Environmental Footprint Declaration Aurubis Copper Cathode

This document presents an environmental footprint declaration based on the results of a life cycle assessment (LCA) of Aurubis copper cathodes, developed in accordance with ISO 14040 and ISO 14044 standards and the principles of ISO 14025. No applicable Product Category Rules (PCR) were available at the time of publication.

1. General information

Product name	Copper cathode
Declared unit	1 metric ton of copper cathode
Manufacturer	Aurubis
Production site(s)	Weighted average of cathodes produced at Hamburg, Pirdop, Olen, Lünen and Beerse plants
LCA	Aurubis supported by Sphera
Publication date	13/10/2025
Time coverage	Reference calendar year 2024
Independent verifier	TÜV NORD CERT Prüf- und Umweltgutachtergesellschaft mbH
Review type	Critical review per ISO 14044 (Clause 6)

2. Methodology and scope

Applied standards/guidelines: The study was conducted in accordance with the ISO 14040 (ISO 14040:2021 Environmental management — Life cycle assessment — Principles and framework) and ISO 14044 (ISO 14044:2021 Environmental management — Life cycle assessment — Requirements and guidelines) LCA standards and the Environmental Footprint impact assessment method (3.1). The study is consistent with the methodology adopted by the International Copper Association.

Functional unit: 1 metric ton of copper cathode at plant gate.

System boundaries: Cradle-to-gate analysis of copper cathode production including mining, concentration, transport, smelting, refining and associated processes. Excludes packaging, downstream use, and end-of-life.

Allocation procedures: Allocation was applied in the life cycle inventory of copper cathodes to fairly account for the wide range of co-products (in line with the International Copper Association guidance/copper environmental profile).

3. Product

Product description: The copper cathode is a high-purity form of copper, typically 99.99 % pure.

Technical properties/applications: Complies with the ASTM B 115, Grade 1, DIN EN 1978 and Cu-KATH-1 cathode standards. Copper is used for the production of high-quality products for various applications. Copper's properties make it the material of choice for wires, cables and electrical equipment.

Expected service life: 50+ years (dependent on downstream application, e.g., in construction or electronics)

4. Environmental performance — impact results (per 1 metric ton copper cathode)

Impact Category	Unit	Result
Climate change	kg CO_2 eq	1,289
Ozone depletion	kg CFC-11 eq	0.00000001
Human toxicity, cancer effects[1]	CTUh	0.0000009
Human toxicity, non-cancer effects[1]	CTUh	0.00002
Particulate matter	Disease incidences	0.0002
Ionizing radiation	kBq U235 eq	73.8
Photochemical ozone formation	kg NMVOC eq	8.4
Acidification	mol H+ eq	11.5
Eutrophication (terrestrial)	mol N eq	33.5
Eutrophication (freshwater)	kg P eq	0.011
Eutrophication (marine)	kg N eq	3.1
Ecotoxicity (freshwater)[1]	CTUe	6,882
Land use[1]	Pt	5,317
Water use	m^3 world eq	1,378
Resource use, energy carriers	MJ	15,080
Resource use, mineral and metals[1]	kg Sb eq	0.98

[1] Impacts are not sufficiently robust and accurate to be used for metals.

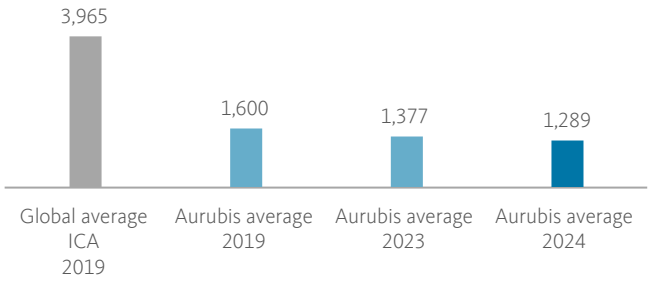
5. Environmental performance improvement and comparison with global average

The following graphs show the environmental improvements achieved by the company between 2019, 2023 and 2024 for copper cathode production.

They also compare the environmental impact of Aurubis copper cathode with global average values. Global average data was sourced from the environmental profile for global copper cathode published by the International Copper Association.

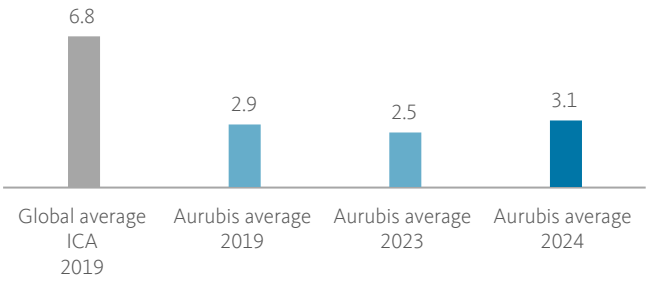
Carbon footprint

in kg CO_2 eq/t CU



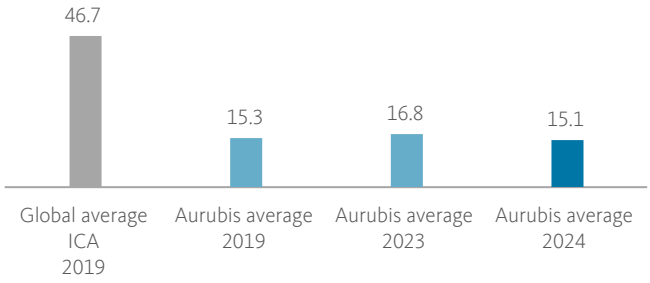
Eutrophication, marine

in kg N eq/t Cu



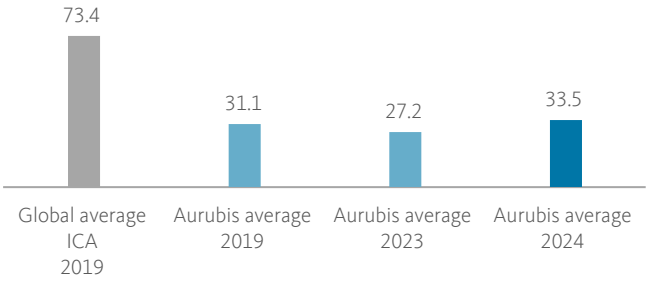
Resource use, fossils

in GJ/t Cu



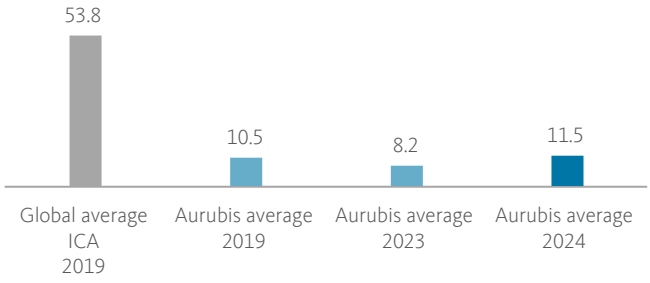
Eutrophication, terrestrial

in mole N eq/t Cu



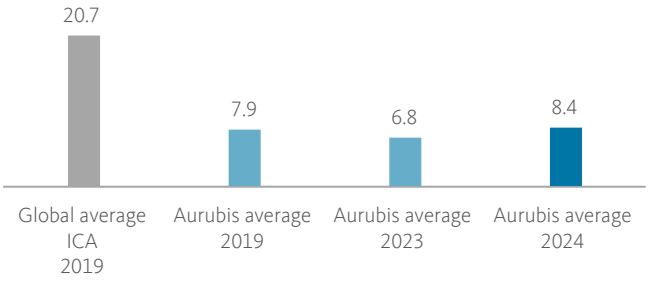
Acidification

in mole H+ eq/t Cu



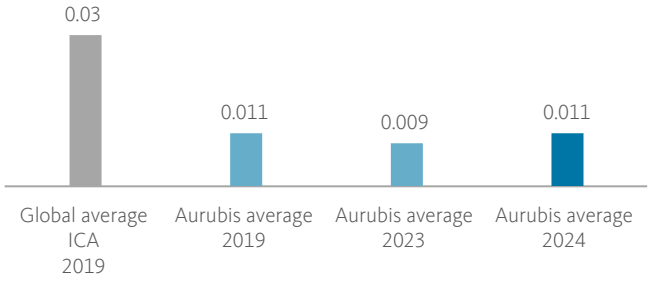
Summer smog

in kg NMVOC eq/t Cu



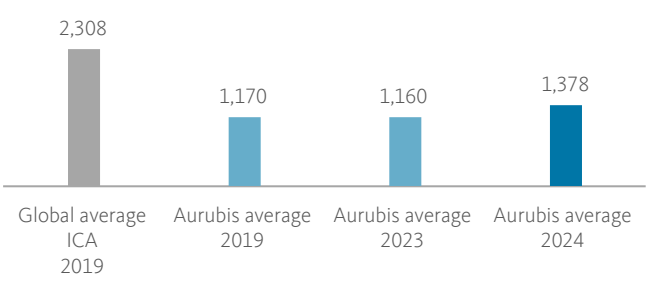
Eutrophication, freshwater

in kg P eq/t Cu



Water use

in m^3 world eq/t Cu



6. Additional environmental information

Recycled content: The recycled content of copper cathode production for calendar year 2024 was 44 %. The recycled content has been verified by TÜV Nord Cert based on ISO 14021.

Environmental labels/Certifications: All cathode producing sites are certified to ISO 14001 , ISO 50001, and The Copper Mark.

7. Interpretation and conclusions

The impact of copper cathodes is dominated by concentrate (mining and concentration) and purchased blister. Emissions associated with purchased electricity and grid mix also play an important role. The improvements achieved reflect changes in energy sources, increasing recycled content, process optimization, and increased energy and operational efficiency.

The environmental impacts of the Aurubis copper cathode are significantly lower than the global industry average from the International Copper Association for all impact categories.

The updated environmental impact of Aurubis copper cathode for 2024 is lower than the profile from the baseline year 2019 for climate change and resource use, fossils. This is mainly due to continuous efforts to reduce direct emissions, lower emission factors per ton of copper in concentrate, and a higher share of renewable electricity. For the other impact categories, we saw slightly higher impact in 2024 compared to the previous year due to a lower share of impacts allocated to anode slime because of lower precious metals content.

8. Verification

Verification type	Critical review in accordance with ISO 14040 (2021) and ISO 14044 (2021)
Verifier name & organization	Dr. Winfried Hirtz, Michael Sommer
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Date of verification	2/10/2025

The review confirmed that the LCA complies with the applicable standards and is scientifically and technically valid.

9. Disclaimer

This declaration has not been issued under a program operator and has not been verified in accordance with a PCR because none is available. The information is provided for transparency and B2B communication purposes.

10. Annexes

A. LCA Report

B. Benchmarking Information (Environmental profile of global copper cathode, https://internationalcopper.org/wp-content/uploads/2023/05/ICA-LCI-GlobalSummary-202305-F.pdf

C. Results as per ISO 15804

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