Type III Environmental Product Declaration No. 614/2024

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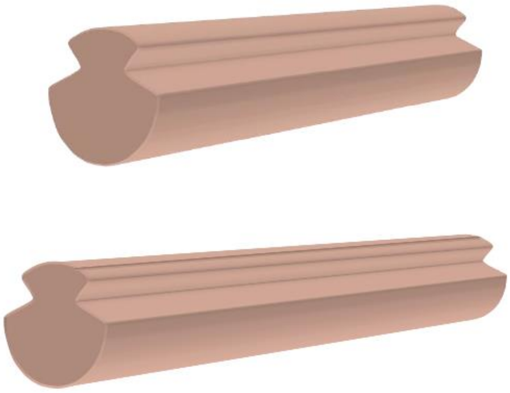
Cu, CuAg contact wires



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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, B6, C1-C4 and D modules in accordance with EN 15804 (Cradle-to-Gate with options)

The year of preparing the EPD: 2024

Product standards: ZN-TFK-019:2000, PN-E-90090,PN EN 50149

Service Life: 30 years

PCR: ITB-PCR A

Declared unit: 1 km

Reasons for performing LCA: B2B

Representativeness: Poland, 2022

MANUFACTURER

Figure 1 The view of TELE-FONIKA Kable S.A. manufacturing plant located in Cracow

TELE-FONIKA Kable S.A. – the Krakow-Wielicka plant was established in 1928. The plant obtained ISO 9002 certification in 1992 and ISO 14001 certification in 1998, demonstrating its commitment to quality management and environmental responsibility. The Kraków-Wielicka plant is one of the biggest cable factories in Poland. It manufactures power cables and wires, including rubber insulated cables and wires applicable in the mining industry and in the offshore and onshore wind farms. As one of the few European manufacturers, the plant is a supplier for mines located in Europe, US, Canada, South America, Africa and Australia. Its offer also includes specialized cables for applications in the railway and shipbuilding industry. All types of rubber compounds used for EPR, CR, CM, EVA, and CSP cables are developed using proprietary formulas in collaboration with research and development centres.

The factory's product range includes low and medium-voltage cables, signal and control cables for specialized applications as well as bare copper and aluminium conductors. These products are aligned with the latest global trends, focusing on sustainability, safety, and energy efficiency. By adhering to the most stringent sustainability and safety standards, the factory showcases its commitment to innovation and the ever-evolving needs of modern industries.

The factory has an extensive, well-equipped laboratory that allows us to conduct advanced research and development work, which ensures the continuous development of our products.

Long-term cooperation with renowned certification and testing bodies, including VDE (VDE Testing and Certification Institute, Representative Office in Poland), BASEC (the British Approvals Service for Cables), KEMA (Keuring van Elektrotechnische Materialen te Arnhem), DEKRA (DEKRA Certification S.A.), CESI (Centro Elettrotecnico Sperimentale Italiano), and STRI (Swedish National Testing and Research Institute) ensures that the factory's products meet the highest international quality and safety standards.

PRODUCTS DESCRIPTION

Contact (trolley) wires, type Djp and DjpS covered by EPD are made of Cu-ETP copper and CuAg 0.10 copper alloy, respectively, they consist of a single grooved hard profile wire. Symmetrically made grooves (indentations) at the top of the round contact wire allow it to be attached to hanger cables. Trolleys are the most important component of a catenary wire, and the combination of electrical and mechanical parameters that characterize them limits the capabilities of the catenary and thus the performance of trains. The most common material used for the production of contact wires is copper. This metal is characterized by excellent electrical conductivity and at the same time has (in the hard state) very good strength properties, which, however, are reduced at elevated temperatures of the order of 80°C. Due to this fact, Djp type contact wire cannot be overloaded with electric current, which in turn affects the limitation of the maximum speed of trains to about 160 km/h. The solution to this problem is the addition of a small amount of alloying additives to the copper, which reduce the conductivity of the wire to no or a small extent, while increasing its mechanical properties and raising its operating temperature. For this reason, DjpS type contact wires have a higher current carrying capacity, which translates directly into an increase in train speed, even up to

250 km/h. At present, in Poland, the most modern solution of the structure designed for railway traffic is the YC150-2CS150 catenary with a variation of YC120-2CS150 with a Cu 150 mm^2 or 120 mm^2 carrying wire and two silver copper contact wires of the DjpS 150 type, approved by the Office of Rail Transport for powering of rail traction vehicles running at speeds up to 200 km/h.

Table 1 Description of manufactured products

Product	Specification	Diameter mm^2	Resistance DC Ω/km	Weight kg/km	Conversion coef.
Djp 100	Djp 100 MT/21.07.2021	100	0.182	395	0.395
DjpS 100	DjpS MT/30.04.2020	100	0.183	890	0.890
DjpS 150	DjpS MT/30.04.2020	150	0.122	1335	1.335

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Unit

The declared unit is 1 km of installed cable (over a period of 30 years for LCA purposes). The results presented in the LCA (Tables 3-6) are presented for a 1 km long cable with the representative weight of 1000 kg and resistance of 0.1 Ω/km. To convert the impacts on cables with different weights per kilometer, use a conversion factor equal to the linear cable density (see Table 1) to the reference cable. For example, if the cable weighs 1500 kg/km, a conversion factor of 1.5 should be applied.

System boundary

The life cycle analysis of the declared products covers "Product Stage" A1-A3, A4, C2-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 ITB PCR A and EN 15804+A2. Production of Cu, CuAg contact wires is a line process conducted in TELE-FONIKA Kable S.A.. Allocation was done on product mass basis. All impacts associated with the extraction and processing of raw materials used for the production of Cu, CuAg contact wires are allocated in module A1 of the LCA . Impacts from the global line production were inventoried and 100% were allocated to un Cu, CuAg contact wires production. Water and energy consumption, associated emissions and generated wastes are allocated to module A3 Packaging materials were takien into consideration - wooden cable drums.

System limits

All data obtained from the LCI survey were taken into consideration, all available data from production have been considered, i.e. all raw materials/elements used as per assembly process, utilized thermal energy, 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 5 % of energy usage and mass per module A, B, C or D. Machines and facilities required during production are neglected. The production of etiquettes, tape and glue was also not considered.

Modules A1 and A2: *Raw materials supply and transport*

The modules A1 and A2 represent the extraction and processing of raw materials and components and transport to the production sites. Copper, copper – silver alloys, steel, paper, polyethylene, timber, additives and packaging materials are sourced from domestic and foreign suppliers (train, ship and TIR). Means of transport include trucks (inventoried). Polish and European standards for average combustion were used for calculations. Data on mode of transport and distances, as reported by suppliers were used for those materials and parts contributing more than 0.1 % of total product mass.

Module A3: ***Production***

The production of Cu, CuAg contact wires is carried out in TELE-FONIKA S.A. in Cracow (Poland). A scheme of the Cu, CuAg contact wires production process by TELE-FONIKA S.A. is presented in Fig. 2. The process of manufacturing Cu, CuAg contact wires consists of drawing the underrun wire according to the information in the product sheet (wire diameter). Each completed product must have a quality control stamp. After inspection, the product is packed on to wooden cable drums. Electricity, ON, LPG and natural gas are consumed in the processes. Losses and breakages from the line are recycled. The packaging of the wires in the functional unit consists of wooden reel.

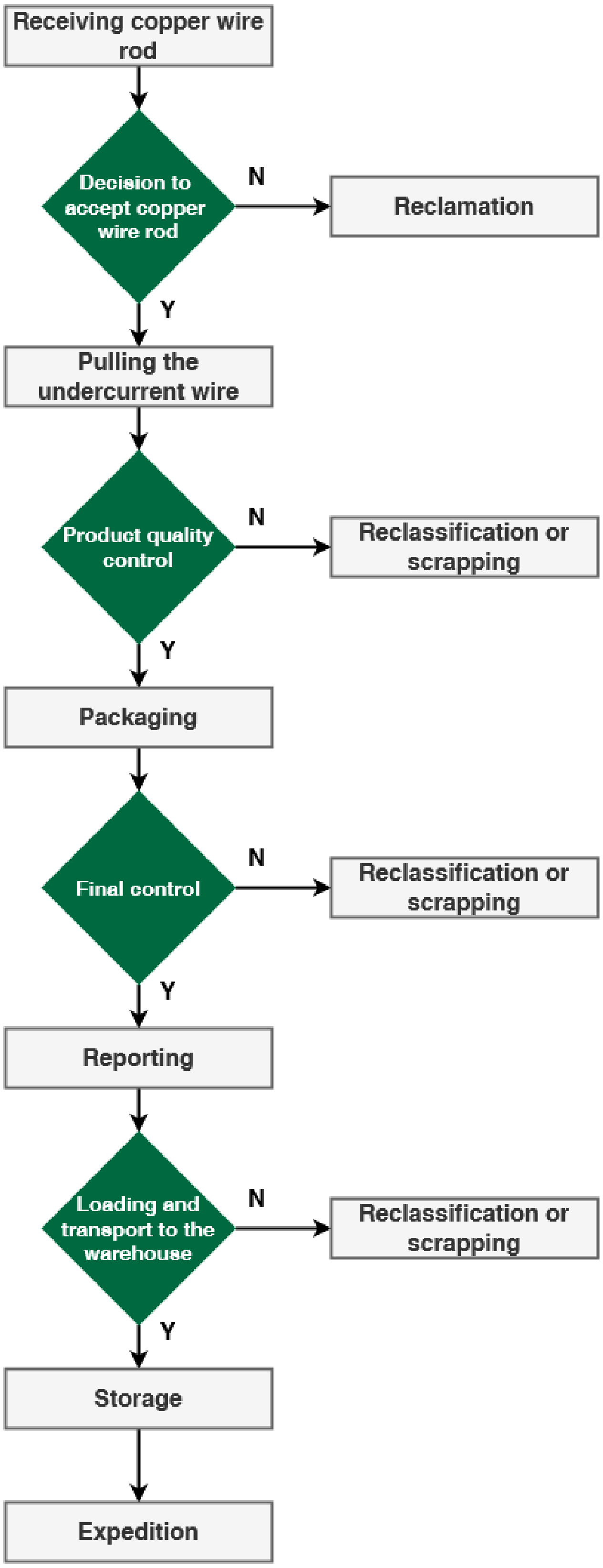

Figure 2 Manufacturing process scheme (A3)

Module A4: ***Transport to a construction site***
The Cu, CuAg contact wires produced are delivered to Polish as well as foreign customers. In the adapted scenario an average distance of 250 km from the factory gate to a recipient is assumed. Means of transport include 16-32t lorry (EURO 5) with fuel consumption of 35 l per 100 km.

Module A5: ***Installation process***
In the adapted scenario the installation process requires application appropriate tools and fastening systems for contact wires recommended by TELE-FONIKA S.A. Only consumable materials have been included in the calculation. Installation does not cause health or environmental hazards. It was assumed a certain amount of electricity necessary for power tools during installation.

Module B6: Use stage, Energy losses

The cables are assumed as no directly emitting product during the life time. Actual data shows that no significant activities have been reported for use, maintenance, repair, replacement, refurbishment, and water use. This reflects an absence of impacts during the 30 years reference service life of the cable in these modules. No repair, replacement, or refurbishment (B3-B5) due to damage is expected within the RSL of 30 years. Furthermore, there is generally no operational water consumption associated with the use stage. Reference lifetime and use rate of energy wires and cables were consensually determined by the technical experts. For energy transmission products, energy consumption results in losses by Joule effect, over the use time (see equation 1):

$$E = R \cdot I^2 \cdot \Delta t \qquad (1)$$

where:
R: linear resistivity of the cable in Ω/km
I: current in A
Δt : use stage time in seconds
Concerning energy wires and cables, because of the wide and various possible uses of these products for a given application, and to ensure the comparability, the functional unit is expressed for a current of 1 A. Concerning the linear resistivity value of 0.1 Ω/km was used for LCA calculation. This rule allows expressing the losses in Joule unit during cable use stage regardless of the use scenario. In this case, it is recommended using the Ampere specific multiplier for the actual cable use scenario in module B6 (see conversion rules).

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

The deconstruction of the products covered by this study is assumed to be done with electric tools. In the adapted end-of-life scenario, the de-constructed products are transported to recycling plant on the distance 100 km with > 10t lorry, EURO 5. The recycling potential of recovered materials is presented in Table 1. Materials used in the production have potential benefits and load beyond the system boundary. These include the following: copper – 95% copper (made from virgin ores). The recyclability of metals and plastics allows the producers a credit for the net scrap that is produced at the end of a product's life. The benefits from recycling of net scrap are described in formula from EN 15804:2012+A2:2019. Substitution of heat and electricity generated by the incineration with energy recovery of plastic insulation and other parts is also calculated in module D.

Table 2. End-of-life scenario for the product components

Material	Recycling/Reuse %	Landfilling %	Energy recovery %
Copper	95	5	0
Other	0	100	0

Electricity at end-of-life (module C) has been modelled using an average Polish electricity

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 TELE-FONIKA S.A. 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.3.10 (copper, steel, additives, paper, polyethylene, timber, additives, packaging materials). Specific (LCI) data quality analysis was a part of the input data verification. As a result, both upstream- and downstream activities are based on average supply mixes for the specific region depending on the given dataset and KOBiZE data is used (Polish electricity mix and combustion factors for fuels).

Assumptions and estimates

The impacts of the representative products were aggregated using weighted average. Amounts of energy and material flows used at the manufacturing of the declared product were allocated by dividing the annual amounts with the specific production volume.

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 (Ecoinvent v.3.10 supplemented by actual national KOBiZE data) emission factor used is 0.698 kg CO_2/kWh. As a general rule, no particular environmental or health protection measures other than those specified by law are necessary. Underlays and top-cover membranes are inherently inert, chemically stable, and therefore do not emit pollutants and substances hazardous to the environment and health during use, such as VOCs and radon.

The method of converting the environmental impact for a specific cable product

The results presented in the impacts Table are presented for a 1 km long cable with an average weight of 1000 kg. To convert the impacts on cables with different weights per kilometre, use a conversion factor equal to the linear density value of the assessed cable to the reference cable (Table 1). For example, if the cable weighs 1500 kg/km, a factor of 1.5 should be used.
For the B6 module, the losses in a 30-year cycle (for a specific current intensity) should be calculated according to the formula (1). For other cable resistances, multiply the result by the ratio of the specific wire from Table 1 to reference cable 0.1 Ω/km. For example if resistance is 0.2 Ω/km multiply impacts in B6 by factor 2.

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to declared unit (DU) – 1 kg of Cu, CuAg contact wires produced in Poland. The following life cycle modules (Table 3) were included in the analysis. The following tables 4-7 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**	**MD**	**MND**	**MD**	**MD**	**MD**	**MD**	**MD**

Table 3 Life cycle assessment (LCA) results for contact wires – environmental impacts of (DU: 1 km, 30 years)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO_2	6.58E+03	1.25E+02	6.25E+02	7.33E+03	1.67E+01	3.49E+01	1.84E+02	3.49E+01	3.54E+01	1.59E+01	2.64E-01	-1.81E+03
Greenhouse potential - fossil	eq. kg CO_2	6.99E+03	1.25E+02	5.35E+02	7.65E+03	1.66E+01	3.42E+01	1.80E+02	3.42E+01	3.52E+01	1.58E+01	2.63E-01	-1.80E+03
Greenhouse potential - biogenic	eq. kg CO_2	-4.18E+02	4.26E-01	1.50E+01	-4.02E+02	4.40E-02	1.00E+00	5.26E+00	1.00E+00	1.20E-01	5.40E-02	6.71E-04	-1.37E+03
Global warming potential - land use and land use change	eq. kg CO_2	8.01E+00	4.89E-02	1.81E-01	8.24E+00	6.53E-03	1.20E-02	6.31E-02	1.20E-02	1.38E-02	6.20E-03	2.49E-04	-4.11E+00
Stratospheric ozone depletion potential	eq. kg CFC 11	5.96E-05	2.88E-05	8.96E-06	9.74E-05	3.85E-06	7.00E-07	3.68E-06	7.00E-07	8.15E-06	3.65E-06	1.07E-07	-2.00E-04
Soil and water acidification potential	eq. mol H+	1.69E+02	5.06E-01	5.23E+00	1.75E+02	6.74E-02	3.80E-01	2.00E+00	3.80E-01	1.43E-01	6.41E-02	2.48E-03	-5.54E+01
Eutrophication potential - freshwater	eq. kg P	1.19E+02	8.38E-03	8.21E-01	1.20E+02	1.07E-03	6.50E-02	3.42E-01	6.50E-02	2.37E-03	1.06E-03	2.45E-05	-1.47E+00
Eutrophication potential - seawater	eq. kg N	4.89E+01	1.53E-01	7.83E-01	4.99E+01	2.03E-02	5.50E-02	2.89E-01	5.50E-02	4.32E-02	1.93E-02	8.62E-04	-1.49E+01
Eutrophication potential - terrestrial	eq. mol N	7.10E+02	1.67E+00	6.54E+00	7.19E+02	2.22E-01	4.65E-01	2.45E+00	4.65E-01	4.71E-01	2.11E-01	9.43E-03	-2.29E+02
Potential for photochemical ozone synthesis	eq. kg NMVOC	1.40E+02	5.10E-01	2.00E+00	1.42E+02	6.80E-02	1.30E-01	6.84E-01	1.30E-01	1.44E-01	6.46E-02	2.74E-03	-4.67E+01
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	2.18E+00	4.42E-04	2.30E-04	2.18E+00	5.91E-05	1.67E-04	8.78E-04	1.67E-04	1.25E-04	5.60E-05	6.04E-07	-3.96E+00
Abiotic depletion potential - fossil fuels	MJ	7.98E+04	1.85E+03	9.07E+03	9.08E+04	2.47E+02	5.80E+02	3.05E+03	5.80E+02	5.23E+02	2.34E+02	7.22E+00	-2.86E+04
Water deprivation potential	eq. m^3	2.91E+03	8.56E+00	1.55E+02	3.08E+03	1.13E+00	1.20E+01	6.31E+01	1.20E+01	2.42E+00	1.08E+00	2.29E-02	-1.46E+03

Table 4 Life cycle assessment (LCA) results for contact wires – additional impacts indicators (DU: 1 km. 30 years)

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 contact wires - the resource use (DU: 1 km)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	3.14E+04	2.65E+01	7.21E+02	3.22E+04	3.55E+00	4.30E+01	2.26E+02	4.30E+01	7.50E+00	3.36E+00	6.27E-02	-1.37E+04
Consumption of renewable primary energy resources used as raw materials	MJ	1.55E+03	0.00E+00	0.00E+00	1.55E+03	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	3.30E+04	2.65E+01	7.22E+02	3.37E+04	3.55E+00	4.30E+01	2.26E+02	4.30E+01	7.50E+00	3.36E+00	6.27E-02	-1.37E+04
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	7.94E+04	1.85E+03	7.85E+03	8.91E+04	2.67E+02	5.82E+02	3.06E+03	5.82E+02	5.23E+02	2.34E+02	0.00E+00	-2.57E+04
Consumption of non-renewable primary energy resources used as raw materials	MJ	4.63E+02	0.00E+00	8.19E+02	1.28E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.86E-02	1.52E-03	-9.83E+00
Total consumption of non-renewable primary energy resources	MJ	7.99E+04	1.85E+03	9.11E+03	9.08E+04	2.67E+02	5.82E+02	3.06E+03	5.82E+02	5.23E+02	2.34E+02	7.22E+00	-3.05E+04
Consumption of secondary materials	kg	1.77E+02	6.20E-01	8.22E-01	1.79E+02	0.00E+00	5.30E-02	2.79E-01	5.30E-02	1.75E-01	7.86E-02	1.52E-03	-9.83E+00
Consumption of renew. secondary fuels	MJ	7.36E+00	6.84E-03	3.72E-03	7.37E+00	0.00E+00	2.95E-04	1.55E-03	2.95E-04	1.93E-03	8.66E-04	3.96E-05	-7.67E-04
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.70E-01	2.47E+00	4.70E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater	m^3	7.53E+01	2.33E-01	2.36E+01	9.91E+01	1.23E-02	1.58E-01	8.28E-01	1.58E-01	6.58E-02	2.95E-02	7.90E-03	-1.45E+03

Table 6 Life cycle assessment (LCA) results for contact wires – waste categories (DU: 1 km)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Hazardous waste	kg	1.57E+02	2.08E+00	9.28E+01	1.66E+03	6.56E-04	6.00E-03	3.16E-02	6.00E-03	5.87E-01	2.63E-01	7.67E-03	-5.61E+01
Non-hazardous waste	kg	1.75E+03	3.69E+01	4.17E+02	1.79E+04	1.29E+01	3.12E-01	1.64E+00	3.12E-01	1.04E+01	4.67E+00	1.08E-01	-6.84E+03
Radioactive waste	kg	3.51E-02	1.38E-04	2.53E-03	3.77E-02	1.70E-03	4.35E-04	2.29E-03	4.35E-04	3.90E-05	1.75E-05	4.79E-05	-3.33E-02
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	0.00E+00
Materials for recycling	kg	3.84E+00	5.73E-03	1.06E+02	1.10E+02	0.00E+00	6.00E-04	3.16E-03	6.00E-04	1.62E-03	7.26E-04	1.44E-05	-9.38E-01
Materials for energy recovery	kg	2.56E-02	4.63E-05	9.41E-05	2.57E-02	0.00E+00	5.25E-06	2.76E-05	5.25E-06	1.31E-05	5.87E-06	1.71E-07	-1.68E-03
Exported Energy	MJ	6.14E+01	0.00E+00	6.41E+00	6.78E+01	0.00E+00	1.73E+00	9.10E+00	1.73E+00	0.00E+00	0.00E+00	0.00E+00	-1.10E+02

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+A2 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 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 v 1.6. (2023) General Product Category Rules for Construction Products
- EN 50693:2019 - Product category rules for life cycle assessments of electronic and electrical products and system
- Ecoinvent 3.10 data set, https://ecoinvent.org/
- EN 60228 Conductors of insulated cables
- 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
- KOBiZE Wskaźniki emisyjności CO_2, SO_2, NOx, CO i pyłu całkowitego dla energii elektrycznej. Grudzień 2022

Signature Not Verified
Dokument podpisany przez Michał Piasecki; ITB
Data: 2024.10.02 13:46:49 CEST

Instytut Techniki Budowlanej

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00-611 Warsaw, Filtrowa 1

Thermal Physics, Acoustics and Environment Department
02-656 Warsaw, Ksawerów 21

CERTIFICATE № 614/2024
of TYPE III ENVIRONMENTAL DECLARATION

Products:

Cu, CuAg contact wires

Manufacturer:

TELE-FONIKA Kable S.A.

ul. Hipolita Cegielskiego 1, 32-400 Myślenice, 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 March 2024 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, March 2024