Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

Copper Wire Rod

From **Elcowire AB**

Programme:	The International EPD® System, www.environdec.com
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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

General Information

Programme:	The International EPD® System
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CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR 2019:14 Construction products, version 1.11, date 2021-02-16. Un CPC code: 415
PCR review was conducted by: The Technical Committee of the International EPD® System. A full list of members available www.environdec.com. The review panel may be contacted via info@environdec.com.
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification
Third party verifier: Håkan Stripple, IVL Swedish Environmental Research Institute (Hakan.Stripple@IVL.se) Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

Company Information

Owner of the EPD: Elcowire AB,
Elektrogatan 20
SE-251 09 Helsingborg, Sweden
The EPD owner has the sole ownership

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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 EPD only concerns the production plant in Helsingborg.

Product Information

Product name: Copper wire rod.

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.

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

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

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

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. See Table 2 and Figure 2 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.

System boundaries:

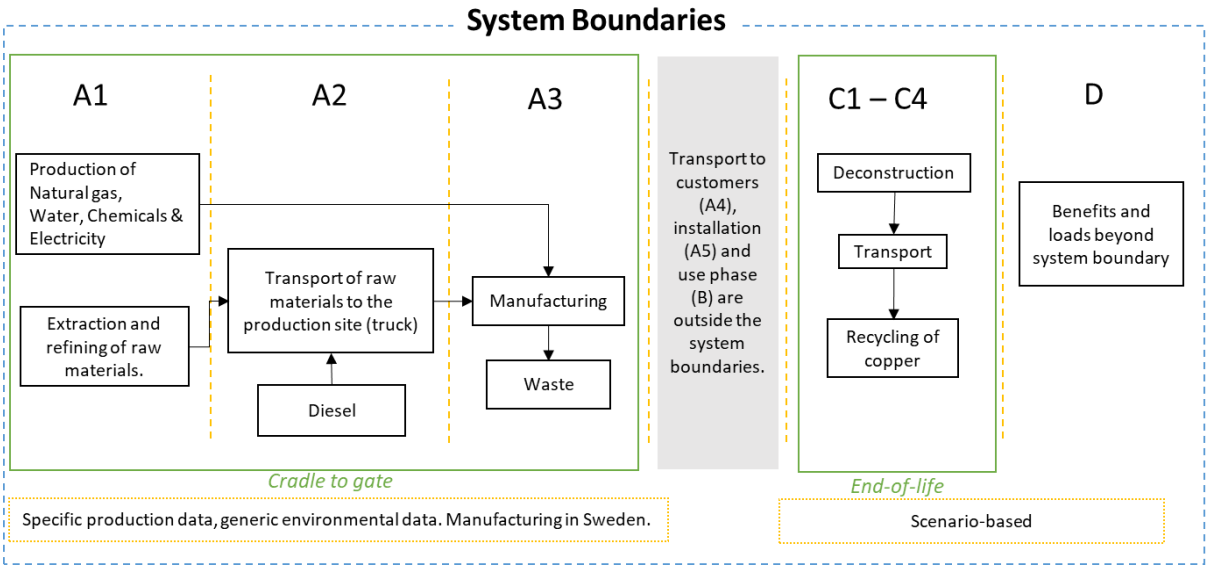

Figure 2. System boundaries.

	Product stage			Construction process stage		Use stage							End-of-life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	SE	-	-	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Specific data used	About 80 %					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	Only one product.					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Only one production site.					-	-	-	-	-	-	-	-	-	-	-	-

Table 2. Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation.

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 – No disposal occurs for the products. All the 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.

Content Information

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Copper	1		
TOTAL	1		

Packaging materials	Weight, kg	Weight-% (versus the product)
Plastic	0.000189	0.0129 %
Corrugated cardboard	0.00000475	0.0005 %
TOTAL	0.000189	

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional or declared unit
TOTAL*			

*No dangerous substances from the candidate list of SVHC for Authorisation

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Results per kg copper wire rod										
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	4.13E+00	3.21E-02	1.64E-01	4.32E+00	0.00E+00	1.74E-02	1.01E-04	0.00E+00	-6.80E+00
GWP-biogenic	kg CO_2 eq.	1.13E-02	1.82E-04	2.09E-03	1.36E-02	0.00E+00	9.21E-06	1.46E-04	0.00E+00	-1.74E-02
GWP-luluc	kg CO_2 eq.	1.56E-02	3.20E-05	2.00E-04	1.58E-02	0.00E+00	7.08E-06	2.18E-09	0.00E+00	-1.02E-02
GWP-total	kg CO_2 eq.	4.15E+00	3.23E-02	1.66E-01	4.35E+00	0.00E+00	1.74E-02	2.47E-04	0.00E+00	-6.83E+00
ODP	kg CFC 11 eq.	3.20E-07	5.01E-09	2.61E-08	3.51E-07	0.00E+00	3.83E-09	7.99E-13	0.00E+00	-4.38E-07
AP	mol H^+ eq.	1.43E-01	1.92E-04	3.78E-03	1.47E-01	0.00E+00	7.19E-05	5.88E-08	0.00E+00	-1.70E-01
EP-freshwater	kg P eq.	1.15E-01	6.28E-06	1.79E-04	1.15E-01	0.00E+00	1.31E-06	7.41E-09	0.00E+00	-1.19E-01
EP-marine	kg N eq.	4.16E-02	6.16E-05	2.03E-04	4.18E-02	0.00E+00	2.12E-05	3.10E-08	0.00E+00	-4.88E-02
EP-terrestrial	mol N eq.	6.09E-01	6.67E-04	2.23E-03	6.12E-01	0.00E+00	2.31E-04	2.65E-07	0.00E+00	-7.09E-01
POCP	kg NMVOC eq.	1.16E-01	1.97E-04	7.10E-04	1.17E-01	0.00E+00	7.04E-05	6.57E-08	0.00E+00	-1.37E-01
ADP-minerals&metals*	kg Sb eq.	2.42E-03	2.87E-07	9.83E-05	2.52E-03	0.00E+00	5.92E-08	1.81E-11	0.00E+00	-2.39E-03
ADP-fossil*	MJ	6.25E+01	5.77E-01	2.62E+00	6.57E+01	0.00E+00	2.56E-01	6.46E-05	0.00E+00	-7.71E+01
WDP	m^3	2.56E+00	5.74E-03	6.90E-01	3.26E+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 – additional mandatory and voluntary indicators

Results per kg copper wire rod										
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	4.14E+00	3.21E-02	1.64E-01	4.34E+00	0.00E+00	1.74E-02	1.01E-04	0.00E+00	-6.81E+00

Use of resources

Results per kg copper wire rod										
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	5.40E+01	3.93E-01	8.08E-01	5.52E+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	5.40E+01	3.93E-01	8.08E-01	5.52E+01	0.00E+00	2.95E-03	2.09E-06	0.00E+00	-3.15E+01
PENRE	MJ	6.56E+01	6.02E-01	2.85E+00	6.90E+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	6.56E+01	6.02E-01	2.85E+00	6.90E+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	2.53E+00	5.25E-03	6.92E-01	3.22E+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									

[1] 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.

Waste production and output flows

Waste production

Results per kg copper wire rod										
Indicator[2]	**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										
Indicator[2]	**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		
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 CO_2.

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

Revision update

Version 2: Update of the result tables to represent the production mix of Copper wire rod at Elcowire.

References

- General Programme Instructions of the International EPD® System. Version 3.01.
- PCR 2019:14 Construction products, version 1.11, date 2021-02-16.
- Rasmusson, L. and Isbring, E. (2023) LCA REPORT OF ELCOWIRE.

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