 kg of EL-PUK product

Reasons for performing LCA: B2B

Representativeness: Polish production, year 06.2020-06.2021

PRODUCTS DESCRIPTION

The PUK Group represents an independent private enterprise started in the tradition of medium German companies. This EPD covers the EL-PUK's products: cable duct systems, cable handle and clamp systems, under-floor duct systems, and systems for photovoltaic panels assembly. EL-PUK manufacturing plant is located in Konstantynów Łódzki (Poland) and has been operating continuously for over two decades in the production of electrical installation equipment. The steel cable route systems allow for professional installations in any type of facility. A wide range of regular elements and accessories for the installation of cable routes make the provided system highly versatile. The system of under-floor ducts and floor cassettes is a solution for distributing electrical installations (and not only) under the floor. Stainless steel floor cassettes are products intended for investments with the high requirements. Selected cassettes and floor boxes have an increased IP class and a high maximum load, which allows them to be used even in such rooms as production halls, car showrooms, shopping malls, stations and airports. Currently, EL-PUK places a great emphasis on the development of production related to photovoltaics. The steel structures for mounting photovoltaic panels allow for installation on both flat and pitched roofs. Also manufacturer provides the free-standing structures for the installation of photovoltaic panels with Magnelis coating are intended both for end customers and for photovoltaic farms.



Cable trays (typical length 3 and 6m, width up to 600mm) consist of: wire mesh cable trays, cable trays, cable ladders, wide-span systems, supporting elements. Underfloor systems as complete solutions for all types of use, consist of: screed flush duct systems, system components for double and cavity floors, screed covered duct systems, device cup and installation devices, made of hot-dip galvanized steel, high-grade steel and synthetic material. PUK solar products are the mounting system for photovoltaic system underframes and based on the use of various standard mounting profiles. All products are made of galvanized, black steel, or stainless steel. Finish is the zinc coatings according to PN-EN 10346, PN-EN ISO 1461, stainless steels according to PN-EN 10088-2, possibly additional powder coated. Technical data is available at manufacturer web-site https://www.elpuk.com.pl/files/Katalogi

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Unit

The declared unit is 1 kg of products; steel cable route systems, underfloor duct systems or photovoltaic construction systems.

System boundary

The life cycle analysis of the declared product covers “Product Stage” A1-A4 modlues. “End of Life stage” C1. C2. C3. C4 modlues and gains beyond system in D module (Cradle to Gate with options) in accordance with EN 15804 and ITB PCR A.

Allocation

The allocation rules used for this EPD are based on general ITB PCR A. Production of steel product is the line process located in Konstantynów Łódzki. Allocation beetwen products is done on product mass basis. The impacts from raw materials extraction are allocated in A1 module of the EPD (including input materials and energy consumption, transportation, emissions and wastes resulting from the production of steel and galvanizing). 100% of impacts from line production were inventoried and allocated to steel section production. Municipal waste and waste water of whole factory were allocated to module A3. Energy supply was inventoried for whole production process. Emissions in the factory are calculated. Energy supply (gas and electricity) was inventoried for whole factory and 100% was allocated to the product assessed. Emissions in the factory are assessed using national and actual for year KOBIZE emission factors for energy carriers were allocated to module A3.

System limits

99.9% of input materials and 100% energy consumption (electricity, gas.) was inventoried in factory and were included in calculation. In the assessment. all significant parameters from gathered production data are considered. i.e. all material used per formulation. utilized thermal energy and electric power consumption, direct production waste. Tires consumption for transport was not taken into account. Ancillary items, precomponents with a percentage share of less than 0.1% were not included in the calculations. It is assumed that the total sum of omitted processes does not exceed 1% 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. Packaing is incuded.

A1 and A2 Modules: Raw materials supply and transport

Process starts with sourced raw materials. Raw material supply includes raw material extraction and pre-treatment processes. The steel (99.9% mass based input material) used in the manufactory plant are produced in the mixed technologies in steel recognised mills in Europe.Transport is relevant for delivery of raw materials and other auxiliary materials to the plant. Data on transport of the different input products to the manufacturing plants were inventoried in detail and modelled by assessor. For calculation purposes European fuel averages are applied in module A2. Density of steel used is 7900 kg/m³.

A3: Production

During the manufacturing process steel are de-rolled from the coils and transferred through roll forming machines with a series of dies that progressively shape the steel into desired shaped section or formed into a variety of shapes. For products made of galvanized steel or stainless steel process is provided in Figure 1.

Figure 1. Production process for galvanized steel and stainless steel.

For products made of black steel process (with additional galvanizing) is provided in Figure 2.

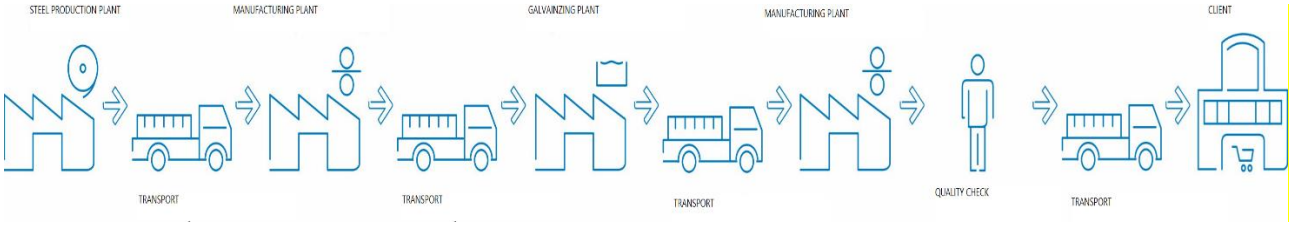


Figure 2. Production process for black steel.

A4: Transport to construction site

Transport of a final product to construction site is taken as the weight average values for transport to customers. The following transport scenario to the place of use was assumed based on the manufacturer's declaration: large vehicle. 75% capacity over an average distance of 800 km. For calculation purposes European fuel averages are applied in module A4.

End-of-life scenarios (C and D modules)

The end-of-life scenario for all products has been generalized. The steel sections may be disassembled (C1 module) by power tools. It is assumed that the recovered steel will be prepared (C3) for further steel production process. It is assumed that at the end of life the transport distance from the product deconstruction place to waste processing (C2) is 50 km on > 16 t loaded lorry with 75% capacity utilization and fuel consumption of 35 l per 100 km.

The reuse, recovery and recycling potential of the recovered steel lub steel scrap is considered beyond the system boundaries (module D) based on World Steel recommendations and national practice. Net scrap is an amount of steel recycled at end-of-life minus scrap input from previous product life cycles.

Table 1. End of life scenarios for steel sections products

Products	Material recovery	Recycling	Landfilling
Steel sections	100%	98%	2%

Data collection period

The data for manufacture of the declared products refer to period between 01.62020 – 01.06.2021 (1 year). The life cycle assessments were done for Poland as reference area.

Data quality - production

The values determined to calculate A3 originate from verified LCI inventory data. A1 values were prepared considering specific data for steel products. Allocation for steel production impacts is done in accordance with LCI *data for Steel products Report* compiled by Brian Hughes and William Hare (World Steel Association). The background data for the secondary inputs come from the Ecoinvent v.3.8 database.

Assumptions and estimates

All input steel products (steel) in A1 module are treated as galvanized.

Calculation rules

LCA was done in accordance with ITB PCR a document. Characterization factors are CML ver. 4.2 based. ITB-LCA algorithms were used for impact calculations. A1 was calculated based on data from the database and specific EPD for steel. Modules A3 and A2 are calculated based on the LCI questionnaire provided by the manufacturer. Emission of greenhouse gases was calculated using the IPCC 2013 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

Databases

The background data for the processes come from the following databases: Ecoinvent v.3.8, specific EPD for a steel producers, energy KOBIZE (Polish electricity mix and combustion factors for fuels). Specific (LCI) data quality analysis was a part of the audit. The time related quality of the data used is valid (5 years).

Additional information

No substances included in the Candidate List of Substances of Very High Concern for authorization under the REACH regulations are present in steel sections. either above the threshold for registration with the European Chemicals Agency or above 0.1 %. The electricity mix represents the average Polish specific electricity supply for final consumers. including electricity own consumption. transmission/distribution losses and electricity imports from neighbouring countries. Reference year is 2020 and carbon impact of electricity mix is 0.25 kg CO_2/MJ.

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to the unit DU– 1 kg of the steel products manufactured by EL-PUK Sp. z o.o. in Poland. The following life cycle modules are included in the declaration (table 2).

Table 2. System boundaries (life stage modules included) in a product environmental assessment

Environmental assessment information (MA – Module assessed. MNA – Module not assessed. 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**
MA	**MA**	**MA**	**MA**	**MNA**	**MNA**	**MNA**	**MNA**	**MNA**	**MNA**	**MNA**	**MNA**	**MA**	**MA**	**MA**	**MA**	**MA**

Table 3. Environmental product characteristic – steel cable route systems, underfloor duct systems. photovoltaic construction systems (1 kg)

Environmental impacts: (DU) 1 kg										
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO_2	2.57E+00	1.60E-02	1.23E-01	8.14E-02	7.58E-02	5.09E-03	2.00E-03	1.06E-04	-1.71E+00
Depletion potential of the stratospheric ozone layer	kg CFC 11	7.01E-09	0.00E+00	3.38E-08	0.00E+00	1.35E-09	0.00E+00	6.89E-15	3.81E-11	-3.36E-13
Acidification potential of soil and water	kg SO_2	6.94E-03	1.24E-04	3.75E-04	6.25E-04	2.88E-04	3.91E-05	6.78E-06	9.19E-07	-4.13E-03
Formation potential of tropospheric ozone	kg Ethene	1.14E-03	8.31E-06	2.46E-04	4.21E-05	3.60E-04	2.63E-06	4.70E-07	7.36E-08	-5.30E-04
Eutrophication potential	kg $(PO_4)^{3-}$	7.57E-04	2.19E-05	2.10E-05	1.11E-04	8.42E-06	6.91E-06	7.99E-07	1.69E-07	-3.53E-04
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb	6.83E-04	0.00E+00	1.16E-03	0.00E+00	9.00E-04	0.00E+00	9.53E-10	1.54E-06	-1.76E-04
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	3.29E+01	2.20E-01	1.77E+00	1.11E+00	9.00E-01	6.95E-02	2.25E-02	0.00E+00	-1.36E+01
Environmental aspects: (DU) 1kg										
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	2.59E+00	2.20E-03	5.75E-02	1.11E-02	6.48E-02	6.95E-04	1.12E-02	7.05E-05	-1.24E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	3.41E+01	2.31E-01	7.36E-01	1.17E+00	1.15E+00	7.30E-02	3.43E-02	3.40E-03	-1.38E+01
Use of secondary material	kg	5.12E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.98E-01
Use of renewable secondary fuels	MJ	1.15E-03	1.15E-02	0.00E+00	5.84E-02	0.00E+00	3.65E-03	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	1.15E-03	0.00E+00	1.80E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water	m^3	7.49E-02	2.35E-06	3.12E-04	1.19E-05	1.80E-05	7.44E-07	1.53E-05	0.00E+00	-6.00E-04
Other environmental information describing waste categories: (DU) 1 kg										
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**C1**	**C2**	C3	**C4**	**D**
Hazardous waste disposed	kg	1,23E-03	8,46E-06	9,57E-04	4,28E-05	7.00E-05	2,67E-06	2.18E-10	2,17E-09	-8,98E-09
Non-hazardous waste disposed	kg	4,16E-02	1,00E-02	8,47E-03	5,08E-02	7.00E-03	3,17E-03	2.01E-02	2,00E-02	-2,72E-02
Radioactive waste disposed	kg	2,70E-04	0,00E+00	0,00E+00	0,00E+00	0.00E+00	0,00E+00	0.00E+00	2,15E-08	0,00E+00
Components for re-use	kg	1,18E-06	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	2,64E-02	0,00E+00	0,00E+00	0,00E+00	0.00E+00	0,00E+00	9.80E-01	0,00E+00	0,00E+00
Materials for energy recover	kg	0,00E+00	0,00E+00	1,00E-03	0,00E+00	0.00E+00	0,00E+00	0.00E+00	0,00E+00	0,00E+00
Exported energy	MJ	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

RESULTS INTERPRETATION

The environmental impact of EL-PUK products is mainly dependent on the energy-intensive production of steel on which the manufacturer has a limited influence (96% of total carbon emissions). The global warming potential (carbon footprint) expressed in carbon dioxide for product stage (A1-A3) is 2.7 ton of CO_2 / kg of products.

VERIFICATION

The process of verification of this EPD was 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: Ph.D. Eng. Halina Prejzner LCA. LCI audit and input data verification: D.Sc. Ph.D. Eng. Michał Piasecki. m.piasecki@itb.pl Verification of LCA: Ph.D. Eng. Justyna Tomaszewska. j.tomaszewska@itb.pl

The EPD owner has the sole ownership liability. and responsibility for the EPD. EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.

Normative references

- EN 15804 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
- PN-EN 10346:2015-09 Wyroby płaskie stalowe powlekane ogniowo w sposób ciągły do obróbki plastycznej na zimno -- Warunki techniczne dostawy
- PN-EN ISO 1461:2011 Powłoki cynkowe nanoszone na wyroby stalowe i żeliwne metodą zanurzeniową - Wymagania i metody badań
- TB PCR A General Product Category Rules for Construction Products
- PED 2014/68/UE Directive
- Certificate ISO 9001:2015 no 0198 100 00537 (TÜV Rheinland)
- Krajowy Certyfikat Stałości Właściwości Użytkowych nr 063-UWB-0072 (CNBOP-PIB)
- LCI DATA FOR STEEL PRODUCTS at https://www.worldsteel.org/en/dam/jcr:04f8a180-1406-4f5c-93ca-70f1ba7de5d4/LCI%2520study_2018%2520data%2520release.pdf
- 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 Environmental management – Life cycle assessment – Requirements and guidelines

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CERTIFICATE № 270/2021
of TYPE III ENVIRONMENTAL DECLARATION

Products:

Cable route systems, underfloor duct systems, photovoltaic construction systems

Manufacturer:

EL-PUK Sp. z o.o.

ul.Kościelna 15, 95-050 Konstantynów Łódzki, Poland

confirms the correctness of the data included in the development of Type III Environmental Declaration and accordance with the requirements of the standard

PN-EN 15804+A1

Sustainability of construction works.
Environmental product declarations.
Core rules for the product category of construction products.

This certificate, issued for the first time on 1st December 2021 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, December 2021