

ENVIRONMENTAL SELF-DECLARATION

In accordance with ISO 14021

Copper wire rod with low-carbon copper



The result presented in this document are taken from a LCA performed in accordance with ISO 14040:2006 and ISO 14044:2006 LCA standards. The document is also verified according to ISO 14021:2016.

Publication date: 2023-08-23

Version: 1.01

Third party verifier:

Håkan Stripple, IVL Swedish Environmental Research Institute
(Hakan.Stripple@IVL.se)

Company Information

Owner of the document: Elcowire AB,
Elektrogatan 20
SE-251 09 Helsingborg, Sweden

The document owner has the sole ownership and responsibility.

Contact information: Jonas Ciardi
+46 707 614 726
jonas.ciardi@elcowire.com

Description of the organisation: With an annual production of 300 000 tonnes, Elcowire is one of the largest manufacturers in Europe of copper wire rod, wires, stranded conductors, profiles and overhead catenary systems made from copper, copper alloys and aluminum.

Elcowire also manufacture aluminum conductors, rectangular wire, and profiles for electrical purposes. The production plants are located in Helsingborg, Sweden and in Hettstedt, Germany.

Elcowire is driven by the power of continuous improvement – and always with the customer in focus. The result is high quality products, reliability, attention to details and a strong technical partnership. Our business is divided in five units: Rod, Rail, High Voltage, Specials and Wire & Strands.

Product-related or management system-related certifications: ISO 14001 and ISO 9001

Name and location of production site(s): The production plants are located in Helsingborg, Sweden and in Hettstedt, Germany. This document only concerns the production plant in Helsingborg.

Difference versus previous versions

Figur 2, representing the system boundaries for the study has been updated regarding mode of transportation in module A2 to properly reflect what has been calculated. The result is the same as previous version.

Low-carbon copper

Elcowire offer customer to buy low-carbon copper products. Low-carbon copper is made possible through production that has undergone a substantial transformation due to electrification and automation of various stages of the process. The Low-carbon Copper has also been made possible by a very efficient ore concentration process and a world-class green energy mix. The result is copper wire rods that has a low impact on nature and the climate.

The significantly lower CO₂ emissions of the Low-carbon Copper are verified through several validation processes. The reporting protocol that was used for verification is the Greenhouse Gas Protocol – Product Life Cycle Accounting and Reporting Standard. The product was also validated and reviewed against the general principles in ISO 14064-3 Standard.

Mass Balance calculations are used by Elcowire, which enables manufacturing and increasing the circularity of products without making complicated changes of their production infrastructure. In this case, copper with lower CO₂-emissions is, within the production environment, mixed with other copper causing them to no longer be traceable directly to the source. However, by tracking the amount of each input material and the amount of product output, it is possible to estimate the amount of each input material that is used in the production of the final product.

This document provides information of the environmental impact for *copper wire rod produced with low-carbon copper*.



Product information

Product name: Copper wire rod with low-carbon copper

Product description: : Copper wire rod is produced from grade A copper cathodes in Helsingborg, Sweden. The product is continuously casted and rolled according to EN-1977 and ASTM B 49 standards or according to customer specifications. The product can be further refined by extrusion or drawing.

- For the purpose of drawing, the circular rod is produced in the following dimensions: 8.0, 10.0 and 12.4 mm.
- For the purpose of extrusion, the circular rod is produced in the following dimensions 8.0, 10.0, 12.4, 15.6 and 19.6 mm.

In Table 1, the specification for the rod is presented and in Figure 1, a picture of the product is shown.

Table 1. Specifications of copper wire rod made for further refinement through drawing or extrusion.

Specification Designation	ASTM B49 C11000 ETP C11040	EN 1977 ETP CW 004A	EN 1977 ETP1 CW 003A
Resistivity (nWm)	max 17.24	max 17.24	max 17.07
Elongation (%)	min 30	min 30	min 30
Tolerance of diameter, mm	± 0.38	± 0.4	± 0.4
Oxygen content, ppm	100-650	100-400	100-400

Product identification:

- ASTM B49 Copper Redraw Rod for Electrical Purposes
- EN 1977 Copper and copper alloys – Copper drawing stock (wire rod)

UN CPC code: 415

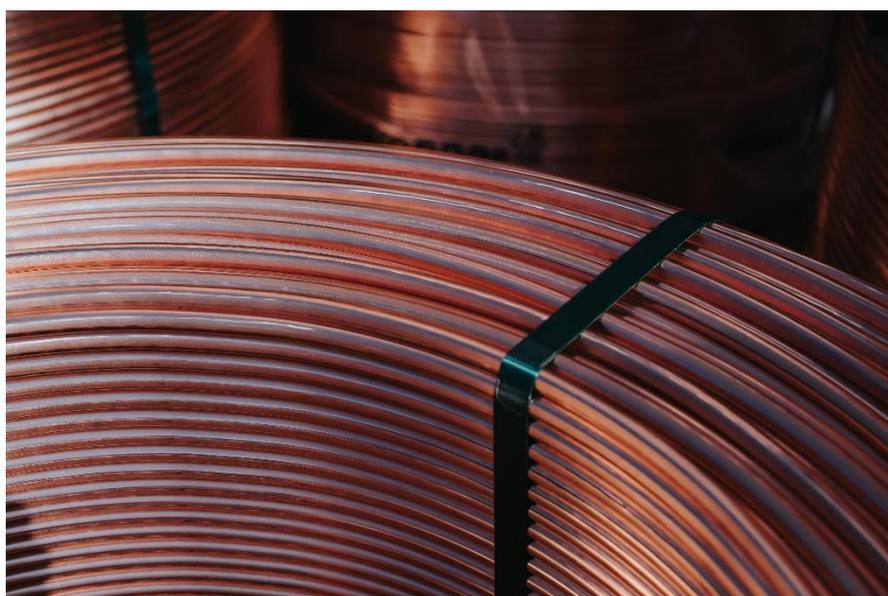


Figure 1 Representative picture of copper wire rod.

LCA Information

Declared unit: 1 kg of copper wire rod.

The environmental declaration includes copper wire rod in the following dimensions: 8.0, 10.0, 12.4, 15.6 and 19.6 mm.

Packaging material consist of plastic and corrugated cardboard.

Time representativeness: Data are representative for production year 2021. For materials, energy and transports, generic industry data from Ecoinvent have been used.

Databases and LCA software used: Ecoinvent 3.8 and SimaPro 9.1.1.1.

Description of system boundaries: Cradle to gate with modules C1–C4 and module D (A1–A3 + C + D)¹. See **Fel! Hittar inte referenskälla.** for a representation of the system boundaries and modules declared.

Estimates and assumptions: Heat, electricity and other energy use as well as waste in the production are calculated as a weighted average per produced tonne of all products using yearly production data for 2021. No assumptions made.

Cut off criteria: All major materials, production energy use and waste are included. Materials less than 1 % weight in the product are not taken into account.

Data quality: The data quality can be described as fair for waste estimations and transports and good for other data. The primary data collection has been done thoroughly and all relevant flows are considered.

Dangerous substances: No dangerous substances from the candidate list of SVHC for authorization are included in the products.

System boundaries:

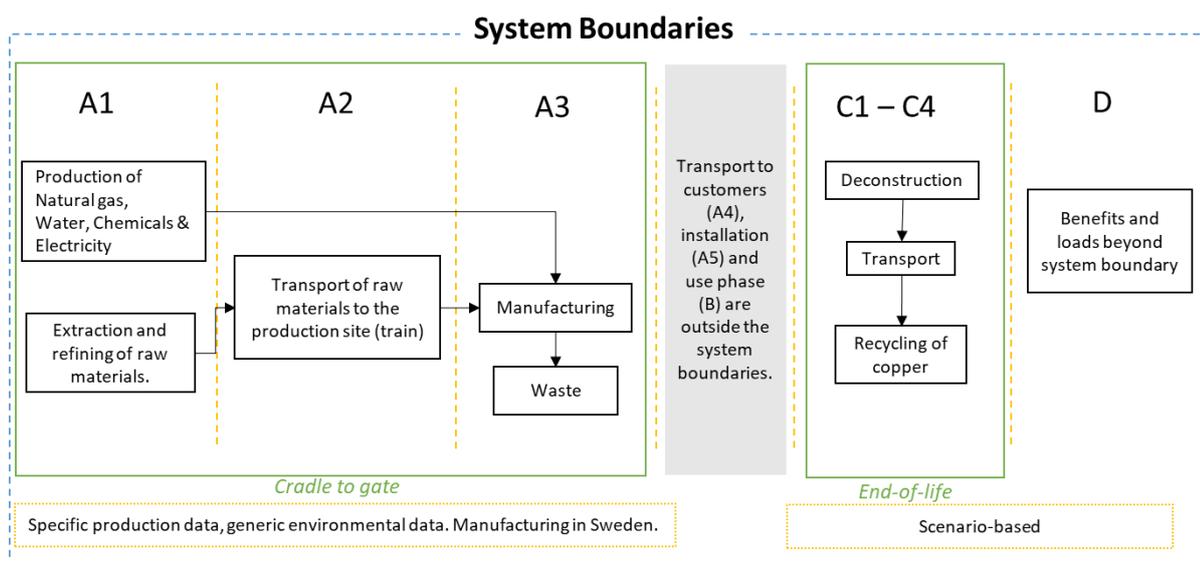


Figure 2. System boundaries.

¹ Equal to EPDs produced in accordance with the EN 15804:2012+A2:2019 standard.

Scenario Based Calculation

Module C and D are calculated based on a scenario.

Module C – Only the copper is taken into consideration in module C, therefore there is no impact in C1.

The copper is assumed to be transported 100 kilometers by a Euro 5 truck from the site to a recycling centre (C2). This is a conservative approach. As only the copper is being considered, no processing before recycling is necessary.

In C3, the packaging of the product is assumed to be incinerated.

No disposal occurs for the products, thus there is no impact in C4.

Module D – All copper goes to recycling and the packaging is incinerated. The recycled copper replace copper made of virgin material and the incinerated packaging assumes to contribute with electricity to the European electricity grid. Therefore, both materials contribute positively beyond the system boundary.

Environmental Information

Potential environmental impact

Results per kg copper wire rod, LCC										
Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	1.38E+00	1.99E-02	1.64E-01	1.57E+00	0.00E+00	1.74E-02	1.01E-04	0.00E+00	-6.80E+00
GWP-biogenic	kg CO ₂ eq.	1.21E-02	1.97E-04	2.09E-03	1.44E-02	0.00E+00	9.21E-06	1.46E-04	0.00E+00	-1.74E-02
GWP-luluc	kg CO ₂ eq.	4.08E-03	2.95E-05	2.00E-04	4.31E-03	0.00E+00	7.08E-06	2.18E-09	0.00E+00	-1.02E-02
GWP-total	kg CO ₂ eq.	1.40E+00	2.02E-02	1.66E-01	1.58E+00	0.00E+00	1.74E-02	2.47E-04	0.00E+00	-6.83E+00
ODP	kg CFC 11 eq.	1.51E-07	2.06E-09	2.61E-08	1.79E-07	0.00E+00	3.83E-09	7.99E-13	0.00E+00	-4.38E-07
AP	mol H ⁺ eq.	5.19E-02	1.50E-04	3.78E-03	5.58E-02	0.00E+00	7.19E-05	5.88E-08	0.00E+00	-1.70E-01
EP-freshwater	kg P eq.	1.35E-03	5.88E-06	1.79E-04	1.54E-03	0.00E+00	1.31E-06	7.41E-09	0.00E+00	-1.19E-01
EP-marine	kg N eq.	1.53E-02	4.98E-05	2.03E-04	1.56E-02	0.00E+00	2.12E-05	3.10E-08	0.00E+00	-4.88E-02
EP-terrestrial	mol N eq.	2.44E-01	5.38E-04	2.23E-03	2.47E-01	0.00E+00	2.31E-04	2.65E-07	0.00E+00	-7.09E-01
POCP	kg NMVOC eq.	4.60E-02	1.56E-04	7.10E-04	4.68E-02	0.00E+00	7.04E-05	6.57E-08	0.00E+00	-1.37E-01
ADP-minerals&metals*	kg Sb eq.	4.07E-03	2.69E-07	9.83E-05	4.17E-03	0.00E+00	5.92E-08	1.81E-11	0.00E+00	-2.39E-03
ADP-fossil*	MJ	2.27E+01	4.12E-01	2.62E+00	2.57E+01	0.00E+00	2.56E-01	6.46E-05	0.00E+00	-7.71E+01
WDP	m ³	8.30E-01	5.66E-03	6.90E-01	1.53E+00	0.00E+00	8.86E-04	1.29E-05	0.00E+00	-2.80E+00

Acronyms GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Potential environmental impact

Results per kg copper wire rod, LCC										
Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
GWP-GHG ²	kg CO ₂ eq.	1.46E+00	2.02E-02	1.63E-01	1.64E+00	0.00E+00	1.74E-02	2.47E-04	0.00E+00	-6.70E+00

² The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Use of resources

Results per kg copper wire rod, LCC										
Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
PERE	MJ	1.32E+01	4.43E-01	8.08E-01	1.44E+01	0.00E+00	2.95E-03	2.09E-06	0.00E+00	-3.15E+01
PERM	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
PERT	MJ	1.32E+01	4.43E-01	8.08E-01	1.44E+01	0.00E+00	2.95E-03	2.09E-06	0.00E+00	-3.15E+01
PENRE	MJ	2.38E+01	4.25E-01	2.85E+00	2.71E+01	0.00E+00	2.72E-01	6.99E-05	0.00E+00	-8.22E+01
PENRM	MJ	8.19E-03	0.00E+00	0.00E+00	8.19E-03	0.00E+00	0.00E+00	-8.19E-03	0.00E+00	0.00E+00
PENRT	MJ	2.38E+01	4.25E-01	2.85E+00	2.71E+01	0.00E+00	2.72E-01	-8.12E-03	0.00E+00	-8.22E+01
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	0.00E+00
RSF	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
NRSF	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
FW	m ³	8.34E-01	5.10E-03	6.92E-01	1.53E+00	0.00E+00	8.94E-04	1.30E-05	0.00E+00	-2.77E+00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water									

Waste production

Results per kg copper wire rod, LCC										
Indicator ³	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	0.00E+00	0.00E+00	6.59E-03	6.59E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste disposed	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
Radioactive waste disposed	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

Output flows

Results per kg copper wire rod, LCC										
Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
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
Material for recycling	kg	0.00E+00	0.00E+00	9.98E-03	9.98E-03	0.00E+00	0.00E+00	1.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	1.89E-03	1.89E-03	0.00E+00	0.00E+00	1.94E-04	0.00E+00	0.00E+00
Exported energy, electricity	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	-2.05E-03
Exported energy, thermal	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

Information on biogenic carbon content

Results per kg copper wire rod, LCC		
BIOGENIC CARBON CONTENT	Unit	QUANTITY
Biogenic carbon content in product	kg C	0
Biogenic carbon content in packaging	kg C	1.74E-05

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO₂.

³ All waste flows are managed within the system limits in Ecoinvent processes, which is why there is 0 kg of waste under these modules.

References

- ISO 14021:2016 Environmental labels and declarations – Self-declared environmental claims (Type II environmental labelling)
- ISO 14040 Environmental management – Life cycle assessment – Principles and framework. Second edition 2006-07-01
- ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines. Second edition 2006-07-01
- Rasmusson, L. & Domhagen, M. (2023) LCA REPORT OF ELCOWIRE - METHODOLOGY REPORT FOR LOW-CARBON COPPER WIRE ROD AND LOW-CARBON COPPER PROFILE.