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Clamps and accessories to support building service installations

Type III Environmental Product Declaration No. 545/2023

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-A5 and D modules in accordance with EN 15804 (Cradle-to-Gate with options).
The year of preparing the EPD: 2023
Product standard: EN ISO 3834-2, EN 1090-1
Service Life: 50 years
PCR: ITB-PCR A
Declared unit: 1 kg
Reasons for performing LCA: B2B
Representativeness: Poland, Europe, 2022

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MANUFACTURER

THALE sp. z o. o. sp. k. (NICZUK brand owner) is a leading Polish manufacturer of fastening systems for sanitary, industrial, ventilation and fire protection installations and technological solutions for the transport of loose materials. The company's headquarters and main production plant is located in Wilimowo (Warmińsko-Mazurskie Voivodeship).

Fig. 1 *The main manufacturing plant in Wilimowo, Poland*

All company operations are subject to an integrated quality and environmental management system in accordance with ISO 9001:2015, ISO 3834, ISO 14001:2015, EN 1090 and Factory Production Control.

Export sales of products under the brand name NICZUK began in 2000. The first direction was neighboring countries such as Germany, Lithuania, and Ukraine. Today, the high quality of products under the brand NICZUK also finds buyers in such demanding markets as Italy, Denmark, Greece, Sweden, Spain, Turkey and many others. NICZUK brand range is already sold to more than 20 countries worldwide.

The focus on the quality of technically and functionally refined products, combined with a service for the selection of fasteners for installation, sales and after-sales service, is a consequence of the company's strategy and building of its reputation. THALE has the largest department of fixing designers in Poland and its own testing laboratory offering design support and technical advice to its customers.

PRODUCTS DESCRIPTION

Clamps and accessories to support building service installations covered by this EPD are 800 clamp ranges with high temperature and corrosion resistance dedicated to all piping and industrial installations. Products are made of carbon steel and stainless steel with/or without EPDM, PVC or rubber elements/linings. Products are covered by zinc coating using hot-dip galvanization process, electric galvanization or technology of non-electrolytic application of anti-corrosion coatings called Ultra Cover XP. Ultra Cover XP characterizes with high resistance to external factors and belongs to the group of lamellar (flake) coatings. Ultra Cover XP does not contain any harmful chromates.

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

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

UNIT
The declared unit is 1 kg of product - clamps and accessories for suspension of pipes and installation wires.

SYSTEM BOUNDARY
The life cycle analysis of the declared products covers "Product Stage" A1-A3, A4-A5, C1-C4+D modules in accordance with EN 15804 and ITB PCR A (cradle to gate with options). Energy and water consumption, emissions as well as information on generated wastes were inventoried and were included in the calculation. 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. Production of the covered products is a line process (as presented in Figure 2) conducted in the manufacturing plant located in Wilimowo (Poland). Input and output data from the production is inventoried and allocated to the production on the mass basis (weigh averaged). The declaration covers a wide range of steel products. Their production resources and processing stages are basicly similar, so it is possible to average the production by product weight.

SYSTEM LIMITS
Minimum 99.8% input materials and 100% energy consumption (electricity, gas, LPG, other) were inventoried in a processing plant and were included in the 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 and available emission measurements. Tires consumption for transport was not considered. Substances with a percentage share of less than 0.1% of total mass were excluded from the calculations. The packaging products (wooden pallets) are included.

MODULES A1 AND A2: RAW MATERIALS SUPPLY AND TRANSPORT
The modules A1 and A2 represent the extraction and processing of raw materials (mainly steel elements) and transport to the production site. The steel sheets are semi-products commonly used to produce steel elements. Steel used come from a specific suppliers producing steel with EAF technologies and BOF. For A2 module (transport) European averages for fuel data are applied and global maritime/freight transport.

MODULE A3: PRODUCTION
The input steel/semi-product (black or galvanized sheet metal) is processed to a dedicated shape by cutting and forming. The production process is partially automated and is based on receiving metallurgical materials for production (steel coils or steel sheets), followed by cold processing of the steel (unwinding, cutting, bending). Black finishing of the structure, including welding of the base and accessories is carried out by MIG-MAG welding methods and mechanical methods - cutting, grinding, burning. Products are protected against corrosion by hot-dip galvanizing in external galvanizing units, optionally they can be powder-coated or hydrodynamically painted. In the end products are assemled and packed.

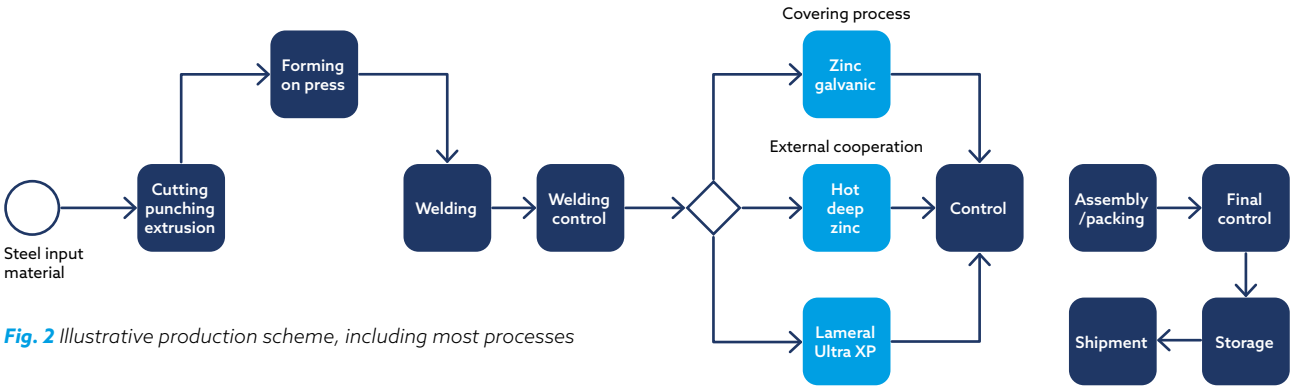

Fig. 2 Illustrative production scheme, including most processes

MODULE A4: TRANSPORT TO CONSUMER

Vehicle transport at distance 500 km is considered (emission standard: Euro 5) with 100% load capacity.

MODULES C AND D: END-OF-LIFE (EOL)

Due to the fact that the declaration covers a wide range of steel products for various purposes and usage scenarios, it is not possible to directly specify the de-construction technology and the amount of energy for disassembly in C1 module (so this module is very generic based on literature). In the adapted end-of-life scenario, the de-constructed steel products are transported to a steel mill distant by 100 km on > 16t lorry EURO 5 where are used as steel scrap to produce a new steel. The recycling potential of C3 module is 98% and it is assumed that only 2% of the products will end up in a landfill – C4 module (Table 2). Module D presents credits resulting from the recycling of the steel scrap (used for steel production), calculated in accordance with the approach developed by World Steel Association.

Table 1 End-of-life scenario for the clamps and accessories for suspension of pipes and installation wires

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

Electricity at end-of-life (module C) has been modelled using an average Polish electricity mix as the location where the product reaches end-of-life is unknown.

DATA COLLECTION PERIOD

The data for manufacture of the declared products refer to period between 01.01.2022 – 31.12.2022 (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 THALE sp. z o.o. sp. k. and verified during data audit. No data collected is older than five years and no generic datasets used are older than ten years. The representativeness, completeness, reliability, and consistency is judged as good. The background data for the processes come from the following resources database Ecoinvent v.3.9.1 (steel, welding, Zn process, coverings, polyethylene terephthalate, PVC, PET, polystyrene, carkg, polypropylene, EUR-flat pallet, structural timber). Specific (LCI) data quality analysis was a part of the input data verification. Where no background data was available, data gaps were complemented by manufacturer information and literature research.

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

Polish electricity (Eocinvent v 3.9.1 supplemented by actual national Kobize data) emission factor used is 0.704 kg CO_2/kWh. As a general rule, no particular environmental or health protection measures other than those specified by law are necessary.

LIFE CYCLE ASSESSMENT (LCA) – Results

DECLARED UNIT

The declaration refers to declared unit (DU) – 1 kg of Clamps and accessories for suspension of pipes and installation wires produced in Europe. The following life cycle modules (Table 2) were included in the analysis. The following tables 3-6 show the environmental impacts of the life cycle of selected modules (A1-A5+C1-C4+D).

Table 2 *System boundaries for the environmental characteristic of the product*

Environmental assessment information (MD – Module Declared, MND – Module Not Declared, INA – Indicator Not Assessed)																
Product stage			Construction process		Use stage							End of life				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse-recovery-recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
MD	MD	MD	MD	MD	MND	MND	MND	MND	MND	MND	MND	MD	MD	MD	MD	MD

Table 3 *Life cycle assessment (LCA) results for specific product – environmental impacts (DU: 1 kg)*

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO2	2,53E+00	6,70E-02	6,61E-01	3,26E+00	8,34E-02	4,69E-05	7,04E-03	2,21E-02	5,85E-02	1,06E-04	-7,17E-01
Greenhouse potential - fossil	eq. kg CO2	1,11E+00	6,69E-02	5,93E-01	1,77E+00	8,31E-02	4,69E-05	7,04E-03	2,20E-02	5,85E-02	1,05E-04	-7,19E-01
Greenhouse potential - biogenic	eq. kg CO2	5,60E-03	4,53E-05	8,70E-03	1,43E-02	2,84E-04	1,23E-07	1,85E-05	7,52E-05	1,85E-05	2,68E-07	2,73E-03
Global warming potential - land use and land use change	eq. kg CO2	1,06E-03	4,53E-05	6,03E-04	1,71E-03	3,26E-05	7,14E-09	1,07E-06	8,64E-06	1,07E-06	9,94E-08	-4,31E-05
Stratospheric ozone depletion potential	eq. kg CFC 11	2,66E-08	4,61E-09	8,15E-08	1,13E-07	1,92E-08	2,51E-13	3,77E-11	5,09E-09	3,77E-11	4,26E-11	-2,53E-08
Soil and water acidification potential	eq. mol H+	5,95E-03	1,57E-03	2,51E-02	3,26E-02	3,37E-04	4,83E-07	7,25E-05	8,93E-05	1,18E-03	9,90E-07	-2,86E-03
Eutrophication potential - freshwater	eq. kg P	2,98E-04	2,79E-06	7,11E-04	1,01E-03	5,59E-06	7,87E-08	1,18E-05	1,48E-06	1,18E-05	9,81E-09	-3,06E-04
Eutrophication potential - seawater	eq. kg N	1,21E-03	3,95E-04	1,46E-03	3,06E-03	1,02E-04	6,84E-08	1,03E-05	2,70E-05	5,93E-04	3,45E-07	-6,25E-04
Eutrophication potential - terrestrial	eq. mol N	1,91E-02	4,36E-03	9,71E-02	1,21E-01	1,11E-03	5,97E-07	8,95E-05	2,94E-04	6,47E-03	3,77E-06	-6,82E-03
Potential for photochemical ozone synthesis	eq. kg NMVOC	9,05E-03	1,19E-03	2,32E-03	1,26E-02	3,40E-04	1,72E-07	2,57E-05	9,01E-05	1,60E-03	1,10E-06	-3,61E-03
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	6,03E-06	1,08E-07	6,47E-05	7,08E-05	2,95E-07	1,72E-11	2,58E-09	7,80E-08	2,58E-09	2,42E-10	-1,38E-05
Abiotic depletion potential - fossil fuels	MJ	1,05E+01	8,67E-01	1,16E+01	2,30E+01	1,23E+00	7,21E-04	1,08E-01	3,27E-01	1,08E-01	2,89E-03	-5,89E+00
Water depriva-tion potential	eq. m^3	4,38E-01	2,89E-03	3,00E-01	7,41E-01	5,70E-03	1,38E-05	2,07E-03	1,51E-03	2,65E-03	9,16E-06	-9,53E-02

Table 4 *Life cycle assessment (LCA) results for specific product – additional impacts indicators (DU: 1 kg)*

Indicator	Unit	A1-A3	A4-A5	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA	INA

Table 5 *Life cycle assessment (LCA) results for specific product - the resource use (DU: 1 kg)*

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.75E+00	7.89E-03	4.10E-01	2.16E+00	1.77E-02	5.93E-05	8.90E-03	4.69E-03	8.90E-03	2.51E-05	-4.96E-01
Consumption of renewable primary energy resources used as raw materials	MJ	5.34E-01	0.00E+00	0.00E+00	5.34E-01	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	2.28E+00	7.89E-03	4.10E-01	2.70E+00	1.77E-02	5.93E-05	8.90E-03	4.69E-03	8.90E-03	2.51E-05	-4.96E-01
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.18E+01	8.67E-01	4.99E+00	1.77E+01	1.23E+00	7.21E-04	1.08E-01	3.27E-01	-5.05E-01	2.89E-03	-5.65E+00
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	6.13E-01	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	1.18E+01	8.67E-01	4.99E+00	1.77E+01	1.23E+00	7.21E-04	1.08E-01	3.27E-01	1.08E-01	2.89E-03	-5.65E+00
Consumption of secondary materials	kg	1.08E+00	3.75E-04	4.89E-04	1.08E+00	4.14E-04	6.27E-08	9.40E-06	1.10E-04	9.40E-06	6.07E-07	9.80E-01
Consumption of renewed secondary fuels	MJ	4.81E-05	1.55E-06	2.28E-06	5.19E-05	4.56E-06	3.16E-10	4.75E-08	1.21E-06	4.75E-08	1.59E-08	-1.28E-04
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	0.00E+00
Net consumption of freshwater	m3	3.65E-03	6.53E-05	1.86E-02	2.23E-02	1.55E-04	2.07E-06	3.11E-04	4.11E-05	3.11E-04	3.16E-06	-5.17E-03

Table 6 *Life cycle assessment (LCA) results for specific product – waste categories (DU: 1 kg)*

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	1.58E-02	6.09E-04	4.30E-02	5.94E-02	1.38E-03	5.59E-06	8.38E-04	3.67E-04	8.38E-04	3.07E-06	-7.27E-05
Non-hazardous waste	kg	1.20E-01	1.17E-02	2.64E+00	2.77E+00	2.46E-02	3.76E-04	5.65E-02	6.51E-03	5.65E-02	4.32E-05	1.12E-01
Radioactive waste	kg	6.14E-05	8.58E-08	3.61E-05	9.75E-05	9.21E-08	1.08E-10	1.62E-08	2.44E-08	1.62E-08	1.92E-08	1.24E-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	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	1.71E-01	6.82E-05	1.60E-01	3.31E-01	3.82E-06	4.84E-09	7.26E-07	1.01E-06	7.26E-07	5.78E-09	0.00E+00
Materials for energy recovery	kg	4.64E-02	1.68E-08	1.00E-02	5.64E-02	3.09E-08	7.78E-12	1.17E-09	8.18E-09	1.17E-09	6.85E-11	0.00E+00
Exported energy	MJ	5.07E-03	4.53E-05	1.63E-02	2.14E-02	0.00E+00	2.31E-06	3.46E-04	0.00E+00	3.46E-04	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 (sub clause 8.1.3.)
[X] external [ ] internal
External verification of EPD: Halina Prejzner, PhD. Eng. LCI audit and verification: Michał Chwedaczuk, 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 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
- EN 1090-2:2018 - Execution of steel structures and aluminium structures - Technical requirements for steel structures
- PN-EN 1090-1+A1:2012 - Wykonanie konstrukcji stalowych i aluminiowych – Część 1: Zasady oceny zgodności elementów konstrukcyjnych
- 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, NO_X, CO i pyłu całkowitego dla energii elektrycznej. December 2021
- World Steel Association 2017 Life Cycle inventory methodology report for steel products

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CERTIFICATE № 545/2023
of TYPE III ENVIRONMENTAL DECLARATION

Products:

Clamps and accessories to support building service installations

Manufacturer:

THALE sp. z o.o. sp. k.

ul. Wilimowo 2, 11-041 Olsztyn, 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 27th October 2023 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, October 2023

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