RECYCLED CONTENT IN COPPER:

PRACTICAL DEFINITIONS FOR REAL-WORLD APPLICATIONS

Cu Copper Development Association Inc.

STANDARDIZING ESG METRICS FOR TRANSPARENCY, COMPARABILITY, AND CIRCULAR ECONOMY GOALS

version 1.0

Table of Contents

Executive Summary

The copper industry has aligned on a consistent, transparent approach to recycled content reporting. At the core of this statement is a clear rule: scrap reused within the semi fabrication casting process is excluded, while scrap generated after the casting process is counted as recycled content. This principle ensures comparability across manufacturers and supports fair, transparent reporting.

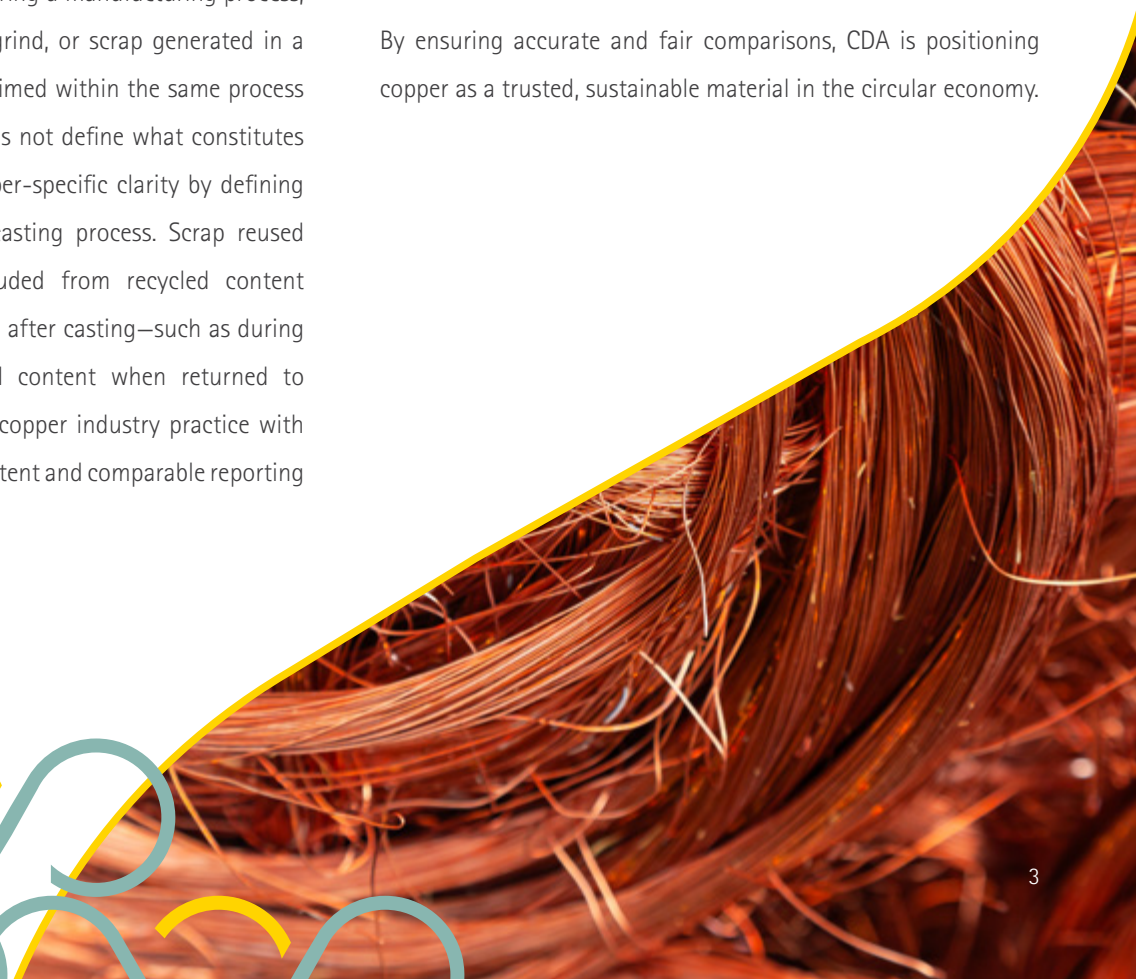
The Copper Development Association (CDA) has established a copper-specific framework that defines how scrap is counted, setting the semi-fabrication casting boundary as the common point of reference. This framework builds on universal environmental management standards such as ISO 14021 and ISO 59020, which provide the foundation for recycled content reporting. By interpreting these standards through copper-specific terminology and processes, CDA removes ambiguity and ensures consistent, comparable reporting across manufacturers.

ISO 14021:2016 defines recycled content as the proportion, by mass, of recycled material in a product or packaging, specifying that only pre-consumer and post-consumer materials may be considered. It defines pre-consumer material as material diverted from the waste stream during a manufacturing process, but explicitly excludes 'rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it.' Because ISO does not define what constitutes a 'process,' CDA has provided copper-specific clarity by defining the process as semi-fabrication casting process. Scrap reused within casting is therefore excluded from recycled content calculations, while scrap generated after casting—such as during metalworking—counts as recycled content when returned to casting. This interpretation aligns copper industry practice with ISO principles while ensuring consistent and comparable reporting across manufacturers."

This process-based definition provides a clear and defensible cutoff for reporting recycled content, a critical need for vertically integrated operations where scrap can move across multiple stages. By consistently drawing the line between casting and metalworking, CDA has established a transparent benchmark that ensures manufacturers are evaluated on equal terms and that customers can make accurate, comparable assessments across diverse supply chains.

This paper provides clarity for evaluating recycled content in copper products, enabling fair comparisons between copper suppliers. When choosing between materials more broadly, however, companies should also consider product design and end-of-life performance, which strongly influence circularity.

By ensuring accurate and fair comparisons, CDA is positioning copper as a trusted, sustainable material in the circular economy.



Introduction:

The Need for Standardized Recycled Content Reporting

Customers increasingly seek products with high recycled content as part of their sustainability strategies. While the concept seems straightforward, calculating recycled content is complex—and without standardized boundaries, results are inconsistent and difficult to compare.

In practice, different reporting approaches have allowed similar scrap flows to be treated differently. A company that performs certain processes internally may exclude that scrap, while another company outsourcing those processes might later count the same material as recycled content. Such variations undermine comparability and can confuse customers when evaluating suppliers.

To address this, CDA members have aligned on a copper-specific interpretation of existing standards. CDA has clarified how recycled content is defined in copper production, ensuring that scrap is treated consistently regardless of operational structure. This alignment eliminates ambiguity, strengthens transparency, and enables fair supplier-to-supplier comparisons across the copper industry.

Defining the Semi-Fabrication Casting Boundary

The semi-fabrication casting boundary refers to the dividing line between two core stages in the copper product manufacturing process: casting and metalworking. This boundary is used to determine how internally recycled material—commonly referred to as run-around scrap—is classified in recycled content calculations.

Casting is the initial phase of semi-fabrication, where primary copper (such as cathode) and high-quality scrap are melted and solidified into intermediate forms such as cakes, slabs, or billets. These cast forms are then transferred into the metalworking stage, where they are shaped and refined into near-final products through processes like rolling, drawing, or extrusion.

Defining the Semi-Fabrication Casting Boundary (continued)

The casting boundary defines the point at which scrap generated during metalworking, if returned to casting, qualifies as recycled content. By drawing the boundary at the conclusion of the casting process:

- Scrap generated after casting (e.g., trim scrap, swarf, or offcuts from metalworking) is counted as recycled content if it is reintroduced into casting.
- Scrap generated during casting (e.g., furnace clean-out, head/tail scrap, scrap created when cutting to size, grinding of rough edges and other surface treatment) is excluded from recycled content calculations as it does not cross the boundary.

This boundary-based approach aligns with ISO guidance, which excludes materials reused within the same process from being counted as recycled content. Also, in accordance with ISO 14021 and ISO 14040, a process is defined as a "set of interrelated or interacting activities that transforms inputs into outputs." Under this definition, casting constitutes a distinct process because it transforms inputs—such as virgin metal and scrap—into outputs like cakes, slabs, or billets. Metalworking, in turn, transforms those cast formats into finished or near-finished products through rolling, extrusion, or drawing. By defining casting and metalworking as distinct processes, the CDA enables consistent and fair treatment of post-casting scrap across all manufacturers, regardless of operational structure.

This interpretation is also fully consistent with EN 45557:2020 General method for assessing the proportion of recycled material content in energy related products (Annex A.5.2, Metals), which provides additional guidance on defining the process boundary for metals manufacturing. EN 45557 confirms scrap produced in downstream operations – such as rolling, forming, extrusion, finishing, or machining – may not be recycled within those process steps and is therefore considered pre-consumer material when returned to casting.

Concerns About Scrap Manipulation

A common concern in discussions about recycled content reporting is whether manufacturers might intentionally generate additional scrap during production to artificially inflate recycled content percentages. This concern stems from the assumption that higher reported recycled content automatically translates to better sustainability performance. However, in reality, manufacturers have strong financial and operational incentives to minimize scrap, making intentional scrap generation an impractical and counterproductive strategy.

"Why scrap manipulation is unlikely given business realities of minimizing scrap"

Scrap production is inherently a cost burden rather than a benefit. Excess scrap leads to higher material costs, additional handling and processing expenses, and increased energy consumption associated with remelting and reworking. In industries like copper, where material efficiency is a key driver of profitability, companies continuously optimize their processes to reduce scrap generation rather than increase it. Any scrap that does arise is typically a byproduct of necessary shaping and precision manufacturing, rather than an intentional effort to boost recycled content percentages.

Higher scrap rates do not necessarily indicate lower process efficiency. In many cases, copper products, such as precision-engineered components, require tighter tolerances and additional shaping. While this can result in greater scrap generation, that extra processing often enhances the performance and efficiency of the systems these products serve. When evaluated across the full life cycle, the use-phase savings from a more efficient system typically outweigh the incremental impacts of generating and recycling additional scrap

By clearly defining which materials count toward recycled content and which do not, CDA's framework prioritizes comparability, accuracy, and integrity in sustainability disclosures.

Conclusion:

Strengthening Transparency and Fairness in Recycled Content Reporting

Standardized recycled content reporting strengthens transparency, credibility, and fairness across the copper industry. With this framework, the industry has resolved long-standing questions around run-around scrap by defining the semi-fabrication casting boundary as the point of reference. This alignment builds directly on ISO standards while providing the copper-specific clarity needed for consistent application across manufacturers.

Through direct engagement with product councils, CDA has achieved industry alignment across key product groups, ensuring that scrap generated after casting—such as during metalworking—is consistently recognized as recycled content. This achievement provides customers, regulators, and other stakeholders with confidence that recycled content claims are measured on equal terms.

Looking ahead, CDA will continue leading efforts to communicate these methodologies to buyers, regulators, and stakeholders. Recycled content reporting is one essential element of transparency in material sourcing, but true circularity also depends on product design and end-of-life recyclability. By establishing this foundation and reinforcing copper's leadership in responsible material reporting, the industry is positioning copper as a trusted, sustainable material of choice in the circular economy.

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- Technical Review Statement -

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Authored by: Jessica Sanderson

Reviewers: Christoph Koffler, PhD – Technical Director, Sphera

Scope of the Technical Review

The goal of the Technical Review was to assess whether the proposed method is consistent with the international standards ISO 14021, ISO 14040, ISO 59020, and EN 45557 and is technically valid.

This technical review shall not be misconstrued to be a formal conformity assessment with these standards as the document under review is neither a case study nor does it contain any actual environmental claims or recycled content calculations for specific products.

This review statement is only valid for the specific report titled “RECYCLED CONTENT IN COPPER: PRACTICAL DEFINITIONS FOR REAL-WORLD APPLICATIONS” in its first version.

Technical Review Process

The review was conducted by exchanging comments and responses using a spreadsheet based on Annex A of ISO/TS 14071:2014.

The review was carried out between 10/06/2025 (receipt of draft document) and 11/20/2025 (delivery of the final review statement). There was one formal round of comments on the draft version of the report. A copy of the final review report containing all written comments and responses has been provided to the study commissioner along with this review statement.

The overall review was conducted in an equitable and constructive manner. The reviewer would

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like to highlight the good and constructive collaboration with the authors of the study. All comments were addressed and all open issues resolved. There were no dissenting opinions held by any of the involved parties upon finalization of the review.

Conclusion

Based on the revised document, it can be concluded that the proposed method is consistent with the international standards ISO 14021, ISO 14040, ISO 59020, and EN 45557, and that it is technically valid.

Christoph Koffler, PhD
11/20/2025

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