worldsteel guidelines for GHG chain of custody approaches in the steel industry

GHG reduction certificates

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worldsteel
ASSOCIATION

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Reference	Published on	Details
Version 1	12/11/2024	Covers the calculation of GHG emission reductions from projects and their use as GHG reduction certificates.

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1. Introduction

The steel industry has a long history of producing life cycle assessments (LCA) and carbon footprints (CFP) of its products[1]. Up until recently, the reductions in greenhouse gas (GHG) emissions[2] by the industry were passed on to customers by being included in an updated CFP. In recent years, the demand for low-carbon products has been increasing and steel companies are looking for ways to best meet the requirements of their customers. In this context, the use of chain of custody approaches to assign GHG emission reductions to specific products can be a useful tool and its use has been increasing in the industry.

Chain of custody is a method in which inputs and outputs and associated information are transferred, monitored and controlled as they move through each step in the relevant supply chain[3]. Chain of custody is an increasingly important method of managing certifications and declarations of safety, sustainability and social compliance for a variety of products. For input material, chain of custody approaches are already commonly used in other sectors such as chemicals, plastics and coffee in terms of their recycled / biobased / 'green' content. These approaches are also increasingly relevant for steel (for example in terms of recycled content or low carbon (ferrous) input material) and will be considered for inclusion in a subsequent version of these guidelines.

This document describes worldsteel's guidelines on the use of GHG chain of custody approaches in the steel industry and their role as a tool during the transition to a decarbonised steel industry. These guidelines provide further details to worldsteel's Principles on this topic, published in April 2024[4]. The aim is to enhance transparency and provide guidance to worldsteel members and stakeholders on how steel companies can apply GHG chain of custody approaches in their organisation on a consistent basis where agreement has been reached.

Our general approach to applying these GHG chain of custody guidelines consists of three steps.

- First, calculate the carbon footprint (CO_2e) of the specific steel products.
- Second, identify GHG emission reduction projects and determine their GHG emission reductions (CO_2e).
- Third, use the emission reductions:
  - by issuing GHG reduction certificates with steel products or,
  - by assigning the reductions to specific products using mass balance.

[1] Steel products include hot-rolled sheets, heavy plates, sections, beams, bars, wire rods, cold-rolled sheets, hot dipped galvanized sheets, electro-galvanized sheets, rail, welded pipes and tubes, forged pipes, seamless pipes and stainless steel.

[2] GHGs include carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6).

[3] ISO 22095: 2020, section 3.1.1

[4] worldsteel Principles on chain of custody in the steel industry.

This first version of the guidelines focuses on the issuance of GHG emission reduction certificates while assigning reductions to specific products will be considered for inclusion in a subsequent version. All steps shall be verified and/or certified by a third-party and systems shall be in place to ensure that the scheme avoids double counting at all costs.

2. Definitions of chain of custody models

Several chain-of-custody models exist and ISO 22095:2020 Chain of Custody – General terminology and models classifies them into five models of which the mass balance and book and claim models have attracted attention as possible solutions that can encourage the use and production of more sustainable materials. The five models are:

Identity preserved model: chain of custody model in which the materials or products originate from a single source and their specified characteristics are maintained throughout the supply chain.

Segregated model: chain of custody model in which specified characteristics of a material or product are maintained from the initial input to the final output.

Controlled blending model: chain of custody model in which materials or products with a set of specified characteristics are mixed according to certain criteria with materials or products without that set of characteristics resulting in a known proportion of the specified characteristics in the final output.

Mass balance model: chain of custody model in which materials or products with a set of specified characteristics are mixed according to defined criteria with materials or products without that set of characteristics.

Book and claim model: chain of custody model in which the administrative record flow is not necessarily connected to the physical flow of material or product throughout the supply chain.

In the context of the steel industry, the GHG chain of custody approaches outlined in these guidelines cannot strictly follow ISO 22095:2020, specifically because the application of chain of custody approaches for GHG emissions was not originally intended when the standard was developed. worldsteel acknowledges the definitions in ISO 22095:2020 and puts them in a broader context. This document describes the process of pooling GHG emission reductions from emission reduction projects implemented by companies. Steel products can then be sold:

- together with certificates that can be used by customers to claim a reduction of their upstream emissions, or
- by assigning the savings to specific products using mass balance. Further detail on this approach will be considered for inclusion in a following version of these guidelines.

These guidelines focus only on the mass balance and book and claim approaches and for these purposes, and based on ISO 22095: 2020, worldsteel uses the following terms and descriptions:

- Mass balance: where emission reductions within an organisation are linked to the product being sold, i.e. there is physical connection within the production chain.
- Book and claim: where emission reductions within an organisation are allocated to any product being sold, i.e. physical connection within the production chain is not necessary.

In both cases, physical connection means that the product line is connected, regardless of whether products are produced at a single site or across multiple sites.

Figure 1 below shows an illustrative example of how mass balance and book and claim chain of custody approaches can be applied in relation to the use of GHG reduction certificates in the steel industry, as outlined in these guidelines.

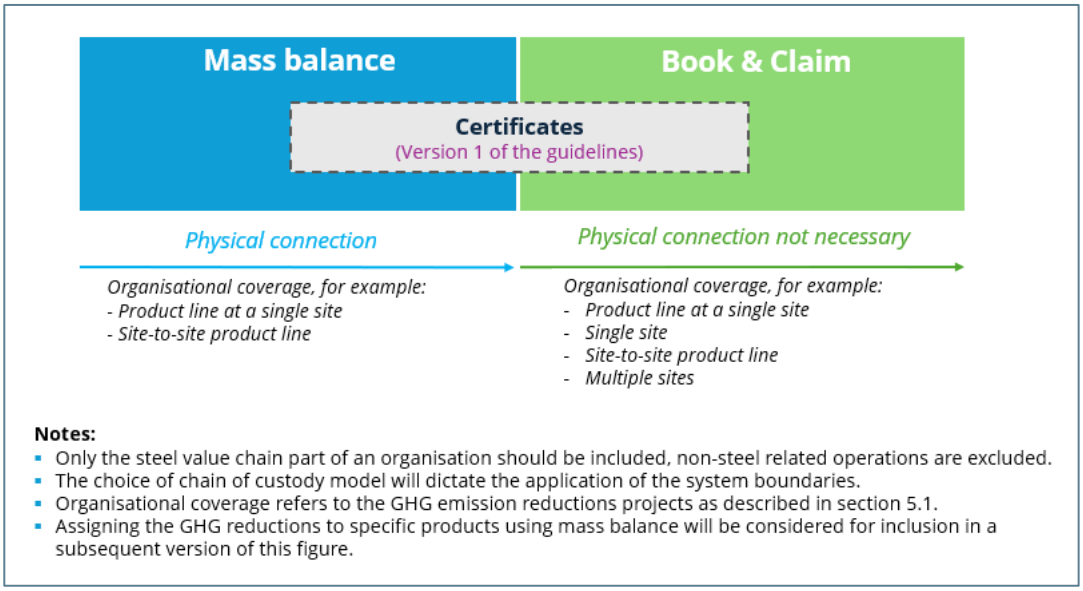

Figure 1: Illustration of a typical application of mass balance and book and claim chain of custody approaches in the steel industry.

3. Scheme description

Details of how the scheme operates shall be readily available from the steel producer, ensuring maximum transparency of the scheme and methodology followed, in particular relating to fully explaining and justifying:

- if and how the method is consistent with established relevant standards
- the organisational boundary within which the emission reductions are generated (section 5)
- how the emission reductions are generated (section 5)
- how the emission reduction project meets additionality requirements (section 5.3)

- In the case of certificates:
  - how the certificates are generated (section 5)
  - how the certificates are linked to the products sold (section 7)
  - how the certificates can be used by customers (section 7.3)
- In the case of assigning the savings to specific products using mass balance, this will be considered for inclusion in a next version of these guidelines.

4. Calculation of carbon footprint (CFP) for steel products

Calculate the 'cradle to gate' GHG emissions intensity without burdens/credits associated with end-of-life scrap recycling. GHG emissions intensity should be calculated and reported in CO_2e in accordance with a recognised standard such as:

- ISO 20915, ISO 14067, ISO 14040/44, ISO 21930
- PEF
- The GHG Protocol Product standard
- EN 15804, prEN 17662[5]
- Publicly Available Specifications PAS 2050 (2011).

The References list provides further details about these standards. Any other method used shall be declared and justified.

The results should be declared through a third-party verified report, such as an ISO 14025 conformant Type III EPD, or following ISO 14026 or an independently verified ISO 14021 self-declared environmental claim[6]. Results can be communicated in various formats such as a carbon footprint (CFP), an Environmental Product Declaration (EPD)[7], or a life cycle inventory (LCI). For the purpose of this document, CFP is used, understanding that this also refers to the LCI, EPD or other equivalent value.

[5] Not yet published.

[6] A "Type II Environmental Label" in accordance with ISO 14021 where environmental data is disclosed and self-declared. Data could be from an LCI or CFP study which is reviewed by a third-party.

[7] An EPD is a "Type III Environmental Label" in accordance with ISO 14025, an environmental program that provides quantitative disclosure of the environmental impact of a product or service throughout its life cycle, from procurement of raw materials to disposal and recycling.

4.1. Data

Data quality requirements shall be followed in accordance with the specified methodology (section 4). Where not specified in the methodology, data for electricity that corresponds to the actual electricity purchased (either from the supplier or via a Power Purchase Agreement (PPA)) and consumed shall be used.

When renewable energy certificates (RECs) are being used, the rules defined in the chosen methodology need to be followed. If the chosen methodology neither allows nor precludes the use of RECs (which should originate from the expansion of renewable energy), the data hierarchy (in the order of robustness or data uncertainty) listed below should be followed and documented:

1. the GHG emissions of the actual electricity purchased shall be used
2. the GHG emissions of the country specific residual grid mix
3. the scheme owner can determine a geographically relevant, credible, conservative proxy residual grid mix GHG emission factor[8] that shall be higher than the currently available grid mix, shall be explained and justified, and avoids double counting.

If country A does not sell RECs but a company located in country A purchases RECs from country B, then the residual grid mix of country A shall be used.

4.2. Time-related coverage

As a minimum requirement, and as per ISO 20915 and EN 15804 requirements, primary data should be less than 5 years old at the point that the CFP is issued, covering annual production (justification shall be provided if less than a 12-month period is covered and if data older than 5 years is used) and secondary data should be maximum 10 years old. If older data is used, it shall be clearly stated and justified why the data is still considered valid. If the specified methodology has more stringent requirements, those requirements shall be applied. The CFP should be recalculated every 5 years as a minimum in order to reflect ongoing decarbonisation of the steel industry.

4.3. Organisational coverage

The term organisation covers the specific production site or a chain of 2 or more sites where the product is physically transferred from one site to another for further processing (site-to-site). It can also be an average across all or a subset of the organisation's sites (multiple sites) that manufacture the product. The chosen approach shall be declared and justified.

4.4. GHG coverage

The latest version of the IPCC Assessment Report should be used, currently AR6[9], to determine the full list of GHGs to be considered, or as specified in the applied methodology. The methodology and the GHGs considered shall be documented, including any deviation from IPCC, AR6.

[8] This approach is being recommended in the absence of official residual grid mixes being available.

[9] https://www.ipcc.ch/report/sixth-assessment-report-cycle/

4.5. Third-party verification and certification

The calculation should be verified and/or certified by a third-party certification body based on the specified standard, in line with ISO 14064-3:2019 - Specification with guidance for the verification and validation of GHG statements, or other relevant standards. A requirement of published EPDs is to have them verified in accordance with the relevant EPD standards and therefore additional verification and/or certification is not required.

The results shall be declared through a third-party verified report, such as an ISO 14025 conformant Type III EPD, or following ISO 14026 or an independently verified ISO 14021 self-declared environmental claim[10]. Any other method used shall be declared and justified.

5. Calculation of GHG emission reductions from projects

GHG emission reductions of the emission reduction projects should be calculated in line with the ISO 14064 standards or the Greenhouse Gas Protocol project accounting standard[11] or other relevant standards. Where there is uncertainty in the calculations, a conservative approach shall be taken to ensure that the emission reductions are not overestimated.

The project can only be considered if it was implemented after the date of the data related to the most recent published CFP, i.e. the effects of the project have not been included in the CFP. If the project occurred before this most recent CFP, it needs to be ensured that the reductions achieved are not double counted, i.e. emission reductions that have already been accounted for in the latest CFP shall not be banked (see section 6). Additionality criteria for the project still need to be met for the full period for which the emission reductions are being banked.

5.1. Organisational coverage

Reduction projects shall be implemented within an organisation. An organisation must have one or more steel production facilities and can also include other processes in the steel value chain such as rolling and coating and upstream operations (e.g. mining) owned by the organisation. In addition, projects at subsidiaries / affiliates, etc., where the organisation has sufficient control over the management of those companies (e.g. joint ventures), may be included ensuring no double counting. The organisational coverage of the project is linked to the chain of custody approach chosen (section 2) and shall be clearly explained and justified and shall refer to one or more of the items below:

[10] A "Type II Environmental Label" in accordance with ISO 14021 where environmental data is disclosed and self-declared. Data could be from an LCI or CFP study which is reviewed by a third-party.

[11] https://ghgprotocol.org/project-protocol

- The steel value chain part of the organisation (e.g. including iron ore and coal mining)
- Multiple sites owned by the same organisation
- Single site of an organisation
- The product related part of the organisation, e.g. product line at a single site or site-to-site product line in the same organisation
- Emission reductions in the upstream supply chain, ensuring the same rigour as in these guidelines is applied
- Emission reductions associated with carbon capture and storage

For companies making products other than steel, emission reductions achieved in the non-steel related operations of the organisation are not eligible.

5.2. GHG coverage

The latest version of the IPCC Assessment Report shall be used, currently AR6[9], to determine the full list of GHGs to be considered, or as specified in the applied methodology. The methodology and the GHGs considered shall be documented, including any deviation from the method.

5.3. Additionality

Projects must fulfil additionality requirements. This means that the organisation shall explain and justify how the GHG reduction project is additional and has resulted in GHG emission reductions or removals above and beyond what would have occurred under normal operating conditions. The following are considered to be normal operations:

- Business as usual i.e. the normal execution of standard functional operations within an organization, or natural variations in operations or when continuing the usual way of working, e.g. maintenance
- Complying with conditions in the current operating license or permit (this excludes the permit requirements for the implementation of a GHG reduction project)
- Minor reductions as a result of continuous improvement
- Changes to production quantity or the product range

Examples of illustrative tests for additionality are presented in the GHG Protocol for Project Accounting standard (see Annex). The project can be assessed to be additional from a legal/regulatory/institutional, technology, investment, common/practice or timing aspect.

5.4. GHG emission reductions

The GHG emission reductions achieved must be included as net emission reductions on a full cradle-to-gate basis. In other words, both reductions and increases of GHG emissions, as a result of the

implementation of the reduction project, need to be included in the calculation of GHG emission reductions.

When the emissions reductions are achieved through the use of finite resources (e.g. biomass or scrap), every effort should be made to ensure that such materials are sustainably sourced and their use creates additionality or improves usability, quality, and/or its sustainability impact.

When the emission reductions are achieved in the upstream supply chain, these can be included in the project's GHG emission reductions in a transparent manner, ensuring no double counting and demonstrating additionality (for example physical PPAs; using the residual grid mix for any additional electricity that is purchased from the grid when RECs, which originate from the expansion of renewable energy, are used) as described in section 5.3[12].

Emission reductions in the form of certificates from suppliers of input materials (including raw materials, energy and intermediate or semi-finished steel products) can be included in the project's GHG emission reductions only if they are additional, do not exceed the amount of input used to make that product, following a relevant chain of custody approach and ensuring the same rigour as in these guidelines is applied.

Emission reductions from the upstream supply chain from which you are banking savings shall not exceed the total emissions within the organisational boundary in question.

5.5. Data

Specific (i.e. empirical or actual) data from the organisation (or its supply chain in case of upstream reductions) shall be used to calculate the GHG emission reductions from the reduction project. The functions and boundaries before and after the application of the project shall be equivalent. Data quality requirements shall be followed in accordance with the specified methodology (section 5). Data for electricity that corresponds to the actual electricity purchased and consumed should be used. Where this is not available, the national or regional electricity consumption grid mix should be used.

However, when renewable energy certificates (RECs) are being used, for the non-renewable part, data shall be used as per the hierarchy in section 4.1.

5.6. Calculation period

The calculation period refers to the time over which the GHG emission reductions of a reduction project are calculated, e.g. monthly, annually. The chosen period shall be explained and justified.

5.7. Calculation of GHG emission reductions

GHG emission reductions from a reduction project shall be calculated based on the GHG emissions before and after the implementation of the project during the chosen calculation period (section 5.6). If

[12] It should be noted that there are various types of RECs and not all of them fulfil the additionality requirement in section 5.3. One way to ensure that organizations demonstrate additionality in their use of RECs is to limit them to those that are not subsidized (e.g. feed-in-tariffs).

the CFP is renewed during the implementation of the project, it must be ensured that no double counting occurs.

5.8. Management of multiple reduction projects

If multiple reduction projects are implemented within the same time period, measures shall be in place to ensure no double counting occurs.

5.9. Third-party verification and certification

The calculation shall be verified and/or certified by a third-party based on the specified standard, in line with ISO 14064-3:2019 - Specification with guidance for the verification and validation of GHG statements, or other relevant standards.

6. Banking GHG emission reductions

GHG emission reductions from emission reduction projects are pooled in a bank (an accounting system within the organisation where GHG emission reductions are recorded) with the conditions described in the sections below.

6.1. Eligibility criteria for banking

The following eligibility criteria shall be met:

- Emission reductions shall only be banked after the project's implementation and once they have occurred.
- Emission reductions shall not be banked once they have been included in a published CFP.
- Only net emission reductions shall be banked (see section 5.4).
- Emission reductions shall be verified and/or certified prior to banking.

6.2. Time range of banking emission reductions from projects

The GHG emission reductions from specified projects fulfilling the criteria in section 5 can only be banked for the period following the date of the data used to calculate the published CFP and following the date of implementation of the project and once the reductions have occurred, up until a new CFP, which includes the reduction project, is calculated. This is to ensure that there is no double counting between the CFP and the banked emission reductions. However, if the project occurred before this new CFP and the organisation wants to continue banking the savings, it shall be ensured that the reductions achieved are not double counted. Additionality criteria for the project need to be met for the full period for which the savings are being banked.

The banking of emission reductions from projects must be terminated when it becomes clear that one or more of the respective requirements from section 5 are no longer met.

6.3. Expiration of banked emission reductions

The expiration date of banked emission reductions should be set and properly managed and should be a maximum of 3 years after the date of banking. A longer expiration period should be explained and justified. It is possible that there could be a period where the CFP has been updated but the banked emission reductions from a project now included in the CFP are still available. In practice this period will be limited as the CFP update process takes time.

The scheme shall clearly specify when the reductions are removed from the bank.

6.4. Information to be recorded when banking emission reductions

When emission reductions are banked, the metadata for the projects shall be recorded in the accounting system and shall include the following:

- A technical description of the project.
- The time period over which the emission reductions have occurred.
- The amount of emission reductions per calculation period.

6.5. Using reductions from the bank

When GHG reductions are used (either sold to customers as certificates or assigned to specific products using mass balance), the emission reductions shall be cancelled from the bank and a register kept of historical transactions.

6.6. Third-party verification and certification

The bank / accounting system shall be verified and/or certified by a relevant third-party. ISO14021:2016 - Environmental labels and declarations prescribes rules related to issuing of self-declared environmental claims.

7. Supply of steel products with certificates

GHG emission reductions that have been banked can now be sold alongside steel products or assigned to specific products using mass balance (this will be considered for inclusion in a next version of the guidelines). This section deals with products sold with certificates.

Certificates shall not be included as part of the CFP of the product sold to customers but declared to the customers separately. Products shall be supplied with a certificate of the emission reductions and a document stating the GHG emission intensity of the steel products as calculated in section 4.

The issuing of certificates is carried out by the scheme operator or certification / assurance body and in either case, the process of issuing of certificates is verified and/or certified by a third-party.

Once sold, the emission reductions shall be withdrawn from the bank and the following shall be ensured:

- No more GHG reductions in the form of certificates shall be sold than are available in the bank.
- No more GHG reductions in the form of certificates shall be sold with the steel products than the total CFP of the purchased tonnage of the steel product.
- The certificates by themselves shall not be distributed in the market but shall only be sold down the value chain alongside steel products.

7.1. Information supplied to customers regarding product and related GHG information

For transparency purposes, the following information shall be provided:

- Steel product description
- Amount of steel product purchased
- CFP of the steel product
- Quantity of certificates purchased and/or associated GHG value in $CO2\text{-}_e$ separate to the CFP
- The chain of custody model followed, and the system boundary applied (section 2). Note: the GHG reductions from which the certificates have been generated need to have occurred within this boundary.

7.2. Information supplied to customers regarding the scheme

ISO 14021:2016 - Environmental labels and declarations – Self-declared environmental claims (Type II environmental labelling) section 5 specifies requirements of information that needs to be provided when making self-declared environmental claims. For the purpose of these guidelines, the following information should be made available to customers alongside the certificates:

- Owner of the scheme, i.e. the steel company
- Details about how the scheme operates, in particular:
  - methodology used
  - relevant international standards
  - data quality
  - organisational coverage
- Details about the emission reduction projects associated with the scheme and how the reductions meet additionality requirements
- The time period over which the reductions were made
- Verification and/or certification details
- Details about the verifier(s).

7.3. Use of certificates by customers

Customers who purchase steel with certificates following this GHG chain of custody approach can use them to claim a reduction in their upstream emissions on, for example an organisational, project or product level, equivalent to the amount of the certificates purchased. This means that, in the context of the GHG Protocol, customers and end users can use them to reduce their scope 3 emissions. Certificates can only pass once through the value chain. The certificates by themselves shall not be distributed in the market. Use of these certificates by the customer should be done based on the relevant standards or regulations. For example, ISO 14068-1: 2023 provides guidance on how customers can claim carbon neutrality using such types of certificates.

Annex: Tests for additionality

This annex provides the details of possible "tests" for additionality from Table 3.1 from the Greenhouse Gas Protocol for Project Accounting (WRI and WBCSD).

TEST	GENERAL DESCRIPTION OF THE TEST AS IT IS COMMONLY FORMULATED
Legal, Regulatory, or Institutional Test	The GHG project must reduce GHG emissions below the level required (or effectively required) by any official policies, regulations, guidance, or industry standards. If these reductions are not achieved, the assumption is that the only real reason for doing the project is to comply with regulations, and any claimed GHG reductions are not additional.
Technology Test	The GHG project and its associated GHG reductions are considered additional if the GHG project involves a technology that is not likely to be employed for reasons other than reducing GHG emissions. The default assumption is that for these technologies, GHG reductions are a decisive reason (if not the only reason) for implementing them. GHG projects involving other technologies could still be considered additional, but must demonstrate additionality through some other means.
Investment Test	Under the most common version of this test, a GHG project is assumed to be additional if it can be demonstrated (e.g., through the divulgence of project financial data) that it would have a low rate of return without revenue from GHG reductions. The underlying assumption is that GHG reductions must be a decisive reason for implementing a project that is not an attractive investment in the absence of any revenue associated with its GHG reductions. A GHG project with a high or competitive rate of return could still be additional, but must demonstrate additionality through some other means.
Common Practice Test	The GHG project must reduce GHG emissions below levels produced by "common practice" technologies that produce the same products and services as the GHG project. If it does not, the assumption is that GHG reductions are not a decisive reason for pursuing the project (or conversely, that the only real reason is to conform to common practice for the same reasons as other actors in the same market). Therefore, the GHG project is not considered to be additional.
Timing Test	The GHG project must have been initiated after a certain date to be considered additional. The implicit assumption is that any project started before the required date (e.g., before the start of a GHG program) could not have been motivated by GHG reductions. Under most versions of this test, though, GHG projects started after the required date must still further establish additionality through some other test.

References

EN 15804 :2012+A2:2019 - Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.

ISO 14021: 2016 - Environmental labels and declarations — Self-declared environmental claims (Type II environmental labelling).

ISO 14025: 2006 - Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

ISO 14026:2017 Environmental labels and declarations — Principles, requirements and guidelines for communication of footprint information.

ISO 14040: 2006 - Environmental management — Life cycle assessment — Principles and framework.

ISO 14044: 2006 - Environmental management — Life cycle assessment — Requirements and guidelines.

ISO 14064: 2018 series – Greenhouse gases.

ISO 14064-3: 2019 Greenhouse gases Part 3: Specification with guidance for the verification and validation of greenhouse gas statements.

ISO 14067: 2018 - Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification.

ISO 14068-1: 2023 - Climate change management — Transition to net zero Part 1: Carbon neutrality.

ISO 20915:2018 - Life cycle inventory calculation methodology for steel products

ISO 21930: 2017 - Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services.

ISO 22095: 2020 - Chain of custody — General terminology and models.

PEF: Product Environmental Footprint, European Commission.

prEN17662 - Execution of steel structures and aluminium structures - Environmental Product Declarations - Product category rules complementary to EN 15804 for Steel, Iron and Aluminium structural products for use in construction works. Not yet published.

The Greenhouse Gas Protocol Product standard.

The Greenhouse Gas Protocol for Project Accounting, WRI and WBCSD.

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