Environmental Product Declaration Type III ITB No. 137/2020

Issuance date: 30.11.2020
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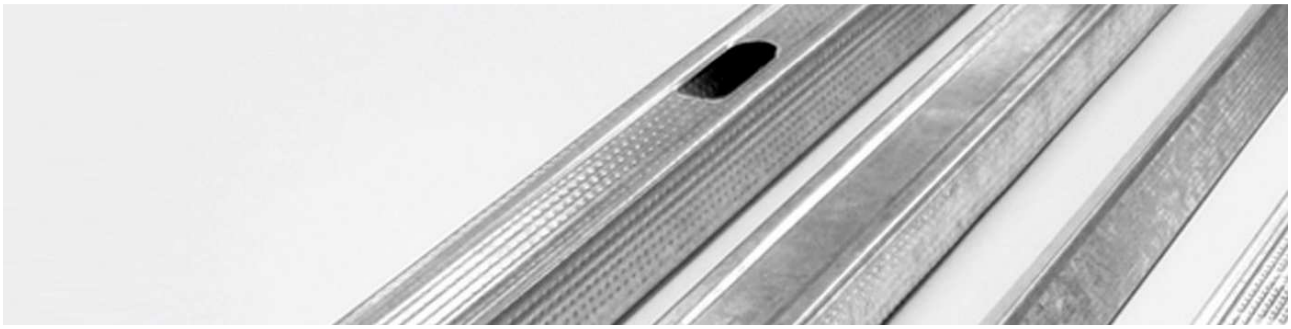
Neoprofil Sp. J.

Galvanized steel profiles



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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 15804:2012+A1 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 15804:2012+A1 (see point 5.3 of the standard).

Life cycle analysis (LCA): A1-A3, C1-C4 and D modules in accordance with EN 15804:2012+A1
(Cradle to Gate with options)

The year of preparing the EPD: 2020

Product standard: EN 14195, DIN 18182

Service Life: not declared

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

Declared Unit (DU): 1 kg of steel profile

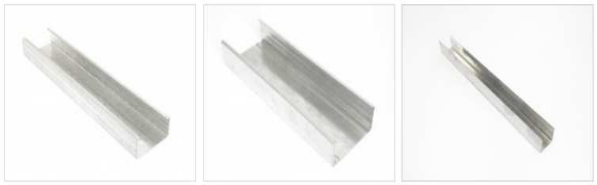
Reasons for performing LCA: B2B

Representativeness: Polish production, year 2019

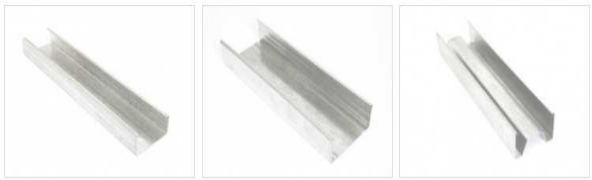
MANUFACTURER AND PRODUCTS DESCRIPTION

The Neoprofil company is a manufacturer of steel profiles for the installation of suspended ceilings and partition walls as well as window profiles. Company was founded in April 2008 and headquartered is located in Bielsko-Biała (Poland). Company has a production plant in Ząbkowice Śląskie. Neoprofil employs approximately 140 people in total. Company is present on many markets of the EU countries and beyond and sell to: Germany, Austria, France, Switzerland, Denmark, Hungary, Czech Republic, the Netherlands, Belgium, Slovakia, Croatia, Slovenia. The export of profiles accounts to approximately 85% of the total production. In addition to steel profiles, the offer includes mounting accessories.

The assortment includes almost 100 products that differ in the width of the steel strip and weight. Weight range from 0.265 kg/m to 3.7 kg/m, steel sheet thickness from 0.42 mm to 2.00 mm, depending on the profile geometry, length of products from 1 m – 12 m. Zinc coating in the thickness range from Z100 (100g/m^2) - up to 275 (275g/m^2). Steel type used is DX51D+Z produced by European steel mills, mainly ArcellorMittal. Fire class of steel is A1.



Profil CD 0.5 mm | Profil CW 0.5 mm | Profil UD 0.5 mm



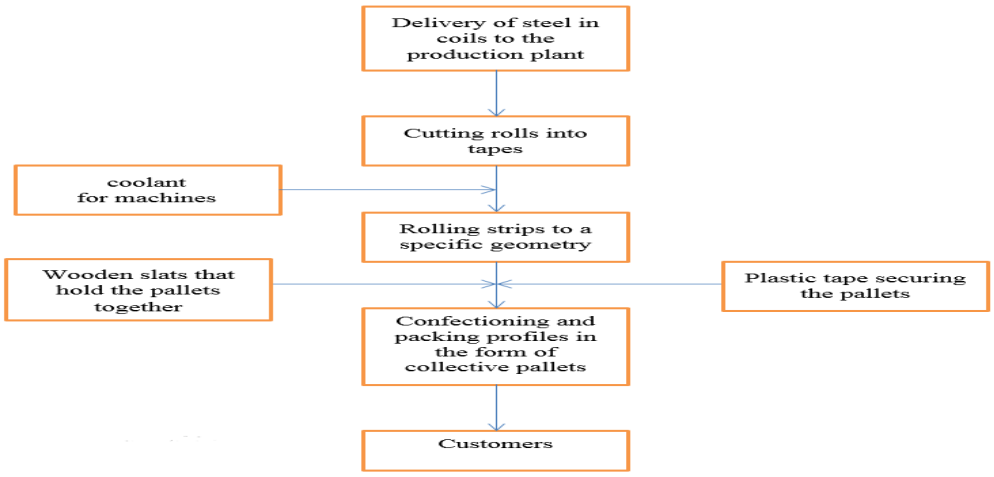
Profil CD 0.6 mm | Profil CW 0.6 mm | Profil SP 0.6 mm

Profil UW 0.5 mm

Profil UD 0.6 mm | Profil UW 0.6 mm

Technical data on steel profiles products can be found at https:// http://www.neoprofil.pl/produkty

The production scheme of steel profiles in the production plant of Neoprofil is shown in a figure below.



LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Unit

The declared unit is 1 kg of steel profile product intended for the installation of plasterboards, internal frames of doors and windows

System boundary

The life cycle analysis of the declared steel products covers “Product Stage” A1-A3, and End of Life stage C1, C2, C3, C4 and gains and loads beyond system in D module (Cradle to Gate with options) in accordance with EN 15804:2012+A1 and ITB PCR A.

Allocation

The allocation rules used for this EPD are based on general ITB’s PCR A. Production of the Neoprofil products is a line process in one manufacturing plant located at Ząbkowice Śląskie, Poland. Allocation of impact is done on a product mass basis (100% of whole production). All impacts from raw materials (99% is steel) are allocated in A1 module of the LCA, the input contributing more than 1% to the overall mass or energy of the system have been not omitted. It is estimated that the sum of any excluded flows contribute less than 2% to the impact assessment categories. The manufacturing of required machinery and other infrastructure is not considered in the LCA. 100% of impacts from a line production were inventored and allocated to product covered by this declaration. Module A2 includes transport of raw materials such as steel from suppliers to manufacturing plant (based on detailed and verified data). Energy supply was inventoried for whole factory and 100% was allocated to the product assessed. Emissions in the factory are assessed using national KOBiZE 2019 emission factors for energy carriers.

System limits

99% input materials and 100% energy consumption (electricity, oil) was inventoried in the manufacturing plant and were included in provided declaration. In the assessment, all significant parameters from gathered production data are considered, i.e. all material used per formulation (99% of input is steel resource), utilized energy, internal fuel (oil, LPG) and electric power consumption, direct production waste, and available emission measurements. Tires consumption for transport was not taken into account. PES foams, binding tapes, wood tiles with a percentage share (mass basis) of less than 0.5% were not included in the calculations. It is assumed that the total sum of omitted processes does not exceed 2% 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.

A1 and A2 Modules: Raw materials supply and transport

Raw material (rolled galvanized steel) come mainly from supplier providing environmental data (EPDs) on a delivered products. Data on transport (100% of input material) 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.

A3: Production

The production process A3 includes cutting, bending and forming the steel.

End of life scenarios (C and D modules)

The end-of-life scenario for all products has been generalized. Steel is considered as infinitely recyclable material. Typically is recovered by demolition contractors, who sell the recovered steel as ferrous scrap (material recovery rate in analysed case is 98%). According to the scenario, 0.2 MJ of the energy is set to recover the profile from the material derived from the demolition was assumed (electric small equipment). 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. Materials recovered from dismantled products are recycled (8%) and landfilled (2%) according to the Polish treatment practice of industrial waste what is presented in Table 1. The reuse, recovery and recycling potential for a new product system is considered beyond the system boundaries (module D) based on World Steel recommendations (net scrap approach) and national practice (see references).

Table 1. End of life scenarios for Neoprofil products

Progress products	Material recovery	Recycling	Landfilling
Steel products	98%	98%	2%

Data collection period

The data for manufacture of the declared products refer to period between 01.01.2019 – 31.12.2019 (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 Progress LCI inventory data. A1 values were prepared considering specific EPDs representing Polish 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 (2012 for World Steel Association).

Assumptions and estimates

The impacts of the representative products were aggregated using weighted average. Data regarding production of 1 kg of steel product were averaged for the analysed production. All production processes were assigned to different types of products in an equal way. Only one end-of-life scenario has been adopted.

Table 2. Assumptions for Neoprofil product system

Module	Scenario assumptions
A1 and A3	A1- 100% of steel input has specific EPDs A3 - Actual (2019) manufacturing data from 1 production site Utilization of packaging material was not taken into consideration.
A2	Actual data form production site is provided and verified including 100% transport of all inputs
C1	According to the best practice data - approx. 0.2 MJ/kg consumed for material recovery
C2	50 km on > 16 t loaded lorry with 75% capacity utilization and fuel consumption of 35 l per 100 km.
C3	Treatment of steel for recycling based on Ecoinvent v.3.5.data and model
C4	0.02 kg is landfilled. Treatment of steel for landfill - Ecoinvent v.3.5.data and model
D	98% product is recycled. A potential environmental benefit is calculated for the end-of-life stage (module D) for all the considered impact categories. The net amount scrap approach provided by World Steel Association is used, thus module D shows an environmental benefit.

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, A2 and A3 are calculated based on the LCI questionnaire provided by the manufacturer.

Databases

The background data for the processes come from the following databases: Ecoinvent v.3.5 (end of life- steel processes), specific EPD for a steel provider, KOBiZE (2019) and Tauron (Polish electricity mix and combustion factors for fuels). Specific (LCI) data quality analysis was audited. The time related quality of the data used is valid (5 years).

Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to EN 15804 and the building context, respectively the product-specific characteristics of performance, are taken into account.

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to the unit DU – 1 kg of the steel profile product.

Table 3. 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**	**MNA**	**MNA**	**MNA**	**MNA**	**MNA**	**MNA**	**MNA**	**MNA**	**MNA**	**MA**	**MA**	**MA**	**MA**	**MA**

Table 4. Environmental product characteristic – 1 kg of steel profile

Environmental impacts: (DU) 1 kg of steel product									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO_2 eq.	2.52E+00	2.18E-02	4.02E-03	5.24E-02	3.72E-03	5.76E-03	1.20E-03	-1.78E+00
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	8.12E-09	0.00E+00	0.00E+00	5.78E-10	0.00E+00	7.68E-09	2.20E-10	-3.68E-09
Acidification potential of soil and water	kg SO_2 eq.	4.75E-03	1.59E-04	1.24E-05	4.61E-05	2.72E-05	4.80E-04	1.00E-05	-3.03E-03
Formation potential of tropospheric ozone	kg Ethene eq.	7.61E-04	1.16E-05	1.30E-05	2.39E-04	1.98E-06	1.23E-06	2.20E-07	-5.36E-04
Eutrophication potential	kg $(PO_4)^{3-}$ eq.	5.55E-04	2.81E-05	1.70E-06	1.92E-06	4.79E-06	7.68E-04	1.60E-05	-3.18E-04
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb eq.	2.27E-03	0.00E+00	1.49E-08	3.89E-04	0.00E+00	5.87E-09	2.49E-09	-6.22E-08
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	2.26E+01	2.26E-01	9.03E-02	6.00E-01	2.69E-02	7.68E-01	2.08E-02	-1.53E+01
Environmental aspects: (DU) 1 kg of steel product									
Indicator	**Unit**	**A1**	**A2**	**A3**	**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
Use of renewable primary energy resources used as raw materials	MJ	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	8.39E-01	1.41E-02	0.00E+00	9.00E-02	2.15E-03	9.60E-03	1.06E-04	2.36E-01
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
Use of non-renewable primary energy resources used as raw materials	MJ	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	2.32E+01	7.4E-01	9.66E-02	5.04E-01	2.82E-02	8.16E-01	2.20E-02	1.62E+01
Use of secondary material	kg	1.18E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.44E-02
Use of renewable secondary fuels	MJ	1.29E-05	1.86E-04	0.00E+00	0.00E+00	1.41E-03	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	1.23E-04	0.00E+00	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	3.94E-06	1.00E-06	1.76E-05	1.90E-04	2.55E-04	0.00E+00	0.00E+00	3.07E-03
Other environmental information describing waste categories: (DU) 1 kg of steel product									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1.13E-03	4.60E-06	0.00E+00	8.00E-07	2.53E-08	1.44E-07	9.77E-09	1.03E-08
Non-hazardous waste disposed	kg	2.68E-02	4.27E-03	5.90E-04	7.22E-03	2.35E-05	6.26E-05	2.00E-02	2.94E-03
Radioactive waste disposed	kg	7.42E-05	0.00E+00	0.00E+00	8.00E-07	0.00E+00	3.67E-07	3.29E-08	5.36E-05
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
Materials for recycling	kg	3.23E-02	0.00E+00	1.35E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recover	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
Exported energy	MJ	0.00E+00	0.00E+00	000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

RESULTS INTERPRETATION

Interpretation of the results has been carried out considering the methodology, data-related assumptions and limitations declared in the EPD. The environmental impact of the steel profiles (cradle to gate with options) is largely dependent on the energy-intensive production of steel on which the manufacturer has only a small influence. Thus, the environmental impact of the product largely reflects the current level of environmental impact of steel produced in Poland due to its dominant share. The dominant amount of raw material entering the Neoprofil production is produced in BOF process. The distance of raw material delivery does not exceed 250 km, which translates into a low impact of transport. The impact of the production line (A3 module) mainly (energy use) depends on the amount of electricity consumed by manufacturing plant. There are no significant emissions or environmental impacts in the A3 production processes alone. The production process itself does not have significant environmental impacts in the life cycle. Analysis of the LCA results show that the cradle-to-gate A1-A3 GWP (Global Warming Potential) impact of 1 kg of steel product is 2.5 $kgCO_2$ (eq.). For GWP, A1-A3 (production stage) accounts for 97% of the analyzed lifecycle impact. Carbon impact GWP associated with (A3) in comparison to analyzed impact is less than 1%. The production of high-quality galvanized steel as output material (module A1) therefore has the greatest impact on the environmental characteristic of product. Direct emissions from integrated BOF plants typically amount to 1.8-3.0 tonnes CO_2 per tonne of steel produced. The LCA results show that the cradle-to gate primary energy demand (fossil) by the declared unit is 23 MJ while A1 steel production (mainly BOF) consumes 22 MJ of primary energy. The steel profiles products, due to the high potential for recovery and recycling (98%) has significant environmental gains - module D, which is its biggest benefit in the entire life cycle (-1.78 kg CO_2 and -16.2 MJ of non-renewable primary energy). This means that the relatively high energy expenditure of galvanized steel production (A1) is reduced in the subsequent loops of new 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 15804:2012+A1 and ITB PCR A
Independent verification corresponding to ISO 14025 (sub clause 8.1.3.) ☒ external ☐ internal
External verification of EPD: Ph.D. Eng. Halina Prejzner LCA, LCI audit and input data verification: Ph.D. Eng. Michał Piasecki, m.piasecki@itb.pl Verification of LCA: Ph.D. Eng. Justyna Tomaszewska, j.tomaszewska@itb.pl

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
- EN 15804:2012+A1:2013 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
- LCI DATA FOR STEEL PRODUCTS at https://www.worldsteel.org/en/dam/jcr:04f8a180-1406-4f5c-93ca-70f1ba7de5d4/LCI%2520study_2018%2520data%2520release.pdf
- EN 14195 Metal framing components for gypsum board systems - Definitions, requirements and test methods
- KOBiZE Wskaźniki emisyjności CO_2, SO_2, NO_X, CO i pyłu całkowitego dla energii elektrycznej, grudzień 2019
- World Steel Association 2017 Life Cycle inventory methodology report for steel products

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CERTIFICATE № 137/2020
of TYPE III ENVIRONMENTAL DECLARATION

Product:

Galvanized steel profiles

Manufacturer:

NEOPROFIL Sp. J.

ul. Gen. Boruty-Spiechowicza 68, 43-300 Bielsko-Biała, 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 30th November 2020 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Deputy 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, November 2020