Type III Environmental Product Declaration No. 802/2025

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General Purpose Nails

Owner of the EPD:

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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: 2025
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 Kyocera Fastening Solutions in The Netherlands

Senco is a brand of Kyocera Fastening Solutions, dedicated to offering advanced fastening solutions to industry and construction professionals.

PRODUCTS DESCRIPTION AND APPLICATION

All products are manufactured within the specifications and tolerances of our production equipment. The manufacturing facility operates a wide range of machinery, allowing for a wide range of nail products, and also has its own hot dipping line. Nails come in a wide range of sizes, heads, shanks, coatings, set types and packaging solutions. The different set types are shown below (Table 1). Well versed in the production of stainless steel wire to customer requirements standard or custom packaging solutions wide range of impact nails and screws in-house testing facilities internal certifications various shipping solutions. Technical parameters of the products covered by the declaration: fasteners - nails in the diameter range of 1.8 - 4.6 mm are shown in Table 1.

Table 1. technical parameters of a nails produced by Kyocera Fastening Solutions

	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/mm2
Diameter	3,8-4,6	mm
length	90-160	mm
Type	ring/screw	
	Value	Unit
Tensile resistance	min. 800	N/mm2
Diameter	2,3-4,0	mm
length	45-125	mm
Type	Grooved	
	Value	Unit
Tensile resistance	min. 800	N/mm2
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). 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 basicly 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 Kyocera Fastening Solutions are shown in Figure 2. Electricity supplied is from renewable sources.

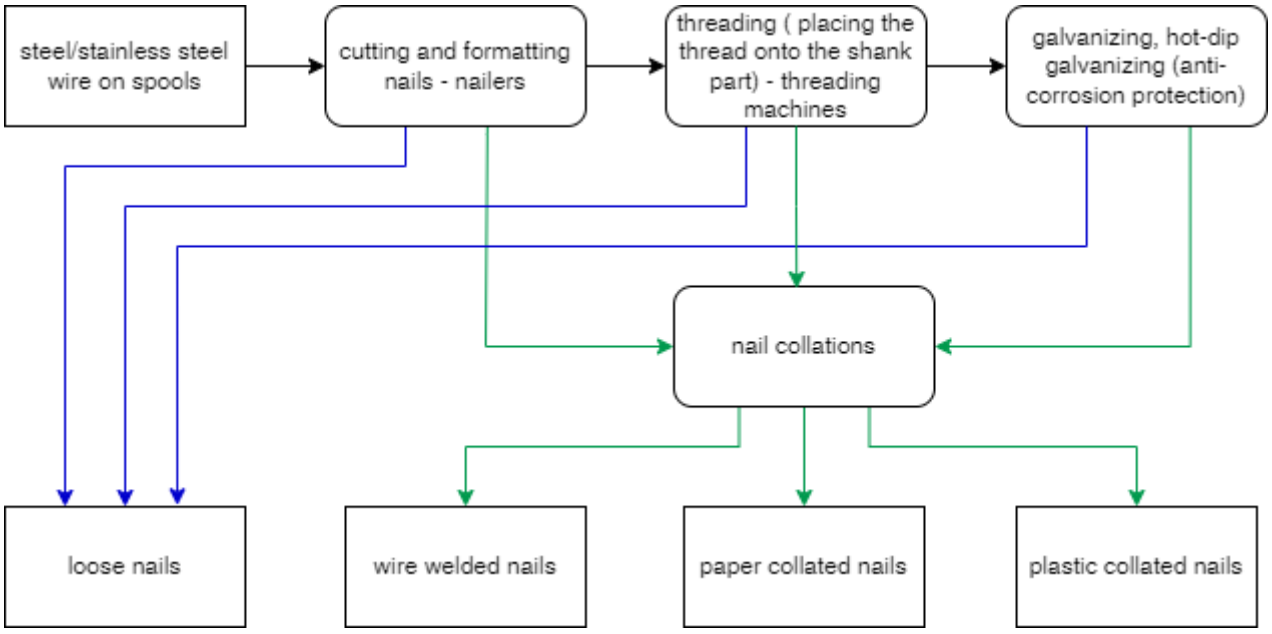

Figure 2. Diagram of the manufacturing process of general purpose nails

Module A4: *Transport to consumer*

Vehicle transport at distance 1200 km is considered (emission standard: Euro 5) with 100% load capacity. The transport scenario assumes transport to the warehouse and then transport from the warehouse to the customer.

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

Data selected for LCA come from ITB-LCI questionnaires verified during data audit. No collected data is older than five years and no generic dataset is older than ten years. Representativeness,

completeness, reliability and consistency are assessed as good. Background data for processes come from the following Ecoinvent v.3.10 resource database and specific suppliers (EPD). Quality analysis of specific data (LCI) was 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 CO_2/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 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

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	2,33E-01	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	2,32E-01	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	1,51E-04	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	7,60E-05	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	4,62E-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	7,27E-04	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	1,55E-05	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	2,45E-04	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	2,66E-03	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	1,14E-03	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	7,59E-07	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	3,26E+00	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	1,58E-02	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

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	5,53E-02	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	5,53E-02	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	3,26E+00	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	3,26E+00	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	1,49E-03	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	1,88E-05	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	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
Net consumption of freshwater	m^3	6.45E-03	3.17E-04	6.08E-04	7.38E-03	4,33E-04	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	4,70E-03	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	9,92E-02	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	1,04E-06	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	2,45E-05	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	2,07E-07	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	1,36E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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	2,23E-01	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	2,23E-01	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	1,45E-04	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	7,30E-05	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	4,43E-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	6,98E-04	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	1,49E-05	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	2,35E-04	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	2,56E-03	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	1,09E-03	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	7,29E-07	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	3,13E+00	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	1,51E-02	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	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

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	5,31E-02	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	5,31E-02	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	3,13E+00	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	3,13E+00	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	1,43E-03	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	1,81E-05	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	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
Net consumption of freshwater	m^3	6.13E-03	3.10E-04	5.96E-04	7.04E-03	4,16E-04	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	4,51E-03	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	9,52E-02	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	9,98E-07	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	2,35E-05	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	1,99E-07	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	1,30E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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	2,23E-01	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	2,23E-01	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	1,45E-04	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	7,30E-05	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	4,43E-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	6,98E-04	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	1,49E-05	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	2,35E-04	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	2,56E-03	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	1,09E-03	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	7,29E-07	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	3,13E+00	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	1,51E-02	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	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

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	5,31E-02	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	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
Total consumption of renewable primary energy resources	MJ	1.06E+01	3.59E-02	1.36E+00	1.20E+01	5,31E-02	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	3,13E+00	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	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
Total consumption of non-renewable primary energy resources	MJ	7.24E+00	2.76E+00	2.63E-01	1.03E+01	3,13E+00	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	1,43E-03	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	1,81E-05	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	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
Net consumption of freshwater	m^3	5.44E-03	3.17E-04	6.08E-04	6.37E-03	4,16E-04	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	4,51E-03	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	9,52E-02	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	9,98E-07	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	2,35E-05	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	1,99E-07	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	1,30E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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	2,23E-01	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	2,23E-01	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	1,45E-04	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	7,30E-05	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	4,43E-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	6,98E-04	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	1,49E-05	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	2,35E-04	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	2,56E-03	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	1,09E-03	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	7,29E-07	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	3,13E+00	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	1,51E-02	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	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

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	5,31E-02	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	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
Total consumption of renewable primary energy resources	MJ	1.10E+01	3.59E-02	1.36E+00	1.24E+01	5,31E-02	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	3,13E+00	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	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
Total consumption of non-renewable primary energy resources	MJ	1.11E+01	2.76E+00	2.63E-01	1.41E+01	3,13E+00	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	1,43E-03	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	1,81E-05	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	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
Net consumption of freshwater	m^3	8.09E-03	3.17E-04	6.08E-04	9.02E-03	4,16E-04	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	4,51E-03	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	9,52E-02	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	9,98E-07	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	2,35E-05	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	1,99E-07	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	1,30E-03	0.00E+00	0.00E+00	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.) ☒ 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 emisyjności CO_2, SO_2, NOx, 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 № 802/2025
of TYPE III ENVIRONMENTAL DECLARATION

Products:

General Purpose Nails

Manufacturer:

Kyocera Fastening Solutions
Pascallaan 88, 8-218 NJ Lelystad, The Netherlands

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 June 2025 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, June 2025