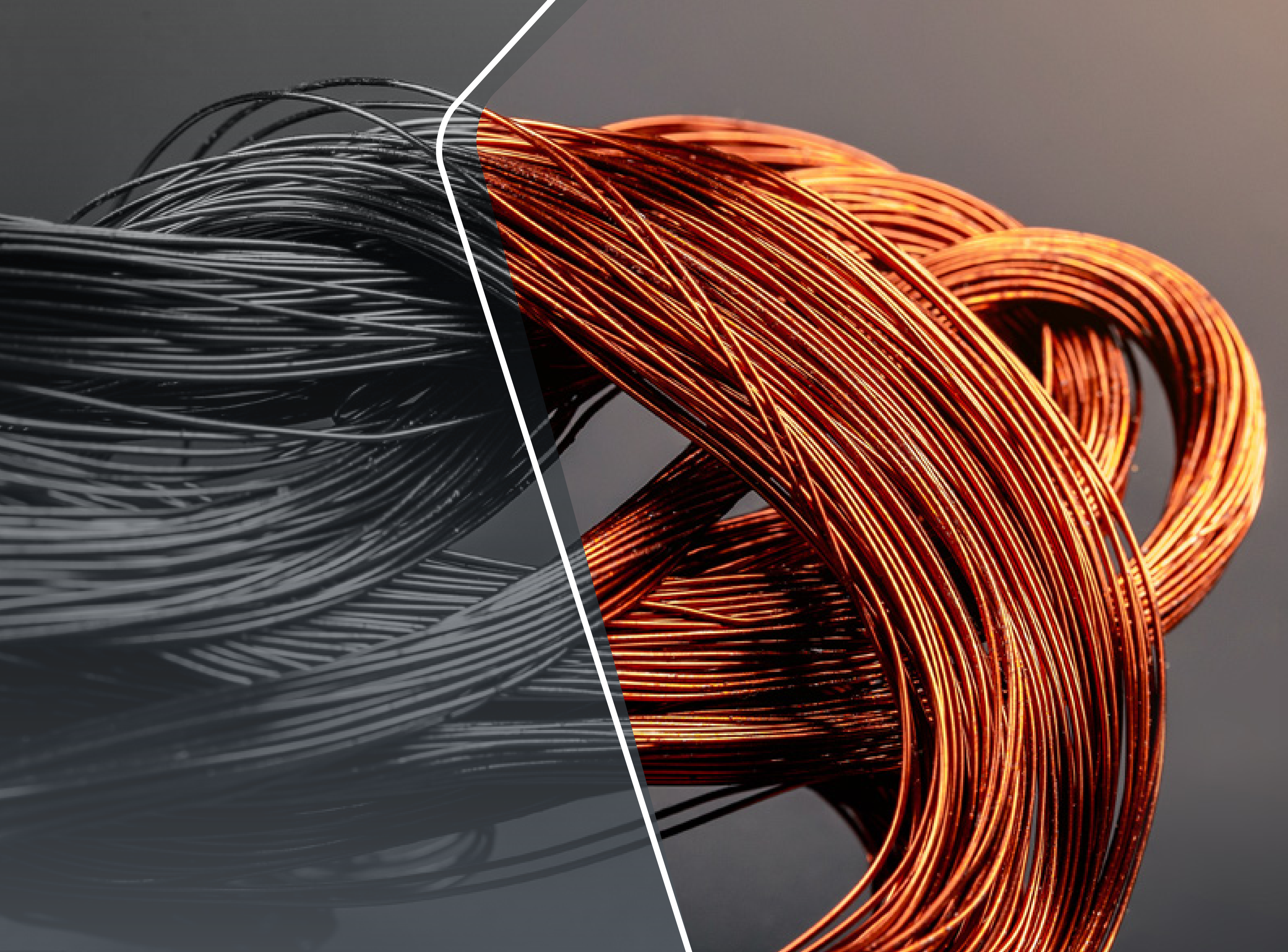


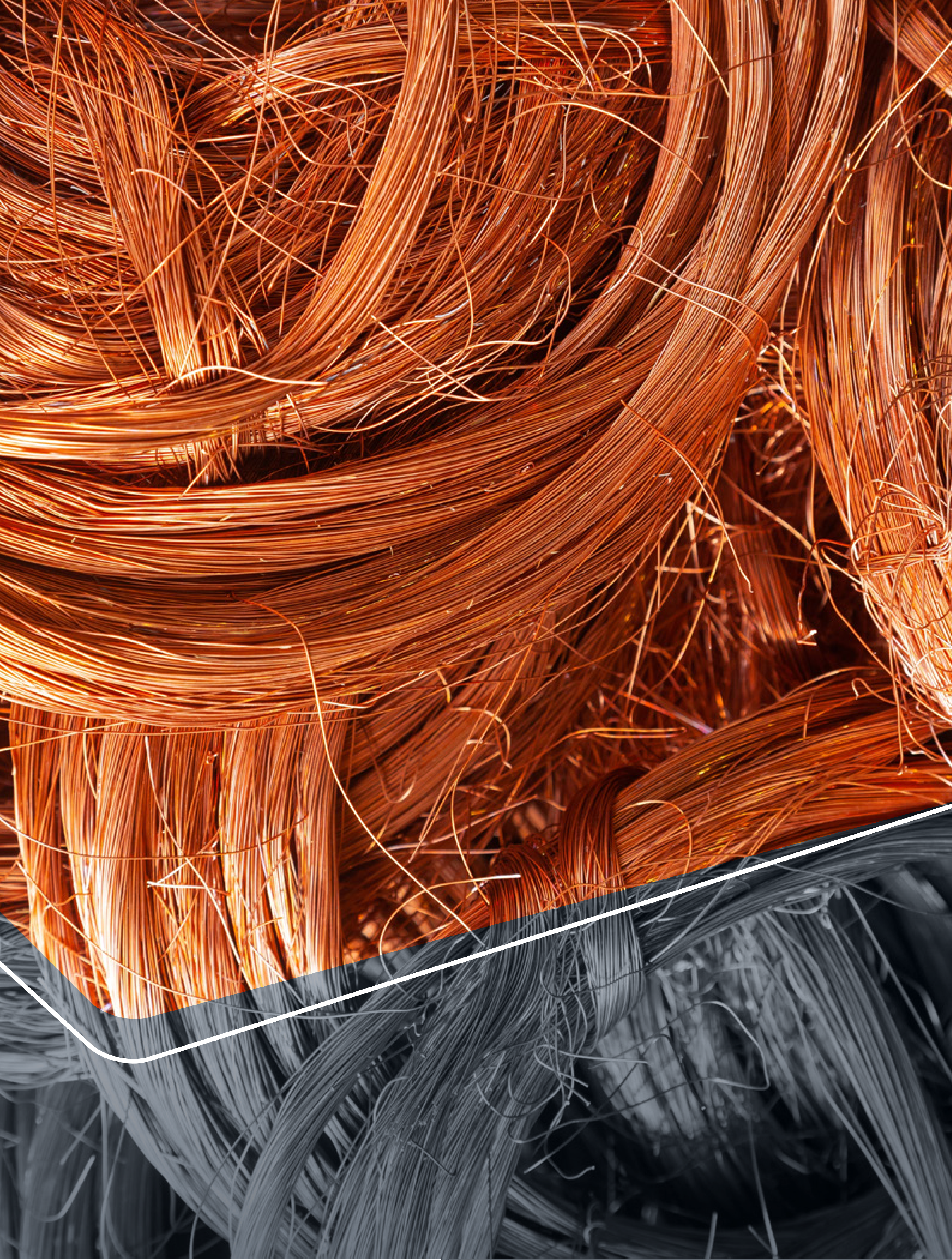
CDA Scrap Accounting **Guidance**

Ensuring Consistency in Product Carbon Footprints

Cu Copper Development Association Inc.

This guidance provides Copper Development Association (CDA) member companies with consistent recommendations for scrap carbon accounting, supporting clarity, comparability, and credibility in product-level disclosures while strengthening copper's circularity and industry sustainability reputation

version 1.0



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1. INTRODUCTION

Consistent treatment of scrap in carbon accounting supports the credibility of product carbon footprint disclosures. CDA supports the cut-off approach as the preferred method for product-level disclosures in business-to-business (B2B) reporting.

In our sector, we use one method to account for scrap generation, reuse, and end-of-life recovery - to ensure clear documentation and alignment across the supply chain. This results in less confusion, comparable data and improves acceptance by customers, regulators, and other stakeholders. In the copper industry, where scrap plays an essential role in production and circular material flows, the need for consistent, credible carbon accounting is especially urgent. Semi-fabricators face increasing pressure to provide reliable product-level carbon data, and we have answered common questions:

- How should scrap be treated in product carbon footprints?
- When and where are recycling benefits recognized?
- What documentation and data are needed for consistent, credible reporting?

This guidance offers practical recommendations for how CDA member companies will account for scrap in product carbon footprints in a way that is:

- Technically rigorous and clearly documented,
- Defensible in external reporting and review, and
- Consistent across copper production routes and facilities.

This will support confidence and comparability in supplier data while minimizing complexity and the risk of double-counting. By establishing a clear and consistent approach to scrap, member companies will assure the credibility of their ESG disclosures and better communicate the environmental performance of copper-based products.

The CDA supports members in applying internationally recognized carbon accounting methods, while addressing real-world data challenges, supply chain variability, and evolving demands for transparency.

This document outlines practices for how CDA member companies will account for scrap in product carbon footprints, including cradle-to-gate and full life cycle assessments. By aligning common principles and disclosures, CDA members further the industry's reputation for transparent sustainability claims, prepare for upcoming regulatory shifts, and unlock competitive advantage through credible reporting. Growing expectations for consistent carbon footprint reporting from customers, regulators, and investors make it essential that the copper industry agrees on a common method.

2. PURPOSE & SCOPE

The purpose of this guidance document is to provide clear and consistent guidelines for how CDA members account for scrap in product-level carbon footprinting. By aligning shared approaches, member companies ensure the credibility and comparability of their environmental disclosures, supporting customer trust, meeting evolving expectations, and strengthening the industry's reputation for transparent sustainability claims.

The scope of this guidance applies to both cradle-to-gate and full life cycle product carbon footprints, recognizing that different disclosure needs may arise across reporting contexts. It is designed primarily for technical, sustainability, and reporting teams responsible for product carbon footprinting, greenhouse gas (GHG) accounting, environmental product declarations (EPDs), and life cycle assessments (LCAs).

Importantly, this document also serves as a forward-looking resource, helping companies prepare for emerging regulatory, customer, and market expectations related to climate reporting, product carbon footprinting, and data transparency.

3. SCRAP IN CARBON ACCOUNTING — KEY CONCEPTS

Scrap plays a central role in copper production — setting of the system boundary is important to carbon footprinting of scrap and emissions reporting. This section introduces the foundational concepts relevant to scrap accounting, including system boundaries, the role of scrap, and the standards that shape reporting expectations.

3.1 Carbon Footprinting and System Boundaries

A product carbon footprint quantifies the greenhouse gas (GHG) emissions associated with a product's life cycle — from raw material extraction through manufacturing, use, and end-of-life. A system boundary defines which parts of this journey are included in the calculation.

Two common boundary types are:

- Cradle-to-gate: Includes emissions from raw material extraction through production, ending when the product leaves the facility.
- Cradle-to-grave: Extends through use, maintenance, and end-of-life treatment (e.g., recycling, disposal).

At first glance, these may appear straightforward — but in practice, even "cradle-to-gate" boundaries can vary significantly. The copper value chain includes multiple "gates" (e.g., casting, metal working, finishing, machining, assembly, installation), each representing a transformation that adds economic, technical, and performance value. Each step adds some GHG emissions — but in many cases, these processes enable system-level efficiency in the final application.

For example, precision extrusion or surface treatments may consume energy during production, but they often enable longer service life, better conductivity, or lower total system emissions during use. These use-phase benefits are only captured in full life cycle assessments and are often overlooked in simplified B2B cradle-to-gate disclosures.

That's why it's essential to be clear about where the system boundary is drawn and what's included. Within semi-fabrication, CDA distinguishes three possible gates: (1) Semi-Fabrication: Casting — when copper is cast into billets, cakes, slabs, or bars; (2) Semi-Fabrication: Metal Working — when those cast forms are further processed into semi-finished products such as tube, rod, strip, or plate; and (3) End-Use Manufacturing — when semi-fabricated products are converted into finished goods or assemblies. A cradle-to-gate footprint should therefore specify the exact gate: for example, a billet represents a semi-fabrication casting gate, while an extruded tube represents a semi-fabrication metalworking gate. These definitions are provided in the Glossary (Appendix C) and reflected in the standardized communication sheet (Appendix A).

These guidelines provides consistent definitions so that cradle-to-gate footprints are clearly understood and supplier comparison becomes possible.

3.2 Role of Scrap in Metal Production and Circularity

Scrap is a constant feature of copper production, not an exception. It flows through many processes and can exit or re-enter the system at multiple points.

With this guideline ,carbon footprinting is transparent and consistent, whether scrap is reused internally or sold externally.

3.3 Relevant Standards and Frameworks

A number of recognized standards provide guidance on scrap treatment in carbon footprinting:

- ISO 14067 – Product Carbon Footprint specification
- ISO 14040 / 14044 – LCA principles, allocation rules
- GHG Protocol Product Standard – Emphasizes boundary setting and allocation transparency
- ISO 21930 and EN 15804 + A2 – Applies to EPDs; includes Module D for end-of-life credits
- GHG Protocol Scope 3 Standard – Relevant for evaluating scrap flows across supply chains

While these frameworks offer flexibility, they can lead to inconsistent application without industry-specific guidance. This document supports copper fabricators in applying these standards in a way that is technically robust, clearly documented, and aligned with industry realities.

4. CDA'S APPROACH TO SCRAP ACCOUNTING

CDA supports the cut-off approach for business-to-business product disclosures. This section outlines recognized methodologies, provides CDA's standard for use, and assures transparent documentation.

4.1 Recognized Scrap Accounting Methodologies

CDA recommends the cut-off approach as the most appropriate method for semi-fabricators reporting cradle-to-gate product carbon footprints. Under this method, recycled inputs enter the system burden-free at a single point of recognition—the casting stage— where the benefit of using scrap is realized through the absence of any assigned upstream primary production burden beyond collection and sorting. This approach supports consistency and enables more transparent and comparable product disclosures across the supply chain. Unlike other approaches that distribute recycling effects across multiple stages or manufacturers, the cut-off method simplifies accounting by recognizing recycled inputs at a single, well-defined point in the production chain.

While other methods are recognized within LCA practice and may still be required by product category rules, comparative life cycle assessments, or environmental product declaration (EPD) frameworks, they pose specific challenges when applied to copper fabrication. These challenges are outlined below.

Alternative methodologies exist within LCA practice, including substitution, Module D, and co-product allocation, but they present challenges when applied to fabricated copper products. Substitution and Module D rely on assumptions about future recycling outcomes, which are uncertain and can lead to inconsistent application of benefits across supply chains. For clarity, the substitution approach described in this guidance refers to end-of-life recycling and the associated avoided burdens of primary copper production. It does not apply to scrap consumed during manufacturing, which—consistent with the cut-off and Module D approaches—enters the system free of any upstream primary material burden. This reflects a substitution approach implemented through a net scrap calculation rather than a value-of-scrap model, in line with current life-cycle practice. They also depend on the datasets used: burdens may vary significantly depending on whether global, regional, or supplier averages are applied. Co-product allocation also presents difficulties, as different rules — whether based on mass, economic value, or other factors — can lead to widely varying results, making transparency essential but comparability difficult. In practice, applying a co-product allocation approach to scrap is also inconsistent with how scrap is typically treated under waste and LCA frameworks. According to ISO 21930:2017, burdens should be allocated to the primary product when it is unclear whether an output is a co-product, by-product, or waste. Because copper scrap is often classified as a waste stream rather than a co-product in these contexts, allocating upstream burdens to it would not be appropriate. Moreover, determining a fair allocation would require detailed data on the specific multi-output processes that generated the scrap—information that is rarely available or verifiable in downstream manufacturing settings.

These issues are compounded in copper fabrication, where scrap can arise at multiple stages of the value chain and often reappears in successive iterations of processing across different fabricators. Because these cycles extend across multiple companies, ensuring consistent application is especially difficult in practical terms.

By contrast, the cut-off approach avoids these complications because it applies a clear and consistent rule for where recycled inputs are recognized—at the casting stage—and does not rely on assumptions about future recycling outcomes or allocation between co-products. This provides clarity, comparability, and a practical framework that can be applied uniformly across companies. For these reasons, it is chosen by CDA members as the preferred method, with further details provided in the following section.

4.2 CDA Guidance: Use Cut-off for Business-to-Business Disclosures

CDA recommends that member companies use the cut-off approach as the standard method for business-to-business (B2B) product disclosures. This method is widely accepted for product-level reporting, straightforward to apply, and aligned with customer expectations for supplier carbon data. By assigning the recycling benefit at a single defined point in the value chain—the casting stage—the cut-off approach provides clarity on where benefits are realized, ensures suppliers using similar scrap inputs report comparable results, and prevents the double-counting that can occur when benefits are split across multiple gates. In practice, it delivers consistent, credible disclosures while avoiding the uncertainty of projecting downstream recycling outcomes.

When other methodologies (e.g., Substitution or Module D) are required by standards or customers, companies should document assumptions transparently and report recycling credits separately from the core footprint.

4.3 When to Apply Other Methods

In some cases – such as Environmental Product Declarations (EPDs), studies comparing competitive materials that may be likely impact the recycling rate, or publicly disclosed life cycle assessments (LCAs) – other methodologies may be required.

- Module D is commonly mandated in EPDs (e.g., per ISO 21930 and EN 15804).
- These methods can provide useful insights for policymakers and customers but require more detailed assumptions about future recycling systems.

4.4 Accounting for End-of-Life Recycling Activities

End-of-life recycling activities cover the preparatory steps that make post-consumer copper scrap ready for remelting or refining. These steps include:

- Collecting and transporting scrap to a recycling facility,
- Dismantling or disassembly to remove major contaminants,
- Shredding and sorting to separate copper from other materials, and
- Compacting or briquetting for efficient handling and delivery to a foundry or refiner.

The emissions from these activities are small compared to the overall life cycle of copper. They mainly arise from transport fuel and electricity used in shredding, sorting, and compacting. For clean and straightforward scrap streams (e.g., plumbing tube), values from established databases (such as EcoInvent) are typically sufficient. For more complex scrap (e.g., motors or electronics), supplier engagement is important to capture additional energy use and uncertain yields.

End-of-life recycling activities are modeled under ISO 21930EN and EN 15804+A2 and related standards, which provide a consistent way to calculate the balance between the substitution credit for displaced primary copper production and the small burdens of recycling preparation. The standard expresses this balance mathematically to ensure that benefits are reported consistently across products and industries.

According to EN 15804+A2, the environmental burdens and benefits of exported secondary material are calculated as:

$$e_{module\ D1} = \sum_i \left(M_{MR\ out}\Big|_i - M_{MR\ in}\Big|_i\right) \cdot \left(E_{MR\ after\ EoW\ out}\Big|_i - E_{VMSub\ out}\Big|_i \cdot \frac{Q_{R\ out}}{Q_{Sub}}\Bigg|_i\right)$$

$M_{MR\ out}$	amount of material exiting the system that will be recovered (recycled and reused) in a subsequent system. This amount is determined at end-of-waste point and is therefore equal to the output flow of "materials to recycling [kg]" reported for modules A4, A5, B and C;
$M_{MR\ in}$	amount of input material to the product system that has been recovered (recycled or reused) from a previous system (determined at the system boundary);
$E_{MR\ after\ EoW\ out}$	specific emissions and resources consumed per unit of analysis arising from material recovery (recycling and reusing) processes of a subsequent system after the end-ofwaste state
$E_{VMSub\ out}$	specific emissions and resources consumed per unit of analysis arising from acquisition and pre-processing of the primary material, or average input material if primary material is not used, from the cradle to the point of functional equivalence where it would substitute secondary material that would be used in a subsequent system
$Q_{R\ out}\ /\ Q_{Sub}$	quality ratio between outgoing recovered material (recycled and reused) and the substituted material.

Takeaway:
even if recycling-prep burdens were doubled, the overall Module D credit would only shift by about one to two percent. The substituted primary production credit remains the dominant factor.

This formulation highlights two central points: first, that credits are only available for the net flow of scrap (the difference between what goes in and what comes out); and second, that the avoided burden of primary copper production dominates the calculation, while recycling prep contributes only a small adjustment. This ensures that the benefits of recycling are captured without overstating their scale or double-counting across the value chain.

Under this framework, the system boundary for scrap entry is defined at the point of scrap generation. At this stage, scrap carries the upstream burdens of collection, sorting, and preparation but does not carry any primary production burden. In plain language, when looking at the impact of recycling prep, you take the large "net savings" from substituting for primary copper production and subtract the small "cost" of preparing scrap for reuse. Because the preparation step is so small compared to the savings, the end result is still very close to the full avoided burden.

Think of it like this: if avoiding primary copper is like saving $100 (because secondary material is $100 cheaper than primary material), the cost of preparing scrap might only be $1–$2. Even if that cost doubled to $2–$4, you would still be saving around $96–$99. The overall picture doesn't change much—the savings are significantly bigger than the preparation costs.

For copper, the burden of preparing scrap for recycling (collection, dismantling, sorting, etc.) is believed to fall in the range of 1–2% of the avoided primary burden.

Recycling-prep burden as % of avoided primary	If doubled, credit changes by...
1–2%	≈ 1–2%

Overall, accounting for end-of-life recycling activities is a small but necessary element in capturing copper's true circularity, ensuring that collection and preparation steps are consistently included in life-cycle assessments. Although Module D primarily reports end-of-life recycling, under EN 15804 and ISO 21930 any manufacturing scrap that leaves the production system and reaches the end-of-waste state is treated the same way—its burdens and substitution credits are included in the Module D calculation.

4.5 Documentation of Boundaries, Data, and Assumptions

Regardless of methodology, companies should:

- Clearly define the system boundary (cradle-to-gate vs. cradle-to-grave) identifying the specific gate,
- Identify all data sources, including emissions factors and regional/global averages versus supplier specific,
- Disclose key assumptions such as recycling rates, scrap quality, and material losses.

When declaring a cradle-to-gate footprint, companies should indicate which gate applies (semi-fabrication casting, semi-fabrication metalworking, or end-use manufacturing) using the definitions in the Glossary and the options in the customer communication sheet. This ensures clarity for customers and consistency across disclosures.

Consistent documentation improves transparency and enables credible, comparable disclosures across the copper industry.

5 DATA QUALITY AND SOURCE CONSIDERATIONS

Accurate and transparent scrap accounting depends not only on the choice of methodology but also on the quality, traceability, and representativeness of data. This section outlines key considerations for evaluating scrap inputs, estimating recyclability, and addressing supply chain risks in a way that supports credible product carbon footprinting.

5.1 Scrap material composition, traceability, and quality

Scrap characteristics are key drivers of both technical feasibility and carbon accounting outcomes. While the selected methodology determines how emissions and credits are assigned, the underlying data about the scrap itself determines whether those values are accurate and credible. According to the GHG Protocol Product Standard, companies must ensure that product carbon footprints reflect actual product specifications and input data "representative of the specific processes and materials used." This includes:

- **Material composition:** Other materials, coatings, contamination, or variability in copper concentration which can all influence the energy intensity of processing.
- **Scrap traceability:** When scrap is purchased from third parties, limited visibility into origin, processing history, or quality may introduce uncertainty into footprint calculations.
- **Processing requirements:** High-quality scrap (e.g., No. 1 scrap) may require minimal reprocessing, while mixed or contaminated scrap often requires additional cleaning, sorting, or refining steps, increasing emissions.

In the context of product carbon footprinting:

- Under the Cut-off Approach, purchased scrap is assumed to enter the system with zero upstream primary material burden. However, it is still critical to verify that the scrap is fit for intended use, as additional processing (e.g., refining, alloy adjustment) may shift the emissions profile within the cradle-to-gate boundary.
- Under Substitution or Module D approaches, end-of-life scrap generates a credit only if the recovered material is expected to displace primary production. In these cases, scrap quality and functional equivalence become especially important: low-quality or non-substitutable scrap may not justify the full credit.

While this guidance does not prescribe fixed rules for traceability thresholds, it encourages CDA members to:

- Document the source and processing pathway for purchased scrap whenever possible, and
- Assess whether the scrap quality meets the technical requirements of its intended application.

Transparent scrap data supports stronger product disclosures and prepares companies for evolving regulatory expectations and third-party verification processes.

5.2 Recyclability assumptions and recovery rates

Under the cut-off approach, end-of-life recycling is not modeled. Companies only receive a benefit for the recycled content actually used as input at the casting stage. No additional benefits are assigned based on recycling rates or future end-of-life outcomes. This keeps cradle-to-gate disclosures straightforward and avoids uncertainty about downstream recycling systems.

By contrast, Module D (required in Environmental Product Declarations under EN 15804) accounts for the avoided burdens of end-of-life recycling. These assumptions depend on several factors:

- **Recovery rate:** The proportion of copper that can be technically and practically recovered during recycling.
- **Collection rate:** The likelihood that products are directed into recycling systems rather than disposal streams.
- **Market readiness:** The existence of infrastructure, technology, and business practices that enable effective recovery.

Recyclability depends strongly on product design, end-of-life pathway, and scrap characteristics. For example:

- **High recyclability:** Products such as plumbing tube, building wire, or other large, clean, and homogenous copper components. These are easy to separate, have established markets, and can be recovered without significant processing.
- **Lower recyclability:** Products embedded in complex assemblies—such as electronics, small motors, or consumer goods—where copper is present in small quantities, difficult to separate, or contaminated by coatings and attachments.

The waste stream into which a product enters at end-of-life also influences recyclability outcomes. Here, processing efficiency describes the share of copper that is actually recovered once material has entered a recycling system. It reflects real-world losses that occur during collection, sorting, shredding, and refining.

Assumptions can be informed by data such as that published by the Fraunhofer Institute in the Dynamic Analysis of Global Copper Flows. Global Stocks, Postconsumer Material Flows, Recycling Indicators and Uncertainty Evaluation, which supports the mass flow model of the copper industry developed by the International Copper Association (ICA) and estimates processing efficiency by waste stream:

Processing efficiency of EoL scrap	Recovery rate
C&D (Construction & Demolition)	93%
MSW (Municipal Solid Waste)	1%
WEEE (Electrical & Electronic Equipment)	73%
ELV (End-of-Life Vehicles)	76%
IEW (Industrial Electrical Equipment Waste)	91%
INEW (Industrial Non-Electrical Equipment Waste)	78%

In practice, this means that construction and industrial equipment streams achieve the highest copper recovery, while municipal solid waste has almost no recovery potential.

In general, clean and concentrated forms of copper scrap (large size, high purity, easily separable) are more likely to achieve high recovery rates, while dispersed or contaminated forms face greater barriers to recycling.

5.3 CDA guidance on assessing scrap quality for Module D reporting

Module D credits are only appropriate when end-of-life recycling is feasible, and the recycled output is technically capable of substituting primary copper. If the recovered material is of low quality or highly contaminated, it may not substitute for primary production and therefore should not receive the full substitution credit.

When evaluating Module D credits, companies should consider factors such as cleanliness, alloy compatibility, and contamination levels to determine the magnitude of the credit. For example, clean plumbing tube scrap can often be directly reintroduced into semi-fabrication with minimal treatment, whereas copper recovered from small electronics may require significant refining and yield lower substitution potential.

It is also important to assess whether the recovered material has a realistic reuse pathway in comparable applications. Scrap that is functionally equivalent to primary copper — such as No. 1 copper scrap or large, homogeneous industrial components — is far more likely to displace virgin inputs than mixed or low-grade fractions.

By applying transparent and consistent quality considerations, members can ensure that Module D reporting reflects copper's real circularity benefits without overstating avoided burdens. Under EN 15804 +A2, the quality ratio ($Q_{r(out)} / Q_{(sub)}$) is applied to the recovered output material to scale the avoided primary burden, reflecting the technical performance of the recycled output relative to the substituted virgin material. While CDA encourages members to consider scrap quality when evaluating realistic recovery and substitution potential, the formal quality ratio in Module D calculations is applied to the recovered output rather than the input scrap. In practice, this means that while high-quality scrap increases the likelihood of achieving a high-quality output, the actual scaling of credits depends on the characteristics of the recovered material entering reuse.

5.4 Recommended data sources

Reliable carbon accounting depends on the quality of emission factors and material flow data. CDA recommends sourcing data from:

- The Copper Environmental Profile, published by the International Copper Association (ICA) which features the results of ICA's copper cathode Life cycle Assessment (LCA), the most representative and comprehensive industry global data set on copper cathode and concentrate to be made publicly available to date.
- ISO 14044 conformant LCA datasets (e.g., Ecoinvent, Sphera MLC)
- Supplier-specific Environmental Product Declarations (EPDs) or verified disclosures.

5.5 Ensuring Consistency in Scrap Accounting Across Product Lines

Consistency in how scrap is treated across product lines and in the use of methodologies or assumptions is critical to credibility by customers, verifiers and comparability across the industry.

CDA's guidance is to:

- **Apply the cut-off methodology across all product categories.**
- **Use uniform assumptions for scrap inputs and end-of-life outputs.** Recycling rates, recovery rates, and scrap quality assumptions should be consistently applied within and across product assessments to avoid selective results.
- **Methodology selection:** Use only the cut-off method. Methodology changes should be justified by external requirements (e.g., EN 15804 for EPDs) or well-documented internal policies.
- **Document rationale for any deviations.** Where customers, regulations, or product category rules mandate a different approach, companies should transparently document why the deviation occurred, what assumptions were used, and how results differ from the standard internal approach.
- **Comparability across facilities.** By using the cut-off method a company that operates multiple plants or business units can roll up results, benchmark and communicate with confidence at the enterprise level.

Consistent application reduces the risk of misinterpretation, supports alignment with customer expectations, and strengthens the credibility of disclosures across the copper industry. Over time, it also reduces internal complexity, as staff can rely on a single, standardized approach rather than recalculating assumptions for every product line.

6 RECOMMENDED PRACTICES FOR MEMBER COMPANIES

CDA member companies play a critical role in credible and consistent copper product carbon disclosures. While methodologies provide the technical framework, the day-to-day practices of data collection, documentation, and communication determine whether those disclosures are trusted and comparable. The following practices are recommended to ensure that product carbon footprints involving scrap are defensible, transparent, and aligned across the industry.

6.1 Internal documentation of data and assumptions

Strong internal traceability is the foundation of credible reporting. Companies should maintain clear records of the methodology selected, the system boundaries applied, and the data sources used — whether global datasets, supplier-specific factors, or default values. Assumptions about scrap type, origin, and recyclability should also be recorded. In practice, this means developing a centralized documentation process that can be referenced for audits, customer requests, or regulatory reviews. Companies that update these records regularly ensure consistency and ensure continuity when staff or reporting systems change.

6.2 Consistent application of methodologies across products

Equally important is the consistent application of the chosen methodology across product categories and facilities. Deviations should only occur when required by external frameworks such as EPDs or customer specifications, and in those cases the rationale should be documented and explained. By aligning assumptions — for instance, using the same recovery rates or treatment of purchased scrap — companies can present a coherent story across product lines, and strengthen customer trust, and avoid the perception of "method shopping."

6.3 Transparent communication with customers

Finally, transparent communication closes the loop between internal practices and external reporting. Customers increasingly expect disclosures that explain not just the numbers, but also the underlying assumptions. Clear statements about system boundaries (cradle-to-gate vs. cradle-to-grave) and the end-of-life allocation approach chosen allow downstream users to correctly interpret supplier data in their own Scope 3 calculations. Providing this information in plain language, supplemented by summary tables or explanatory notes, helps bridge the gap between technical rigor and customer understanding.

Strong documentation, consistent application, and transparent communication reinforce each other. Together, they avoid customer confusion, simplify verification, and strengthen the copper industry's collective reputation for credible and responsible reporting.

6.4 Standardized Customer Communication Sheet

To ensure comparability across the supply chain, CDA recommends that member companies follow a standardized customer communication sheet when sharing product carbon footprint (PCF) information that involves scrap.

A shared format ensures that all disclosures are presented in a consistent, transparent, and easily interpretable way. By centering communication on a common format, companies can provide both the calculated values and the explanatory context customers need to use the data appropriately in their own reporting.

The disclosure should:

- Clearly identify the system boundary (e.g., cradle-to-gate vs. cradle-to-grave).
- State which scrap accounting methodology has been applied (Cut-off, Module D, Substitution, or Co-product allocation).
- Provide the product carbon footprint result (kg CO_{2e} per functional/declared unit) with an indication of whether recycling credits are included.
- Summarize key assumptions, such as recycled content, recovery rates, and scrap quality.
- Reference this CDA Scrap Accounting Guidance for definitions and interpretation.

This format is intended to be customer-facing, bridging the gap between technical rigor and practical understanding. CDA encourages members to use this format consistently across all copper product categories. A sample disclosure has been provided as Appendix A. ISO 14026 serves as the recognized international standard for communicating product carbon footprint information and can be considered the gold standard for ensuring transparency and consistency in footprint disclosures. To align with the transparency principles in ISO 14067 and ISO 14026, companies may benefit from developing a supporting product carbon footprint (CFP) study or methodology report when communicating footprint results externally. Providing such documentation demonstrates conformance with international standards and helps avoid misinterpretation or allegations of greenwashing.

APPENDIX A — CUSTOMER COMMUNICATION SHEET TEMPLATE

Product Information	
Product Name	[Product Name]
Data Collection Period	Beginning on [Date] and ending on [Date]
Expiration Date	[Date]
Manufacturing Location(s)	[Location(s)]
Functional/Declared Unit	[i.e. kg of product]
Reference Flow	[Mass or quantity of product required to fulfill the functional/declared unit]

Carbon Accounting Scope & Methodology

System Boundary

Select one: ☐ Cradle-to-Grave ☐ Cradle-to-Gate If cradle-to-gate, please specify gate:

☐ Semi-Fabrication: Casting ☐ Semi-Fabrication: Metal Working ☐ End-Use Manufacturing

Additional system boundary notes: ______________________________

Scrap Accounting Approach

Select one: ☐ Cut-off (Recycled Content Method) ☐ Substitution (Avoided Burden Method)

☐ EN 15804/ISO 21930 ☐ Co-Product Allocation (Mass Allocation)

☐ Co-Product Allocation (Economic)

Additional methodology notes: ______________________________

Reported Values

Carbon Footprint

Value: ____________ kg CO_{2e} Note: Report using GWP_{100} (IPCC [AR version]), including fossil, biogenic, LULUC, and aircraft GHG emissions consistent with ISO 14067.

If using EN15804/ISO 21930 indicate which stages are included (select all that apply)

☐ A1 ☐ A2 ☐ A3 ☐ A4 ☐ A5 ☐ B1 ☐ B2 ☐ B3 ☐ B4 ☐ B5 ☐ B6 ☐ B7 ☐ C1 ☐ C2 ☐ C3 ☐ C4

If using EN15804/ISO 21930 Module D or Substitution Net Benefit : __________ kg CO_2e per [functional/declared unit]

Additional methodology notes: ______________________________

Scrap Data and Assumptions

Scrap Inputs

Recycled content in product: ________ %

Recycled content includes scrap sourced from the following copper product lifecycle stages (select all that apply):

☐ Semi-Fabrication: Metal Working ☐ End-Use Manufacturing ☐ End-of-Life ☐ Unknown

Scrap Outputs

End-of-life collection rate assumed: _____ % End-of-life recovery rate assumed: _____ %

End-of-life scrap quality considerations: ______________________________

Reference and Contact Information

This disclosure follows the CDA Scrap Accounting Guidance, which provides industry-specific recommendations for scrap carbon accounting and customer interpretation of results.

Company Contact: ______________________________

Email: ______________________________

APPENDIX B — CUSTOMER NOTE: HOW TO INTERPRET THIS SHEET

This communication sheet is designed to provide clear, consistent, and transparent information about the carbon footprint of copper products, including how scrap is treated in the calculation.

1. What the numbers mean

The carbon footprint shown (kg CO_{2e} per functional/declared unit) reflects the emissions up to the specified system boundary (e.g., cradle-to-gate or cradle-to-grave). It includes direct production emissions plus any burdens related to scrap processing.

2. How scrap is treated

- Cut-off approach (recommended for B2B): Scrap enters burden-free (except for processing). No credit is given for future recycling.
- Substitution or Module D: End-of-life credits may be applied to reflect avoided primary copper production.
- Co-product allocation: Emissions are split between the product and any valuable scrap outputs.

The methodology used is marked clearly on the sheet so you know what is — and isn't — included.

3. Why assumptions matter

- Recycled content shows how much scrap was used in production.
- Recovery rate shows how much copper is assumed to be collected and recycled at end-of-life.
- Scrap quality affects whether the scrap can substitute primary copper directly or needs more processing.

4. How to use this information

- Comparing suppliers? Only compare results reported under the same methodology.
- Scope 3 reporting? Use cradle-to-gate values without recycling credits for consistency across suppliers.
- Need more detail? Refer to the CDA Scrap Accounting Guidance or the supplier contact listed on the sheet.

5. Bottom line

This sheet provides a standardized way to communicate product carbon footprints involving scrap. It ensures consistent, transparent information across suppliers — reducing confusion and strengthening the credibility of copper's sustainability story.

APPENDIX C — GLOSSARY OF KEY TERMS

This glossary defines important terms used throughout the guidance, including:

LIFECYCLE STAGES

End-of-Life - The final lifecycle stage when copper-containing products are retired from use. Activities include collection, dismantling, shredding, sorting, and preparation of scrap into grades suitable for recycling. High-quality recovered scrap is reintroduced to semi-fabrication or secondary copper production, closing the loop of copper's lifecycle and supporting circularity.

End-Use Manufacturing - The lifecycle stage in which semi-fabricated copper products are converted into finished goods or integrated into larger systems. Processes include machining, assembly, joining, surface finishing, and installation. This stage produces the copper-containing products used in buildings, vehicles, electronics, infrastructure, and other applications, and may also generate scrap or off-spec material.

Semi-Fabrication: Casting - The process of melting and solidifying copper (from cathode, scrap, or alloys) into shapes such as billets, cakes, slabs, or bars. Casting prepares copper for subsequent mechanical transformation in metal working and may also involve alloying, impurity removal, or surface preparation. Scrap generated during this stage (e.g., head/tail scrap, furnace clean-out, or off-spec material) can be recycled back into the casting process.

Semi-Fabrication: Metal Working - Mechanical processes that transform cast copper products (such as billets, cakes, slabs, or bars) into semi-finished forms including rod, wire, plate, strip, tube, or sheet. Metal working encompasses rolling, extrusion, drawing, forging, and cutting, and may include intermediate annealing or finishing steps. Scrap generated in this stage (e.g., trim, swarf, or off-cuts) may be reused internally or returned for recycling.

METHODOLOGIES

Co-product Allocation - A methodology that allocates process burdens between a main product and valuable co-products (e.g., externally sold scrap), typically using mass or economic value.

Cut-off Approach (Recycled Content Method) - A methodology where recycled inputs enter the system with no upstream production burden, and credits are applied at the point of use (e.g., casting). Favored for cradle-to-gate reporting due to clarity and comparability.

Module D - An additional reporting module under EN 15804 that captures end-of-life recycling benefits beyond the product system boundary, disclosed separately from cradle-to-gate results.

Substitution (Avoided Burden Method) - A methodology that credits the environmental benefits of recycling by subtracting emissions avoided from displacing primary material. Requires assumptions about recovery rates, market conditions, and substitution quality.

DATA & ASSUMPTIONS

Collection Rate - The proportion of end-of-life products that are directed into recycling systems rather than disposal streams.
Processing Efficiency - The percentage of copper actually recovered once material has entered a recycling system, accounting for losses during sorting, shredding, and refining.

Recovery Rate - The proportion of copper that can be technically and practically recovered during recycling processes.
Recyclability (End-of-Life) - The potential for a product or material to be collected, processed, and reintroduced into production after use. Influenced by design, size, homogeneity, and presence in waste streams.

System Boundary - Defines which processes and life cycle stages are included in a product carbon footprint (e.g., cradle-to-gate, cradle-to-grave).

STANDARDS & FRAMEWORKS

Cradle-to-Gate - A system boundary that includes emissions from raw material extraction through to the point the product leaves the manufacturing facility.

Cradle-to-Grave - A system boundary that extends through use, maintenance, and end-of-life treatment (e.g., recycling, disposal).
Environmental Product Declaration (EPD) - A standardized, verified disclosure of a product's environmental impacts, often requiring Module D reporting under EN 15804.

Life Cycle Assessment (LCA) - A systematic analysis of the environmental impacts of a product across its life cycle, from raw material extraction through production, use, and end-of-life.

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- Technical Review Statement -

CDA SCRAP ACCOUNTING GUIDANCE - Ensuring Consistency in Product Carbon Footprints

Commissioned by: Copper Development Association (CDA)

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 does not represent 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 “CDA SCRAP ACCOUNTING GUIDANCE - Ensuring Consistency in Product Carbon Footprints” 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 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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