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General Purpose Nails



Owner of the EPD:

Herco 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, C1-C4 and D modules in accordance with EN 15804
(Cradle-to-Gate with options)

Product standards: EN 10230-1:1999

The year of preparing the EPD: 2024

Service Life: 50 years for standard product

PCR: ITB-PCR A v. 1.6 (PCR based on EN 15804)

Declared unit: 1 kg

Reasons for performing LCA: B2B

Representativeness: Poland, European, 2023

MANUFACTURER



Figure 1 Bird's-eye view of Herco Sp. z o.o.

Herco Sp. z o.o. is one of the largest nail manufacturers in Europe with 30 years experiences

It specializes in high quality nails for hand and automatic nail guns which are used in wood construction, prefab housing and packaging industry. The factory of Herco is located in the center of Poland with very good access to European network of highways. Herco sales its products mainly for clients in European Union and North America.

All the nails sold by Herco are manufactured in the factory in Poland and are CE certified.

PRODUCTS DESCRIPTION AND APPLICATION

All products are made to the requirements of the client, within the specifications and tolerances of our production equipment. Company operates a wide range of machines, allowing to offer a wide range of nail products. The nails come in a wide range of sizes, heads, shanks, coatings, collation types and packing solutions. Below the different collation types are presented (Table 1). Herco is one of the few nail producers who has its own hot dipping line. Well oriented in steel grade of wire manufacturing according to customer requirements standard or custom made packing solutions vast assortment of nails and hitscrews own testing facility in house certifies different shipping solutions. Technical parameters of the products covered by the declaration: fasteners – nails in the diameter range of 1.8 - 4.6 mm are presented in Table 1.

Table 1. technical parameters of a nails produced by Herco Sp. z o.o.

	Value	Unit
Tensile resistance	min. 900	N/mm ²
Diameter	1,8-2,65	mm
length	16-65	mm
Type	ring/screw	
	Value	Unit
Tensile resistance	min. 840	N/mm ²
Diameter	2,8-3,4	mm
length	16-98	mm
Type	ring/screw	
	Value	Unit
Tensile resistance	min. 800	N/mm ²
Diameter	3,8-4,6	mm
length	90-160	mm
Type	ring/screw	
	Value	Unit
Tensile resistance	min. 800	N/mm ²
Diameter	2,3-4,0	mm
length	45-125	mm
Type	Grooved	
	Value	Unit
Tensile resistance	min. 800	N/mm ²
Diameter	2,3-3,8	mm
length	60-145	mm
Type	SQTW	

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 kg of product (averaged for all nails types).

System boundary

The life cycle analysis (LCA) of the declared products covers: product stage – modules A1-A4, end of life – modules C1-C4 and benefits and loads beyond the system boundary – module D (cradle-to-gate with options) 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 v.1.6. Production of the general purpose nails is a line process (as presented in Figure 2) conducted in the manufacturing plant located in Cielądz (Poland). Mass based allocation is used. Input and output data from the production is inventoried and allocated to the production on the mass basis. The declaration covers all types of nails produced in the plant. Their production resources and processing stages are basically similar, so it is possible to average the production by product weight.

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. The packaging products (tapes, wooden pallets, etc.) are included.

Modules A1 and A2: Raw materials supply and transport

Modules A1 and A2 represent the extraction and processing of raw materials (mainly steel) and transport to the production site. Ancillary materials such as welding wires, anticorrosive coatings and packaging materials come from local Polish suppliers. The steel used comes from specific suppliers producing steel. 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 Polish and European averages for fuel data.

Module A3: Production

The production processes carried out at Herco Sp. z o.o. are shown in Figure 2. Electricity supplied is from renewable sources .

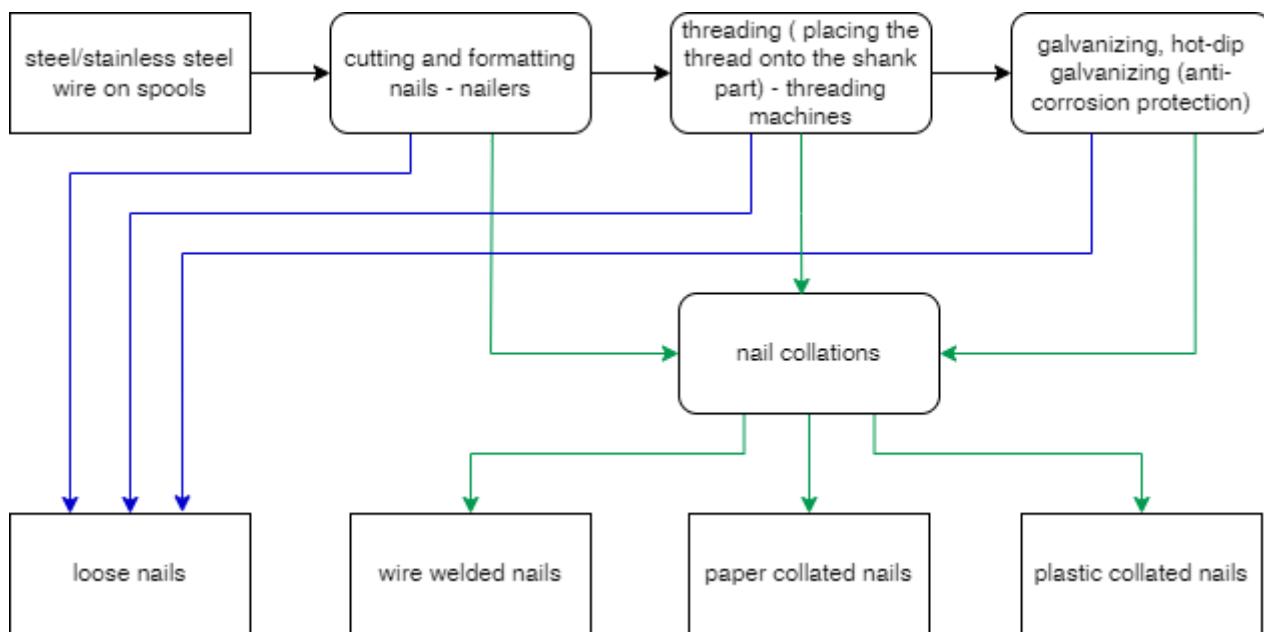


Figure 2. Diagram of the manufacturing process of general purpose nails

Module A4: Transport to consumer

Vehicle transport at distance 100 km is considered (emission standard: Euro 5) with 100% load capacity.

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

Module C1 (de-construction) impact is marginal – considered as zero. 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 90% and it is assumed that only 10% 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, taking into consideration almost 100% recycled content in steel used for production.

Table 2. End-of-life scenario for the nails

Material	Material recovery	Recycling	Landfilling
Steel scrap	100%	95%	5%

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 Herco Sp. z o.o. 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

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judged as good. The background data for the processes come from the following resources database Ecoinvent v.3.10 and specific suppliers (EPDs). 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 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

Additional information

The data for the processes comes from the following databases: Ecoinvent v.3.10, specific EPDs, ITB-Database. Specific data quality analysis was a part of external audit. Polish electricity mix used (production) is 0.685 kg CO₂/kWh (KOBiZE 2023). European electricity mix used is 0.430 kg CO₂/kWh for the end of life (Ecoinvent v3.10, RER).

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to declared unit (DU) – 1 kg of the general purpose nails produced by Herco Sp. z o.o. in Poland. The following life cycle modules (Table 3) were included in the analysis. The following tables 4-11 show the environmental impacts of the life cycle of selected modules (A1-A4+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	MND	MND	MND	MND	MND	MND	MND	MND	MD	MD	MD	MD	MD	

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Table 4 Life cycle assessment (LCA) results of the product – environmental impacts (DU: 1 kg)- EF v.3.1 EN 15804

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO ₂	1.05E+00	1.93E-01	1.19E-02	1.25E+00	1.67E-02	0.00E+00	8.34E-03	9.58E-03	1.06E-03	-3.71E-02
Greenhouse potential - fossil	eq. kg CO ₂	4.70E-01	1.92E-01	1.18E-02	6.74E-01	1.66E-02	0.00E+00	8.31E-03	9.47E-03	1.05E-03	-3.83E-02
Greenhouse potential - biogenic	eq. kg CO ₂	5.31E-01	5.35E-04	7.13E-05	5.32E-01	5.68E-05	0.00E+00	2.84E-05	9.56E-05	1.06E-05	1.13E-03
Global warming potential - land use and land use change	eq. kg CO ₂	7.08E-04	8.89E-05	2.30E-05	8.20E-04	6.52E-06	0.00E+00	3.26E-06	9.60E-06	1.07E-06	4.05E-05
Stratospheric ozone depletion potential	eq. kg CFC 11	5.37E-08	4.32E-08	2.24E-09	9.91E-08	3.85E-09	0.00E+00	1.92E-09	2.88E-09	3.20E-10	-7.01E-11
Soil and water acidification potential	eq. mol H ⁺	6.06E-03	1.27E+01	1.38E-04	1.27E+01	6.75E-05	0.00E+00	3.37E-05	7.99E-05	8.88E-06	-1.59E-04
Eutrophication potential - freshwater	eq. kg P	2.33E-04	1.16E-05	9.24E-06	2.53E-04	1.12E-06	0.00E+00	5.59E-07	2.75E-06	3.06E-07	-9.28E-06
Eutrophication potential - seawater	eq. kg N	1.63E-03	5.05E-04	2.22E-05	2.16E-03	2.04E-05	0.00E+00	1.02E-05	2.76E-05	3.06E-06	-3.21E-05
Eutrophication potential - terrestrial	eq. mol N	1.96E-02	5.55E-03	1.91E-04	2.54E-02	2.22E-04	0.00E+00	1.11E-04	3.00E-04	3.33E-05	-3.82E-04
Potential for photochemical ozone synthesis	eq. kg NMVOC	4.95E-03	1.51E-03	6.47E-05	6.52E-03	6.80E-05	0.00E+00	3.40E-05	8.68E-05	9.64E-06	-2.37E-04
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	7.48E-06	5.96E-07	1.18E-06	9.26E-06	5.89E-08	0.00E+00	2.95E-08	3.21E-08	3.56E-09	-1.91E-06
Abiotic depletion potential - fossil fuels	MJ	1.36E+01	2.76E+00	2.52E-01	1.66E+01	2.47E-01	0.00E+00	1.23E-01	2.19E-01	2.43E-02	-7.44E-02
Water deprivation potential	eq. m ³	2.39E-01	1.20E-02	5.14E-03	2.56E-01	1.14E-03	0.00E+00	5.70E-04	1.27E-03	1.41E-04	2.62E-02

Table 5 Life cycle assessment (LCA) results of the product – additional impacts indicators - EF v.3.1 EN 15804

Indicator	Unit	A1-A4	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA

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Table 6 Life cycle assessment (LCA) results of the the product - the resource use - EF v.3.1 EN 15804

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	6.33E-01	3.59E-02	1.36E+00	2.03E+00	3.54E-03	0.00E+00	1.77E-03	3.84E-03	4.27E-04	-1.72E-02
Consumption of renewable primary energy resources used as raw materials	MJ	3.03E+00	0.00E+00	0.00E+00	3.03E+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	3.67E+00	3.59E-02	1.36E+00	5.07E+00	3.54E-03	0.00E+00	1.77E-03	3.84E-03	4.27E-04	-1.72E-02
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	7.16E+00	2.76E+00	1.29E-01	1.01E+01	2.47E-01	0.00E+00	1.23E-01	2.37E-01	2.63E-02	-1.48E-02
Consumption of non-renewable primary energy resources used as raw materials	MJ	6.95E+00	0.00E+00	0.00E+00	6.95E+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	1.41E+01	2.76E+00	2.63E-01	1.71E+01	2.47E-01	0.00E+00	1.23E-01	2.37E-01	2.63E-02	-1.48E-02
Consumption of secondary materials	kg	1.49E+00	9.88E-04	6.23E-04	1.49E+00	8.27E-05	0.00E+00	4.14E-05	0.00E+00	0.00E+00	-8.33E-03
Consumption of renew. secondary fuels	MJ	6.45E-05	8.98E-06	2.38E-06	7.59E-05	9.11E-07	0.00E+00	4.56E-07	0.00E+00	0.00E+00	-1.95E-05
Consumption of non-renewable secondary fuels	MJ	0.00E+00									
Net consumption of freshwater	m ³	6.45E-03	3.17E-04	6.08E-04	7.38E-03	3.10E-05	0.00E+00	1.55E-05	3.41E-05	3.79E-06	-4.37E-04

Table 7 Life cycle assessment (LCA) results of the product – waste categories - EF v.3.1 EN 15804

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	2.44E-01	3.22E-03	1.76E-03	2.49E-01	2.77E-04	0.00E+00	1.38E-04	3.45E-07	3.83E-08	-6.15E-06
Non-hazardous waste	kg	1.24E+00	5.06E-02	4.37E-02	1.34E+00	4.92E-03	0.00E+00	2.46E-03	9.02E-01	1.00E-01	3.96E-02
Radioactive waste	kg	5.34E-05	1.81E-07	1.02E-06	5.46E-05	1.84E-08	0.00E+00	9.21E-09	1.33E-06	1.48E-07	4.66E-06
Components for re-use	kg	0.00E+00	0.00E+00	7.15E-01	7.15E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	1.96E-01	6.33E-05	3.03E-02	2.27E-01	7.64E-07	0.00E+00	3.82E-07	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	2.98E-06	6.94E-08	2.14E-08	3.07E-06	6.18E-09	0.00E+00	3.09E-09	0.00E+00	0.00E+00	0.00E+00
Exported Energy	MJ	1.36E-02	6.35E-04	2.11E-04	1.44E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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Table 8 Life cycle assessment (LCA) results of the product – environmental impacts (DU: 1 kg) – TRACI v.2.1 method

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO ₂	9.96E-01	1.89E-01	1.16E-02	1.20E+00	1.64E-02	0.00E+00	8.18E-03	9.38E-03	1.04E-03	-3.64E-02
Greenhouse potential - fossil	eq. kg CO ₂	4.47E-01	1.89E-01	1.15E-02	6.47E-01	1.63E-02	0.00E+00	8.15E-03	9.28E-03	1.03E-03	-3.75E-02
Greenhouse potential - biogenic	eq. kg CO ₂	5.04E-01	5.24E-04	6.98E-05	5.05E-01	5.57E-05	0.00E+00	2.78E-05	9.37E-05	1.04E-05	1.10E-03
Global warming potential - land use and land use change	eq. kg CO ₂	6.72E-04	8.72E-05	2.25E-05	7.82E-04	6.39E-06	0.00E+00	3.20E-06	9.41E-06	1.05E-06	3.97E-05
Stratospheric ozone depletion potential	eq. kg CFC 11	5.10E-08	4.23E-08	2.20E-09	9.55E-08	3.77E-09	0.00E+00	1.88E-09	2.82E-09	3.14E-10	-6.87E-11
Soil and water acidification potential	eq. mol H ⁺	5.76E-03	1.25E+01	1.36E-04	1.25E+01	6.61E-05	0.00E+00	3.31E-05	7.83E-05	8.70E-06	-1.55E-04
Eutrophication potential - freshwater	eq. kg P	2.21E-04	1.13E-05	9.06E-06	2.41E-04	1.10E-06	0.00E+00	5.48E-07	2.70E-06	2.99E-07	-9.10E-06
Eutrophication potential - seawater	eq. kg N	1.55E-03	4.95E-04	2.17E-05	2.07E-03	2.00E-05	0.00E+00	9.98E-06	2.70E-05	3.00E-06	-3.14E-05
Eutrophication potential - terrestrial	eq. mol N	1.86E-02	5.44E-03	1.87E-04	2.43E-02	2.18E-04	0.00E+00	1.09E-04	2.94E-04	3.27E-05	-3.74E-04
Potential for photochemical ozone synthesis	eq. kg NMVOC	4.70E-03	1.48E-03	6.34E-05	6.25E-03	6.67E-05	0.00E+00	3.33E-05	8.50E-05	9.45E-06	-2.32E-04
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	7.11E-06	5.84E-07	1.16E-06	8.85E-06	5.77E-08	0.00E+00	2.89E-08	3.14E-08	3.49E-09	-1.87E-06
Abiotic depletion potential - fossil fuels	MJ	1.29E+01	2.71E+00	2.47E-01	1.59E+01	2.42E-01	0.00E+00	1.21E-01	2.14E-01	2.38E-02	-7.29E-02
Water deprivation potential	eq. m ³	2.27E-01	1.17E-02	5.04E-03	2.44E-01	1.12E-03	0.00E+00	5.59E-04	1.25E-03	1.38E-04	2.57E-02

Table 9 Life cycle assessment (LCA) results of the product – additional impacts indicators (DU: 1 kg) – TRACI v.2.1 method

Indicator	Unit	A1-A4	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA
Potential human exposure efficiency relative to U235	eq. kBq U235	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA

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Table 10 Life cycle assessment (LCA) results of the the product - the resource use (DU: 1 kg) – TRACI v.2.1 method

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	6.01E-01	3.52E-02	1.34E+00	1.97E+00	3.47E-03	0.00E+00	1.73E-03	3.77E-03	4.19E-04	-1.69E-02
Consumption of renewable primary energy resources used as raw materials	MJ	2.88E+00	0.00E+00	0.00E+00	2.88E+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	3.48E+00	3.52E-02	1.34E+00	4.86E+00	3.47E-03	0.00E+00	1.73E-03	3.77E-03	4.19E-04	-1.69E-02
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	6.80E+00	2.71E+00	1.26E-01	9.64E+00	2.42E-01	0.00E+00	1.21E-01	2.32E-01	2.58E-02	-1.45E-02
Consumption of non-renewable primary energy resources used as raw materials	MJ	6.60E+00	0.00E+00	0.00E+00	6.60E+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	1.34E+01	2.71E+00	2.57E-01	1.64E+01	2.42E-01	0.00E+00	1.21E-01	2.32E-01	2.58E-02	-1.45E-02
Consumption of secondary materials	kg	1.42E+00	9.68E-04	6.10E-04	1.42E+00	8.11E-05	0.00E+00	4.05E-05	0.00E+00	0.00E+00	-8.16E-03
Consumption of renew. secondary fuels	MJ	6.13E-05	8.80E-06	2.34E-06	7.24E-05	8.93E-07	0.00E+00	4.47E-07	0.00E+00	0.00E+00	-1.91E-05
Consumption of non-renewable secondary fuels	MJ	0.00E+00									
Net consumption of freshwater	m ³	6.13E-03	3.10E-04	5.96E-04	7.04E-03	3.04E-05	0.00E+00	1.52E-05	3.35E-05	3.72E-06	-4.29E-04

Table 11 Life cycle assessment (LCA) results of the product – waste categories (DU: 1 kg) – TRACI v.2.1 method

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	2.32E-01	3.15E-03	1.72E-03	2.37E-01	2.71E-04	0.00E+00	1.36E-04	3.38E-07	3.75E-08	-6.03E-06
Non-hazardous waste	kg	1.18E+00	4.96E-02	4.28E-02	1.27E+00	4.82E-03	0.00E+00	2.41E-03	8.84E-01	9.82E-02	-3.88E-02
Radioactive waste	kg	5.07E-05	1.78E-07	1.00E-06	5.19E-05	1.81E-08	0.00E+00	9.03E-09	1.30E-06	1.45E-07	-4.56E-06
Components for re-use	kg	0.00E+00	0.00E+00	7.01E-01	7.01E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	1.87E-01	6.21E-05	2.97E-02	2.16E-01	7.49E-07	0.00E+00	3.74E-07	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	2.83E-06	6.80E-08	2.10E-08	2.92E-06	6.05E-09	0.00E+00	3.03E-09	0.00E+00	0.00E+00	0.00E+00
Exported Energy	MJ	1.29E-02	6.23E-04	2.07E-04	1.37E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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Annex 1. Informative values of product impacts using X-Carb steel with an origin source certificate for production

Table A1. Life cycle assessment (LCA) results of the product – environmental impacts (DU: 1 kg)- EF v.3.1 EN 15804 - non-galvanized

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO ₂	6.22E-01	1.93E-01	1.19E-02	8.27E-01	1.67E-02	0.00E+00	8.34E-03	9.58E-03	1.06E-03	-3.71E-02
Greenhouse potential - fossil	eq. kg CO ₂	6.21E-01	1.92E-01	1.18E-02	8.25E-01	1.66E-02	0.00E+00	8.31E-03	9.47E-03	1.05E-03	-3.83E-02
Greenhouse potential - biogenic	eq. kg CO ₂	1.34E-03	5.35E-04	7.13E-05	1.95E-03	5.68E-05	0.00E+00	2.84E-05	9.56E-05	1.06E-05	1.13E-03
Global warming potential - land use and land use change	eq. kg CO ₂	4.78E-04	8.89E-05	2.30E-05	5.90E-04	6.52E-06	0.00E+00	3.26E-06	9.60E-06	1.07E-06	4.05E-05
Stratospheric ozone depletion potential	eq. kg CFC 11	3.08E-09	4.32E-08	2.24E-09	4.85E-08	3.85E-09	0.00E+00	1.92E-09	2.88E-09	3.20E-10	-7.01E-11
Soil and water acidification potential	eq. mol H ⁺	2.32E-03	1.27E+01	1.38E-04	1.27E+01	6.75E-05	0.00E+00	3.37E-05	7.99E-05	8.88E-06	-1.59E-04
Eutrophication potential - freshwater	eq. kg P	8.12E-05	1.16E-05	9.24E-06	1.02E-04	1.12E-06	0.00E+00	5.59E-07	2.75E-06	3.06E-07	-9.28E-06
Eutrophication potential - seawater	eq. kg N	5.63E-04	5.05E-04	2.22E-05	1.09E-03	2.04E-05	0.00E+00	1.02E-05	2.76E-05	3.06E-06	-3.21E-05
Eutrophication potential - terrestrial	eq. mol N	6.06E-03	5.55E-03	1.91E-04	1.18E-02	2.22E-04	0.00E+00	1.11E-04	3.00E-04	3.33E-05	-3.82E-04
Potential for photochemical ozone synthesis	eq. kg NMVOC	1.67E-03	1.51E-03	6.47E-05	3.25E-03	6.80E-05	0.00E+00	3.40E-05	8.68E-05	9.64E-06	-2.37E-04
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	1.69E-05	5.96E-07	1.18E-06	1.87E-05	5.89E-08	0.00E+00	2.95E-08	3.21E-08	3.56E-09	-1.91E-06
Abiotic depletion potential - fossil fuels	MJ	7.23E+00	2.76E+00	2.52E-01	1.03E+01	2.47E-01	0.00E+00	1.23E-01	2.19E-01	2.43E-02	-7.44E-02
Water deprivation potential	eq. m ³	2.14E-01	1.20E-02	5.14E-03	2.31E-01	1.14E-03	0.00E+00	5.70E-04	1.27E-03	1.41E-04	2.62E-02

Table A2. Life cycle assessment (LCA) results of the product – additional impacts indicators - EF v.3.1 EN 15804 - non-galvanized

Indicator	Unit	A1-A4	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA
Potential human exposure efficiency relative to U235	eq. kBq U235	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA

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Table A3. Life cycle assessment (LCA) results of the the product - the resource use - EF v.3.1 EN 15804 - non-galvanized

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.06E+01	3.59E-02	1.36E+00	1.20E+01	3.54E-03	0.00E+00	1.77E-03	3.84E-03	4.27E-04	-1.72E-02
Consumption of renewable primary energy resources used as raw materials	MJ	0.00E+00									
Total consumption of renewable primary energy resources	MJ	1.06E+01	3.59E-02	1.36E+00	1.20E+01	3.54E-03	0.00E+00	1.77E-03	3.84E-03	4.27E-04	-1.72E-02
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	7.24E+00	2.76E+00	1.29E-01	1.01E+01	2.47E-01	0.00E+00	1.23E-01	2.37E-01	2.63E-02	-1.48E-02
Consumption of non-renewable primary energy resources used as raw materials	MJ	0.00E+00									
Total consumption of non-renewable primary energy resources	MJ	7.24E+00	2.76E+00	2.63E-01	1.03E+01	2.47E-01	0.00E+00	1.23E-01	2.37E-01	2.63E-02	-1.48E-02
Consumption of secondary materials	kg	1.44E+00	9.88E-04	6.23E-04	1.44E+00	8.27E-05	0.00E+00	4.14E-05	0.00E+00	0.00E+00	-8.33E-03
Consumption of renew. secondary fuels	MJ	2.96E-05	8.98E-06	2.38E-06	4.10E-05	9.11E-07	0.00E+00	4.56E-07	0.00E+00	0.00E+00	-1.95E-05
Consumption of non-renewable secondary fuels	MJ	0.00E+00									
Net consumption of freshwater	m ³	5.44E-03	3.17E-04	6.08E-04	6.37E-03	3.10E-05	0.00E+00	1.55E-05	3.41E-05	3.79E-06	-4.37E-04

Table A4. Life cycle assessment (LCA) results of the product – waste categories - EF v.3.1 EN 15804 - non-galvanized

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	1.08E-01	3.22E-03	1.76E-03	1.13E-01	2.77E-04	0.00E+00	1.38E-04	3.45E-07	3.83E-08	-6.15E-06
Non-hazardous waste	kg	3.58E-01	5.06E-02	4.37E-02	4.52E-01	4.92E-03	0.00E+00	2.46E-03	9.02E-01	1.00E-01	3.96E-02
Radioactive waste	kg	7.06E-05	1.81E-07	1.02E-06	7.18E-05	1.84E-08	0.00E+00	9.21E-09	1.33E-06	1.48E-07	4.66E-06
Components for re-use	kg	0.00E+00	0.00E+00	7.15E-01	7.15E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	3.52E-05	6.33E-05	3.03E-02	3.04E-02	7.64E-07	0.00E+00	3.82E-07	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	1.47E-06	6.94E-08	2.14E-08	1.56E-06	6.18E-09	0.00E+00	3.09E-09	0.00E+00	0.00E+00	0.00E+00
Exported Energy	MJ	3.73E-03	6.35E-04	2.11E-04	4.58E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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Table A5. Life cycle assessment (LCA) results of the product – environmental impacts (DU: 1 kg)- EF v.3.1 EN 15804 - galvanized

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO ₂	8.45E-01	1.93E-01	1.19E-02	1.05E+00	1.67E-02	0.00E+00	8.34E-03	9.58E-03	1.06E-03	-3.71E-02
Greenhouse potential - fossil	eq. kg CO ₂	8.35E-01	1.92E-01	1.18E-02	1.04E+00	1.66E-02	0.00E+00	8.31E-03	9.47E-03	1.05E-03	-3.83E-02
Greenhouse potential - biogenic	eq. kg CO ₂	9.24E-03	5.35E-04	7.13E-05	9.85E-03	5.68E-05	0.00E+00	2.84E-05	9.56E-05	1.06E-05	1.13E-03
Global warming potential - land use and land use change	eq. kg CO ₂	9.89E-04	8.89E-05	2.30E-05	1.10E-03	6.52E-06	0.00E+00	3.26E-06	9.60E-06	1.07E-06	4.05E-05
Stratospheric ozone depletion potential	eq. kg CFC 11	3.24E-08	4.32E-08	2.24E-09	7.78E-08	3.85E-09	0.00E+00	1.92E-09	2.88E-09	3.20E-10	-7.01E-11
Soil and water acidification potential	eq. mol H ⁺	2.49E-02	1.27E+01	1.38E-04	1.27E+01	6.75E-05	0.00E+00	3.37E-05	7.99E-05	8.88E-06	-1.59E-04
Eutrophication potential - freshwater	eq. kg P	2.54E-04	1.16E-05	9.24E-06	2.75E-04	1.12E-06	0.00E+00	5.59E-07	2.75E-06	3.06E-07	-9.28E-06
Eutrophication potential - seawater	eq. kg N	1.54E-03	5.05E-04	2.22E-05	2.06E-03	2.04E-05	0.00E+00	1.02E-05	2.76E-05	3.06E-06	-3.21E-05
Eutrophication potential - terrestrial	eq. mol N	1.03E-01	5.55E-03	1.91E-04	1.09E-01	2.22E-04	0.00E+00	1.11E-04	3.00E-04	3.33E-05	-3.82E-04
Potential for photochemical ozone synthesis	eq. kg NMVOC	2.64E-03	1.51E-03	6.47E-05	4.22E-03	6.80E-05	0.00E+00	3.40E-05	8.68E-05	9.64E-06	-2.37E-04
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	8.49E-05	5.96E-07	1.18E-06	8.66E-05	5.89E-08	0.00E+00	2.95E-08	3.21E-08	3.56E-09	-1.91E-06
Abiotic depletion potential - fossil fuels	MJ	1.08E+01	2.76E+00	2.52E-01	1.38E+01	2.47E-01	0.00E+00	1.23E-01	2.19E-01	2.43E-02	-7.44E-02
Water deprivation potential	eq. m ³	4.22E-01	1.20E-02	5.14E-03	4.39E-01	1.14E-03	0.00E+00	5.70E-04	1.27E-03	1.41E-04	2.62E-02

Table A6. Life cycle assessment (LCA) results of the product – additional impacts indicators - EF v.3.1 EN 15804 - galvanized

Indicator	Unit	A1-A4	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA
Potential human exposure efficiency relative to U235	eq. kBq U235	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA

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Table A7. Life cycle assessment (LCA) results of the the product - the resource use - EF v.3.1 EN 15804 - galvanized

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.10E+01	3.59E-02	1.36E+00	1.24E+01	3.54E-03	0.00E+00	1.77E-03	3.84E-03	4.27E-04	-1.72E-02
Consumption of renewable primary energy resources used as raw materials	MJ	0.00E+00									
Total consumption of renewable primary energy resources	MJ	1.10E+01	3.59E-02	1.36E+00	1.24E+01	3.54E-03	0.00E+00	1.77E-03	3.84E-03	4.27E-04	-1.72E-02
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.11E+01	2.76E+00	1.29E-01	1.40E+01	2.47E-01	0.00E+00	1.23E-01	2.37E-01	2.63E-02	-1.48E-02
Consumption of non-renewable primary energy resources used as raw materials	MJ	0.00E+00									
Total consumption of non-renewable primary energy resources	MJ	1.11E+01	2.76E+00	2.63E-01	1.41E+01	2.47E-01	0.00E+00	1.23E-01	2.37E-01	2.63E-02	-1.48E-02
Consumption of secondary materials	kg	1.44E+00	9.88E-04	6.23E-04	1.44E+00	8.27E-05	0.00E+00	4.14E-05	0.00E+00	0.00E+00	-8.33E-03
Consumption of renew. secondary fuels	MJ	2.96E-05	8.98E-06	2.38E-06	4.10E-05	9.11E-07	0.00E+00	4.56E-07	0.00E+00	0.00E+00	-1.95E-05
Consumption of non-renewable secondary fuels	MJ	0.00E+00									
Net consumption of freshwater	m ³	8.09E-03	3.17E-04	6.08E-04	9.02E-03	3.10E-05	0.00E+00	1.55E-05	3.41E-05	3.79E-06	-4.37E-04

Table A8. Life cycle assessment (LCA) results of the product – waste categories - EF v.3.1 EN 15804 - galvanized

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	1.08E-01	3.22E-03	1.76E-03	1.13E-01	2.77E-04	0.00E+00	1.38E-04	3.45E-07	3.83E-08	-6.15E-06
Non-hazardous waste	kg	3.83E-01	5.06E-02	4.37E-02	4.78E-01	4.92E-03	0.00E+00	2.46E-03	9.02E-01	1.00E-01	3.96E-02
Radioactive waste	kg	8.53E-05	1.81E-07	1.02E-06	8.65E-05	1.84E-08	0.00E+00	9.21E-09	1.33E-06	1.48E-07	4.66E-06
Components for re-use	kg	0.00E+00	0.00E+00	7.15E-01	7.15E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	3.52E-05	6.33E-05	3.03E-02	3.04E-02	7.64E-07	0.00E+00	3.82E-07	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	1.47E-06	6.94E-08	2.14E-08	1.56E-06	6.18E-09	0.00E+00	3.09E-09	0.00E+00	0.00E+00	0.00E+00
Exported Energy	MJ	3.73E-03	6.35E-04	2.11E-04	4.58E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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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: 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)
- EN 10230-1:1999 - Steel wire nails - Part 1: Loose nails for general applications
- 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 emisjyjności CO₂, SO₂, NO_x, CO i pyłu całkowitego dla energii elektrycznej. December 2023
- World Steel Association 2017 Life Cycle inventory methodology report for steel products
- <https://ecoinvent.org/>

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CERTIFICATE № 651/2024 of TYPE III ENVIRONMENTAL DECLARATION

Products:

General Purpose Nails

Manufacturer:

Herco Sp. z o.o.

Cielądz 28C, 96-214 Cielądz, 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.

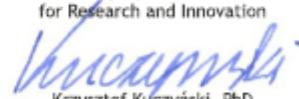
This certificate, issued on 9th August 2024 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Head of the Thermal Physics, Acoustics
and Environment Department


Agnieszka Winkler-Skalna, PhD



Deputy Director
for Research and Innovation


Krzysztof Kuczyński, PhD

Warsaw, August 2024