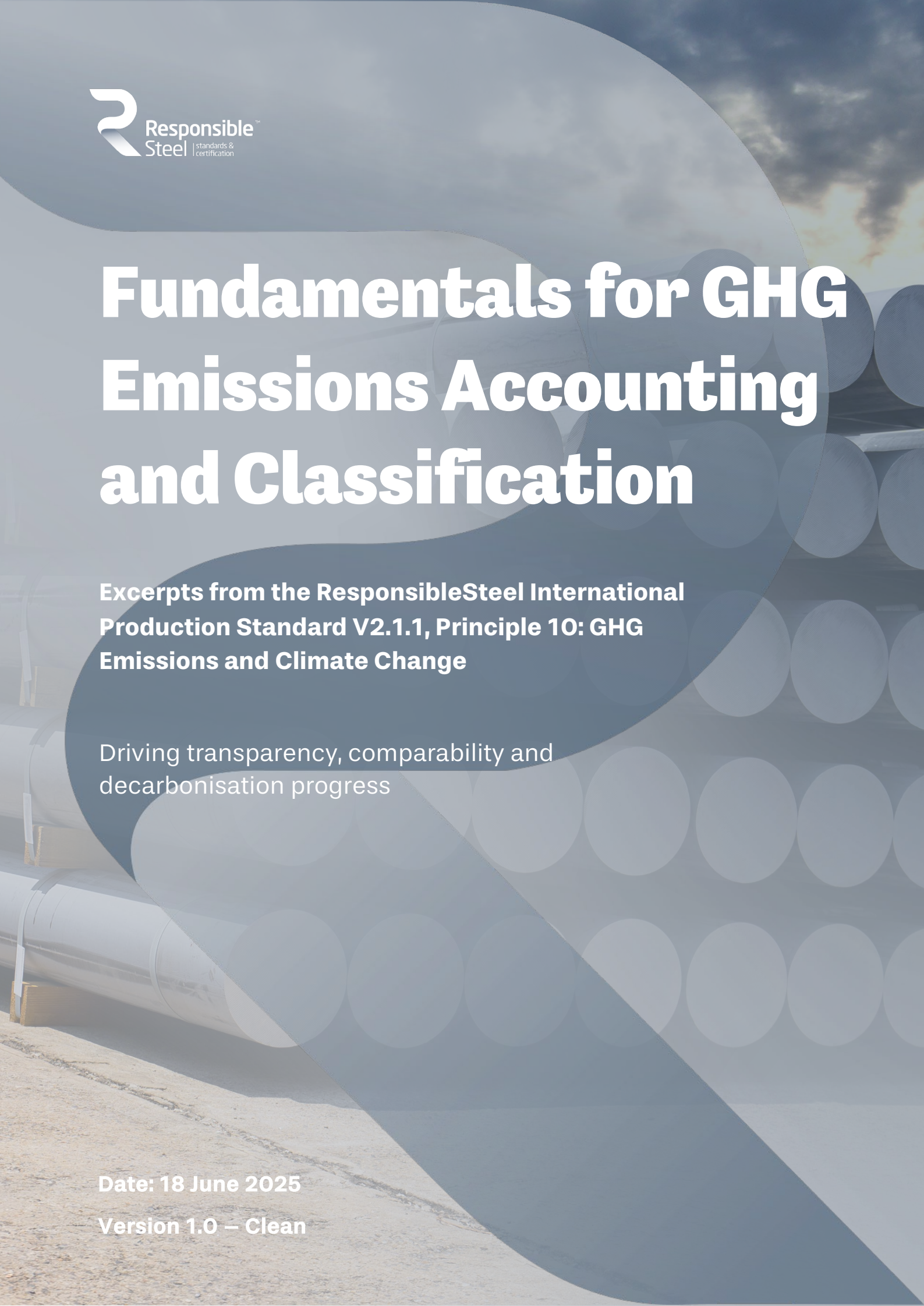
Responsible Steel | standards & certification

# Fundamentals for GHG Emissions Accounting and Classification

**Excerpts from the ResponsibleSteel International Production Standard V2.1.1, Principle 10: GHG Emissions and Climate Change**

Driving transparency, comparability and decarbonisation progress



**Date: 18 June 2025**

**Version 1.0 – Clean**

# About this document

Excerpts from Principle 10 (GHG Emissions and Climate Change) of the ResponsibleSteel International Production Standard V2.1.1 have been compiled and published in this separate document. The purpose is to enhance clarity and usability of fundamental aspects of GHG emissions accounting and classification, and thereby support decarbonisation of the global steel sector.

The document will serve as a highly useful reference for a wide range of stakeholders including steelmakers, steel buyers, policymakers, investors, and civil society organisations.

It contains three distinct sections:

Section 1: ResponsibleSteel methodology on crude steel GHG emissions intensity at site level
Section 2: ResponsibleSteel classification system for decarbonisation progress
Section 3: ResponsibleSteel requirements for GHG emissions intensity declarations at product level

Each section is separable and can be applied individually, but they are intended to be used together to make use of their interconnected value.

**The use of this document does not entitle users to make claims about ResponsibleSteel certification, compliance with some or all of the ResponsibleSteel International Production Standard, or Decarbonisation Progress Level achievement.**

# Version history

| No. | Date | Description |
|---|---|---|
| Version 1.0 – Clean | 18 June 2025 | First publication based on excerpts from version 2.1.1 of the ResponsibleSteel International Production Standard, and version 1.4 of the Guidance & Annexes.<br>This "clean" version has had the redactions deleted. |

### A note on redactions

Throughout Section 1–3 below, some words and clauses have been deleted from the original Production Standard and other reference documents.

The deletions have been made for two reasons:

- if the requirement refers to another part of the Production Standard that is not relevant for the specific section, and/or
- where the requirement refers specifically to ResponsibleSteel's requirements for Certified Steel and claims.

To improve accessibility and readability, there are two versions of this document:

(i) "clean" with redactions deleted (this version), and
(ii) "redacted" with removals shown using strikethrough to show where content has been deleted from the Production Standard or other reference documents.

In the redacted version, redactions have been used to show the origin of the content. In this clean version, the redactions have been removed to avoid unnecessary or distracting content and improve readability. The deletions do not change intent or meaning of the associated clause or section.

# Legend

| | |
|---|---|
| ~~Strikethrough~~ | redacted (not relevant for this version as redactions have been deleted) |
| Orange font (titles) followed by charcoal font (bulk text) | excerpts from the Production Standard, Guidance & Annexes, or Glossary (Reference Documents) |
| Turquoise font (titles) followed by charcoal font (bulk text) | new content to provide context (e.g. introduction, about this section) and new headings to provide structure |
| Red font | indicates minor changes to the Production Standard (occurs in a few cases when references are made to other parts of the Production Standard and readers are instead directed elsewhere, and to correct a few minor typos) |

Note: new figures in this document are noted using letters, e.g. Figure A, B, C. However, existing figures from the ResponsibleSteel Production Standard maintain their original figure numbers, e.g. Figure 3.

## Reference Documents

This document is derived from content from the following existing ResponsibleSteel documents, which can be accessed on the ResponsibleSteel website: www.responsiblesteel.org/emissions-accounting-classification.

- ResponsibleSteel International Production Standard, V2.1.1
- Guidance & Annexes, V1.4
- Glossary, V2.3

## Disclaimer

The official language of the ResponsibleSteel International Production Standard is English. In the case of any discrepancies between the full Standard and this excerpt, the full Standard should be referred to. The definitive version is held on the ResponsibleSteel website. Any discrepancy between copies, versions or translations shall be resolved by reference to the definitive English version.

# Table of Contents

# Background on ResponsibleSteel

**Steel is essential to almost every aspect of modern life and is, today, the world's largest materials industry. But its versatility comes with unique sustainability challenges. ResponsibleSteel was established in 2016 as a direct result of discussions to address these challenges.**

ResponsibleSteel is an international, non-profit, multi-stakeholder membership organisation. Businesses from every part of the steel supply chain, civil society groups, associations, and other organisations with an interest in a sustainable steel industry from anywhere in the world are welcome to join.

ResponsibleSteel's purpose is to maximise steel's contribution to a sustainable society. Its mission is to be a driving force in the socially and environmentally responsible production of net-zero steel, globally, by:

- Providing a multi-stakeholder forum to build trust and achieve consensus
- Developing standards, certification and related tools
- Driving positive change through the recognition and use of responsible steel.

The ResponsibleSteel International Production Standard is designed to support the responsible sourcing and production of steel, as a tool for achieving ResponsibleSteel's vision.

For further information, please see www.responsiblesteel.org.

# Introduction

## i. Relation to the ResponsibleSteel International Production Standard

This document contains excerpts of the ResponsibleSteel International Production Standard (the "Production Standard") and its supporting documents related to Principle 10: Climate Change and Greenhouse Gas Emissions, which is one of ResponsibleSteel's 13 Principles of sustainability.

The ResponsibleSteel requirements within Principle 10 go beyond those contained within this document, as depicted in Figure C. Refer to the complete Production Standard for requirements related to the corporate-level commitments to achieve the goals of the Paris Agreement (Criterion 10.1), climate-related financial disclosures (Criterion 10.2), and site-level GHG emissions reductions (Criterion 10.5).

There are multiple references to Core and Progress Level requirements within this document, and within the complete Production Standard. For further explanation on this terminology, or any other aspects, refer to the ResponsibleSteel International Production Standard.

Please contact standards@responsiblesteel.org for more information about the Production Standard, the supplementary Guidance & Annexes, and related development procedures.

## ii. Rationale for publishing these excerpts from the Production Standard

ResponsibleSteel provides the tools to support the industry to decarbonise. These tools were meticulously developed over multiple years through transparent governance processes, a plethora of multi-stakeholder working groups, and extensive public consultations. This publication is a means of improving ResponsibleSteel's reach to stakeholders specifically concerned about GHG emissions and climate change.

Of particular interest to stakeholders is ResponsibleSteel's methodology to calculate the crude steel GHG emissions intensity at site level, which strikes an optimal balance between emissions inclusivity, consistency, and comparability (see Section 1). The resultant methodology ensures all steelmaking sites, globally, can be compared on a like-for-like basis, based on transparent and fair accounting rules.

Next, ResponsibleSteel's classification system for decarbonisation progress enables all global steelmaking sites to be fairly compared against their peers, independent of technology dependency. The site-level Decarbonisation Progress Level (DPL) is determined based on the crude steel GHG emissions intensity, and scrap percentage (see Section 2). The system rewards genuine investments in low and near-zero emissions steelmaking to drive sector-wide decarbonisation.

Lastly, ResponsibleSteel's product-level requirements (see Section 3) fill two essential emissions data gaps: between the crude steel and finished steel boundary end points, and between the site and product-level system boundaries (refer to Figure A). Site-product relationships vary significantly depending on the company and its supply chain set-up; multiple sites may produce the same product, and multiple products may be produced at the same site. Whilst site-level data provides a more comparable and holistic measure of industrial change, product-level data is most relevant to the steel buyers. Hence, the site and product-level emissions data are distinct but complementary in measuring decarbonisation progress.

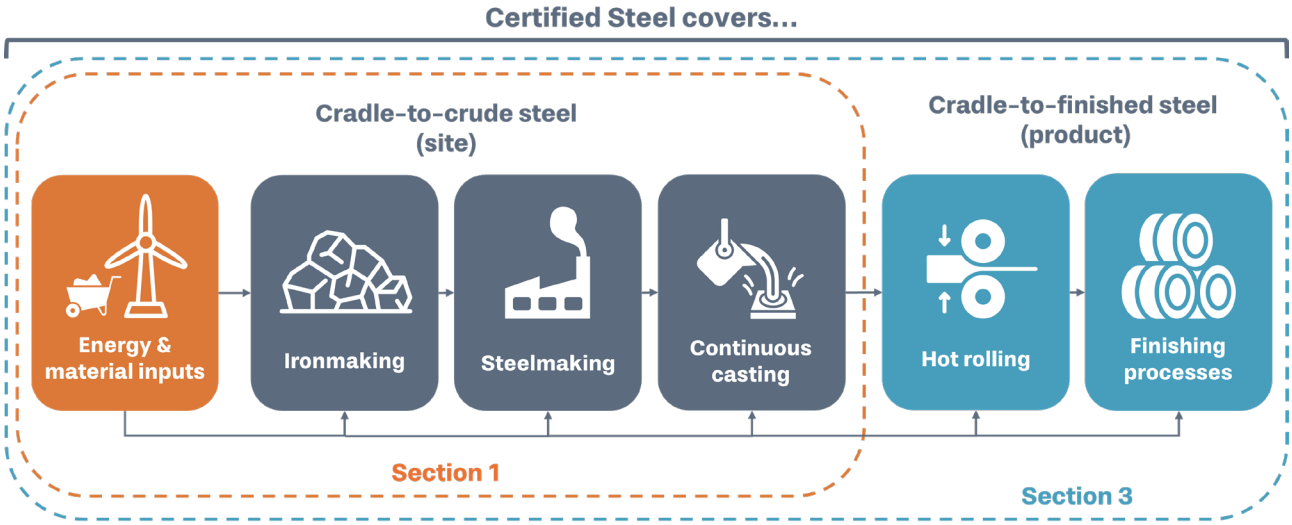



*Figure A: Illustration of the distinct emissions boundaries covered within the scope of Certified Steel.*

The uptake of these requirements will increase the transparency and consistency of emissions-related data produced by steelmakers and utilised by the value chain, meaning less wasted time in administrative burdens and more effective implementation of supporting decarbonisation mechanisms. Downstream users of steel can make more informed procurement decisions; investors can make more informed lending decisions; and policymakers can implement more effective policies.

## iii. Scope of application

The aspects of Principle 10 contained in this document apply to operational steelmaking sites.

The methodology for the calculation of crude steel GHG emissions intensity at site level (Section 1) and classification system to assess a steelmaking site's decarbonisation progress (Section 2) apply to sites producing carbon steels, which contain less than 8% alloys by mass. For sites producing high alloy and carbon steels (containing more than or equal to 8% alloy content), an adjusted emissions accounting methodology and unique Decarbonisation Progress Levels will be developed in the future by ResponsibleSteel that will consider the full emissions impact of ferroalloys and non-ferrous metals.

## iv. Certification and claims

**ResponsibleSteel certification is not currently available in relation to conformity with the requirements of this document.** The requirements for making claims about compliance with the full ResponsibleSteel International Production Standard are available in our current Claims and Logo Use Guidelines.

Accordingly, use of this methodology **does not** entitle the user to make any claims of compliance with the Production Standard, claims of equivalency or claims of Certified Steel. In due course, ResponsibleSteel may develop guidance on what claims are permitted in relation to this document, if any. If released, these will be supported with guidance on the assurance steps required to enable claims.

Please contact assurance@responsiblesteel.org for more information about certification and assurance.

## v. Review and revision

The ResponsibleSteel International Production Standard is reviewed and considered for revision within a maximum of five years from the date of approval, in accordance with the ResponsibleSteel Standards Development Procedures. Consequently, if any revisions to Criteria 10.4, 10.6 or 10.7 of the Production Standard occur, or related elements from the Guidance & Annexes, this document will also be revised accordingly and reissued with a new version number. Refer to the Version Control section at the start of this document for more details.

For further details, please see the ResponsibleSteel Standards Development Procedures at www.responsiblesteel.org/resources/.

## vi. How to use this document

This document contains the following excerpts from the ResponsibleSteel International Production Standard Version 2.1.1 and the Guidance & Annexes Version 1.4 related to Principle 10: Greenhouse Gas (GHG) Emissions and Climate Change:

**Section 1:** ResponsibleSteel's methodology for the calculation and disclosure of crude steel GHG emissions intensity at site level, which contains:

- **About this section**
- **1.1:** Emissions accounting methodology at site level (excerpts from Criterion 10.4)
- **1.2:** Determination of crude steel GHG emissions intensity (excerpts from Criterion 10.6)
- **1.3:** GHG emissions disclosure and reporting (excerpts from Criterion 10.7)

**Section 2:** ResponsibleSteel's classification system to assess a steelmaking site's decarbonisation progress (which includes excerpts from Criteria 10.6 and 10.7), which contains:

- **About this section**
- **2.1:** Scrap percentage calculation and classification system for decarbonisation progress (excerpts from Criterion 10.6)
- **2.2:** GHG emissions disclosure and reporting (excerpts from Criterion 10.7)

**Section 3:** ResponsibleSteel requirements for GHG emissions intensity declarations at product level to support product claims, which contains:

- **About this section**
- **3.1:** Product carbon footprint scope boundaries (excerpts from Criterion 10.4)
- **3.2:** Determination of the product carbon footprint (excerpts from Criterion 10.6)
- **3.3:** Product carbon footprint disclosure and reporting (excerpts from Criterion 10.7)

The connections between different sections of this document are illustrated in Figure B, and the relationship between the contents of this document and the Production Standard are depicted in Figure C.

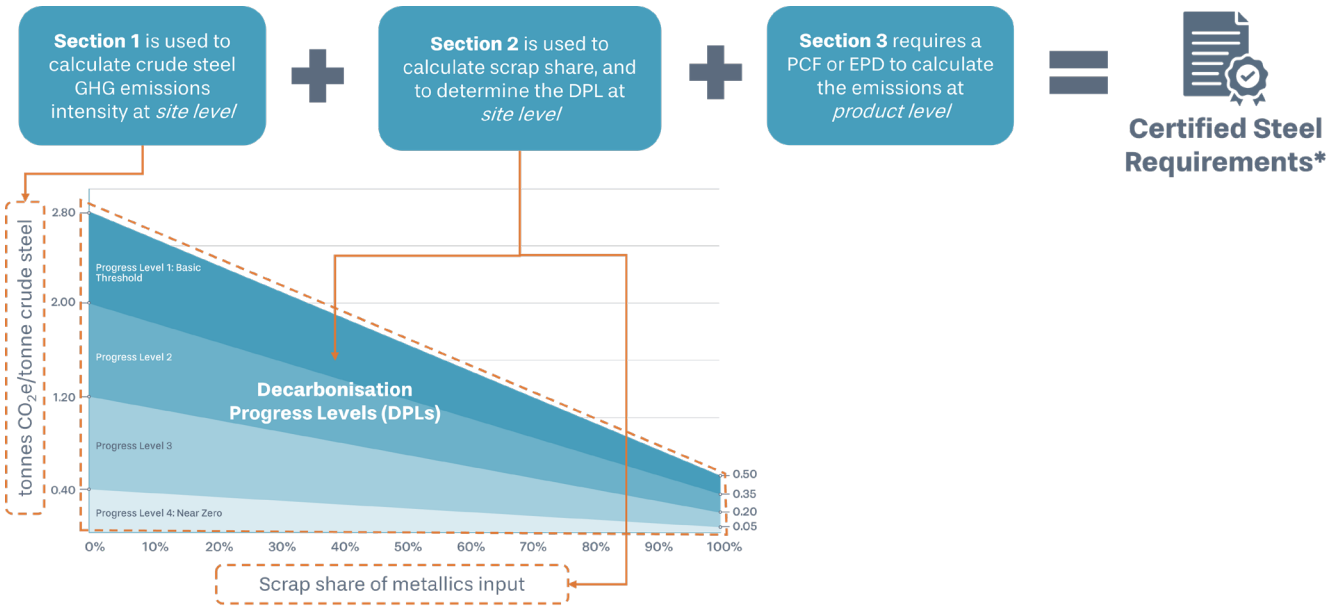



*Figure B: Illustration of the connections between different sections of this document.*

**Note: Meeting these three sections does not enable claims of Certified Steel. Certified Steel requires achievement of at least DPL1, as well as Progress Level 1 for Responsible Sourcing (Principle 3), alongside compliance with all of Principle 10 and the Production Standard's other 12 Principles.*

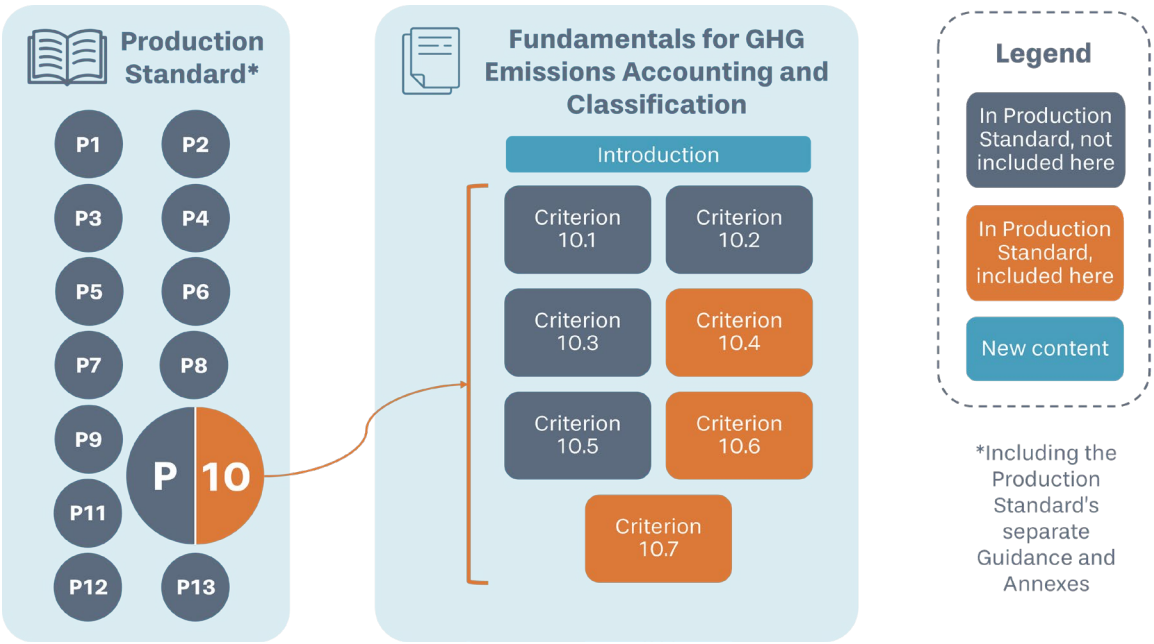



*Figure C: Illustration of the relationship between the contents of the ResponsibleSteel International Production Standard (and the Guidance & Annexes and Glossary) and this document.*

A direct connection exists between ResponsibleSteel's methodology for the calculation of crude steel GHG emissions intensity at site level (Section 1) and the classification system to assess a steelmaking site's decarbonisation progress (Section 2). Determination of the tonnes of carbon dioxide equivalents per tonne of crude steel (t $CO_2$e/t crude steel), according to the requirements set out in the methodology, is a prerequisite for determination of the steelmaking site's Decarbonisation Progress Level, alongside the scrap percentage. ResponsibleSteel's methodology and classification system focus on site-level emissions, from 'cradle-to-crude', including scope 1, scope 2 and upstream scope 3 emissions.

A site-level assessment of decarbonisation progress is necessary to fully and fairly capture changes in energy, material and technology dependencies, removing the need for assumptions surrounding emissions allocation to specific products (that are frequently produced across multiple sites).

Crude steel, the point of first solidification, is the selected cut-off point to ensure a fair comparison across all steelmaking sites globally, independent of the product type. This emissions boundary ensures an effective balance between emissions inclusivity of scopes, comparability at the crude steel endpoint and consistency across all steel products.

ResponsibleSteel's requirements for product carbon footprint disclosure (Section 3) play an integral role in bridging the emissions gap between crude steel and finished product, and in supporting product claims. GHG emissions associated with the further processing of crude steel after first casting must be accounted for. Additionally, obtaining the 'cradle-to-gate' emissions intensity is of prime importance to the downstream customers to calculate their own scope 3 emissions.

All three sections contain their own disclosure requirements, which are essential for transparency.

# Section 1: ResponsibleSteel methodology on crude steel GHG emissions intensity at site level

## About this section

ResponsibleSteel has published this methodology separately to improve its utility and accessibility as the only universally comparable, common methodology for calculating GHG emissions intensity of steel, and supporting disclosure requirements. This methodology has been specifically designed so that users can compare, on a consistent basis, the embodied GHG emissions for every tonne of steel produced anywhere in the world.

The site-level methodology is based on the ISO 14404 series (Parts 1 to 4), and the corresponding worldsteel CO2 Data Collection Methodology, with critical adjustments made such as inclusion of all GHGs, full evaluation of all input materials in upstream scope 3, and incentives for primary data utilisation. The first version of this ResponsibleSteel methodology was published in 2022 in Version 2.0 of the Production Standard.

To achieve both emissions inclusivity and comparability across all steel products, the emissions boundary begins upstream of the steelmaker and has a downstream cut-off at crude steel. Thousands of different steel products and 8 different hot rolling processes exist globally, leading to significant heterogeneity in the processing requirements post-crude steel. This underscores the importance of a crude steel emissions boundary endpoint, which is defined as the point immediately after casting.

The steel industry's harmonisation of emissions accounting methodologies remains a priority to enhance data consistency and comparability, reduce greenwashing risks, restore the market's confidence, improve the efficacy of targeted policies and investment decisions, and limit administrative burdens. Over 60 signatories to the Steel Standards Principles achieved a consensus leading up to COP29 on the importance of utilising emissions intensity units, the mining-to-crude emissions boundary, and incentivising primary data use, which are all fundamental aspects of ResponsibleSteel's methodology.

The determination of the tonnes of carbon dioxide equivalents per tonne of crude steel (t $CO_2$e/t crude steel), according to the requirements set out in this methodology, is a prerequisite for the determination of the steelmaking site's Decarbonisation Progress Level (contained in Section 2), alongside the scrap percentage.

This section contains three parts, each with mandatory requirements and guidance material:

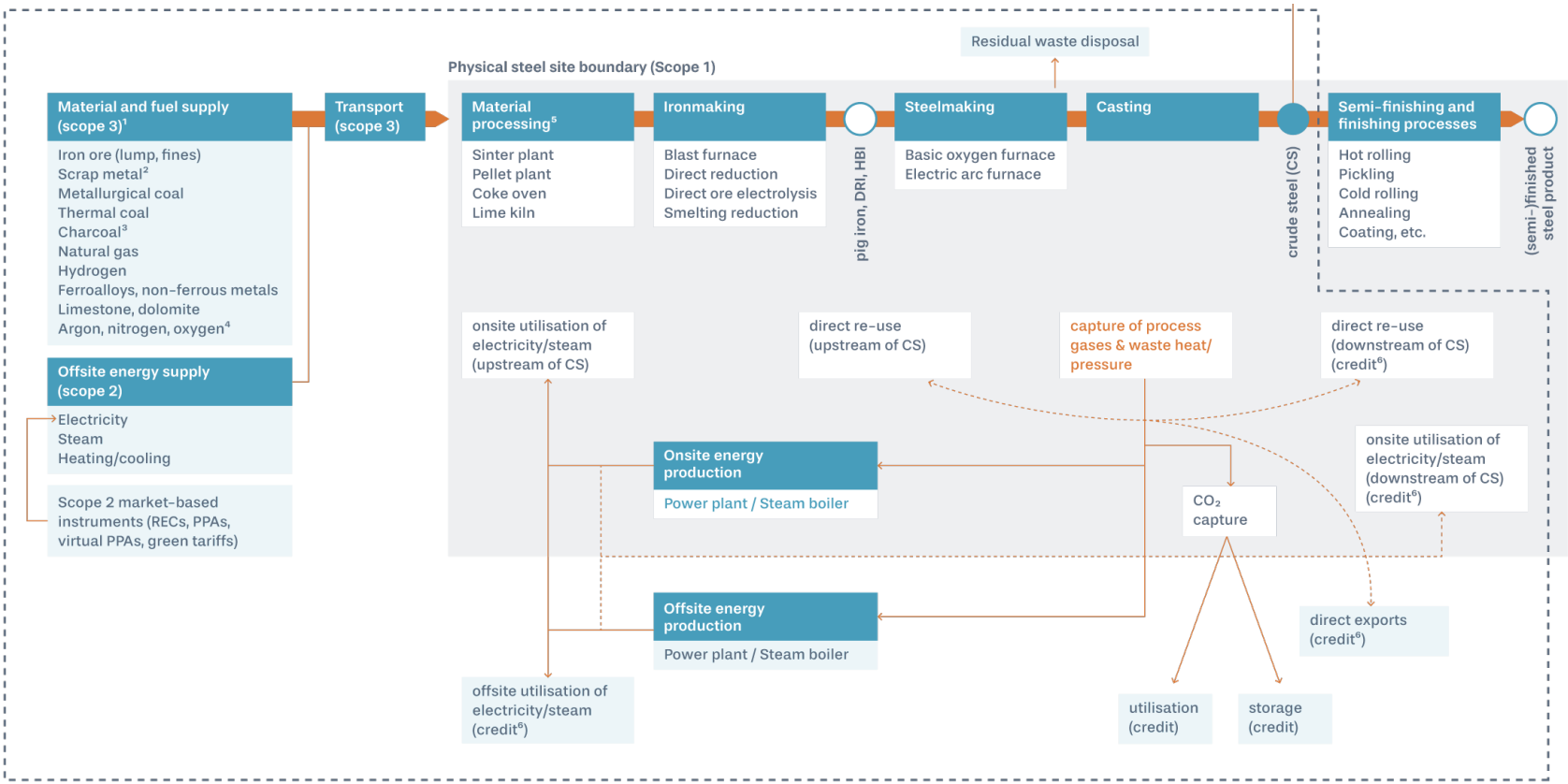
(i) Emissions accounting methodology at site level (excerpts from Criterion 10.4)
(ii) Determination of crude steel GHG emissions intensity (excerpts from Criterion 10.6)
(iii) GHG emissions disclosure and reporting (excerpts from Criterion 10.7)

# 1.1. Emissions accounting methodology at site level

## 1.1.a. Requirements of the Production Standard

| | |
|---|---|
| | **Criterion 10.4: Determination of site-level GHG emissions for the purpose of reporting GHG emissions intensity when producing crude steel** Progress |
| 10.4.1. | GHG emissions data – general requirements:<br>a) When determining GHG emissions, a site must consider the emissions of $CO_2$, $CH_4$, nitrogen trifluoride ($NF_3$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6), using Global Warming Potential (GWP) values relative to $CO_2$ ($CO_2e$) with a 100-year time horizon, as published in the most recently published Intergovernmental Panel on Climate Change Assessment Report.<br>b) The unit of measurement for GHG emissions is tonnes $CO_2$ equivalent ($tCO_2e$).<br>c) The data for the determination of the GHG emissions intensity for crude steel production as specified in this Criterion has been verified and independently reviewed in accordance with the requirements of ISO 14064-3:2019, Greenhouse gases — Part 3: Specification with guidance for the verification and validation of greenhouse gas statements, to either the 'reasonable level of assurance' or the 'limited level of assurance'. |

*Figure 1 from the Production Standard – ResponsibleSteel's Emissions Boundary (under criterion 10.4) for Representation Iron and Steelmaking Sites*




For illustrative purposes only – not all processes are shown.

1. For the full list of scope 3 requirements, refer to Annex 10 of the standard. For any non-listed items (e.g., graphite electrodes and refractories), if they are likely to contribute more than 5% of the scope 3 emissions they must also be included. The emissions boundary for each input is determined by materiality in accordance with recognised international standards. Refer to Criterion 10.4.5 for further details.
2. Upstream embodied GHG emissions for scrap metal are counted as zero, but emissions for transportation are included.
3. $CO_2$ sequestration associated with production of biomass-based products can be claimed when this is independently verified using a recognised standard. In the absence of independently verified primary data the emissions associated with the growth, harvesting and processing of biological materials are assigned a default net upstream GHG emissions factor of zero.
4. Oxygen plant is often located onsite for a BF-BOF plant.
5. Material processing can also be carried out offsite, with imports of iron ore sinter, iron ore pellets, coke and/or lime.
6. Credit given if re-used processes gases/generated electricity is greater than consumed gases/electricity upstream of crude steel.

10.4.2. Scope boundaries:

a) The scope boundary for determining a site's GHG emissions when producing crude steel includes:

- Direct (Scope 1) GHG emissions (see 10.4.3)
- Energy-related indirect (Scope 2) GHG emissions (see 10.4.4)
- Upstream indirect (Scope 3) GHG emissions (see 10.4.5), including GHG emissions associated with:
  - Material extraction
  - Material preparation and processing
  - Transportation.

b) The end point of the scope boundary for determining the total GHG emissions when producing crude steel, and, therefore, determining the ResponsibleSteel crude steel GHG emissions intensity performance, is the point at which crude steel is first produced. GHG emissions associated with further processing of the crude steel after casting (for example, hot rolling, cold rolling, coating) are not included for this purpose.

*Figure 2 from the Production Standard – Summary of ResponsibleSteel's Emissions Boundary (under criterion 10.4)*

| Upstream Emissions | Iron and Steelmaking | Downstream Processes | Downstream Value Chain |
|---|---|---|---|
| **Inclusions** | **Inclusions** | **Inclusions** | **Inclusions** |
| Extraction and processing of input materials and fuels on a 'cradle-to-gate' basis, which may include iron ore, DRI, HBI, coal, coke, natural gas, hydrogen and fluxes (depends on-site configuration).<br><br>Transport of materials to site.<br><br>Offsite production of electricity, steam, heating, cooling.<br><br>Market-based instruments for low emissions electricity procurement (RECs, PPAs, virtual PPAs, green tariffs).<br><br>Ferroalloys and non-ferrous metals (replacement embodied GHG value applied to enable comparison of steels with <8% alloy content) | Flaring of process gases which are caused by on-site combustion processes and iron ore reduction, up to the point of crude steel production, which may include coke oven gas, blast furnace gas, basic oxygen furnace gas, and electric arc furnace gas.<br><br>Process gases that are captured for on/offsite power production are also considered to be flared, and subsequent credits applied if net electricity production occurs (refer to downstream value chain). | Collection and disposal of residual waste. | Exported process gases or waste heat (substituting natural gas).<br><br>On/off-site electricity/steam generation using process gases or waste heat/pressure (substituting grid electricity).<br><br>Captured $CO_2$ for permanent storage or utilisation (CCUS). |
| **Exclusions** | **Exclusions** | **Exclusions** | **Exclusions** |
| Scrap production and collection (embodied GHG value of zero), although emissions related to transport of scrap to site are included.<br><br>Scope 3 emissions related to capital goods, business travel, employee commuting and upstream leased assets. | Emissions associated with intermediary products (e.g., coke, DRI, pellets) that are produced onsite but sold externally for use by other sites.<br><br>Electricity generated onsite using renewables (embodied GHG value of zero). | All processes downstream of crude steel production, including hot rolling, cold rolling, annealing, galvanising, and coating. | Any other co-product credits (slags, dusts, sludge, etc.).<br><br>All other downstream life cycle phases, including use, demolition, re-use and recycling.<br><br>Carbon embedded in the final product. |

Note: Carbon offsets (e.g., land use, whether on/off-site) are also excluded.

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| 10.4.3. | Direct (Scope 1) GHG emissions<br>a) The site's direct (Scope 1) GHG emissions are measured, recorded and verified in accordance with the requirements of an applicable, recognised, international and/or regional standard, as specified in the guidance material and in accordance with the requirements of Criterion 10.4.6, for determining the ResponsibleSteel crude steel GHG emissions intensity performance for the site.<br>b) Determining the site's direct (Scope 1) GHG emissions does not include carbon offsets or similar instruments. |
| 10.4.4. | Energy-related indirect (Scope 2) GHG emissions<br>Energy-related indirect (Scope 2) GHG emissions are determined in accordance with the requirements of an applicable, recognised, international and/or regional standard, as specified in the guidance material, and with the following requirements:<br>a) Imported electricity:<br>• GHG emissions are quantified in accordance with the requirements of ISO 14064-1:2018 Annex E.2 Treatment of imported electricity, using the emission factor that best characterises the pertinent grid, i.e. dedicated transmission line, local, regional or national grid-average emission factor.<br>• Grid-average emission factors are from the emissions year being reported, if available, or the most recent year, if not. Grid-average emission factors for imported consumed electricity are based on the average consumption mix of the grid from which the electricity is consumed.<br>• Determining energy-related indirect (Scope 2) GHG emissions may be based on the use of renewable energy certificates, power purchase agreements, virtual power purchase agreements, or green tariffs paid in relation to the site's sourcing of electricity, where these meet the requirements of ISO 14064-1:2018 E.2.2 Additional information.<br>• Imported electricity that is used upstream of crude steel production at the site, and that has been generated from process gases or waste energy while producing crude steel at the site, is excluded when determining the site's energy-related indirect (Scope 2) GHG emissions for the purpose of determining the ResponsibleSteel crude steel GHG emissions intensity for the site.<br>b) Heating, cooling and steam:<br>• GHG emissions for imported energy other than electricity are quantified using a source-specific emission factor.<br>• GHG emission factors are from the emissions year being reported, if available, or the most recent year, if not. Average emissions factors for imported energy are based on the average consumption mix of the energy generator. |
| 10.4.5. | Upstream indirect (Scope 3) GHG emissions<br>The site's upstream indirect (Scope 3) GHG emissions are determined in accordance with the following requirements: |

a) Determining the site's upstream indirect (Scope 3) GHG emissions includes the direct (Scope 1), energy-related indirect (Scope 2), and upstream indirect (Scope 3) GHG emissions from 'cradle-to-gate' for the following input materials, if applicable:

- Ferrous-containing materials: cold iron, direct reduced iron (DRI), granulated pig iron (GPI), hot briquetted iron (HBI), iron ore, pellets, scrap, sinter, steel slab
- Auxiliary materials: argon, burnt dolomite, burnt lime, crude dolomite, limestone, nitrogen, oxygen
- Alloys and metallic additives: aluminium, copper, ferro-chromium, ferro-manganese, ferro-molybdenum, ferro-nickel, ferro-silicon, ferro-vanadium, lead, magnesium, manganese, molybdenum oxide, nickel metal, nickel oxides, nickel pig iron, silico-manganese, silicon metal, tin metal
- Solid fuels: charcoal, bio-coke, biomass, coal, coke, petroleum coke, used plastic, used tyres
- Liquid fuels: heavy oil, kerosene, light oil, liquified petroleum gas (LPG)
- Gas fuels: hydrogen, natural gas, biogas
- Other input materials for steelmaking: other inputs that are assessed as likely to contribute more than 5% to the total upstream (Scope 3) GHG emissions of steelmaking at the site.

b) The determination of the site's upstream indirect (Scope 3) GHG emissions uses either:

(i) The current ResponsibleSteel default embodied GHG values as published in Annex 5 or;

(ii) Primary data provided by the supplier that meets the requirements specified in 10.4.5.c.

c) The site uses primary data, whenever available, to determine the upstream indirect (Scope 3) GHG emissions of input materials provided by the supplier. The supplier must conform with the following specifications for the declaration of the embodied GHG values:

- It must include an estimate of the direct (Scope 1), energy-related indirect (Scope 2), and upstream indirect (Scope 3) GHG emissions of the supplied input material from the original source ('cradle') to the point of sale.
- It should exclude any carbon offsets.
- It must conform with any ResponsibleSteel guidance provided for the specific material (see guidance notes).
- Any declaration should include reference to the ResponsibleSteel-recognised international standard used as the basis for the determination, as well as the date the determination was made, whether it has been independently assured and, if so, the level of assurance achieved.

d) The site includes an estimation of the GHG emissions associated with transporting the input materials from the point of purchase to the site.

e) The site's upstream indirect (Scope 3) GHG emissions are reduced pro rata if imported materials with GHG emissions that have been included in the determination of the site's GHG emissions for crude steel production are subsequently exported from the site before such use.

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| 10.4.6. | The following GHG emissions accounting rules apply for determining the ResponsibleSteel crude steel GHG emissions intensity performance for sites which produce crude steel:<br>a) Carbon physically embedded in final products, co-products, and by-products:<br>Carbon that remains physically embedded within steel or other final products, co-products or by-products produced at the site, and that is not emitted to the atmosphere through further processing or use, is not included as a GHG emission when determining the ResponsibleSteel crude steel GHG emissions intensity performance for the site. See 10.4.7 for consideration of carbon capture and use, or storage of process gases.<br>b) Allocation of GHG emissions to co-products and by-products:<br>The GHG emissions associated with steelmaking are allocated in full to the site's production of crude steel. There is no reduction in the ResponsibleSteel crude steel GHG emissions intensity for the site due to the allocation of GHG emissions to steel by-products or co-products at the site (for example, dust, sludge, chemicals, oils). See 10.4.7 for consideration of carbon capture and use, or storage of process gases.<br>c) Allocation of emissions for exported intermediate products ('merchant' production):<br>Where a site produces and exports intermediate products, such as coke, pig iron, GPI or industrial gases, the GHG emissions associated with producing the exported quantity of the intermediate products should be determined and deducted from the total GHG emissions when determining the ResponsibleSteel crude steel GHG emissions intensity performance of the site.<br>d) Energy use for on-site processing of crude steel:<br>GHG emissions associated with the on- or off-site processing of crude steel are not included as emissions for the purpose of determining the ResponsibleSteel crude steel GHG emissions intensity performance of the site. The energy-related indirect (Scope 2) GHG emissions associated with the downstream processing of crude steel should be deducted from the total energy-related indirect (Scope 2) GHG emissions of the site when determining the ResponsibleSteel crude steel GHG emissions intensity performance for the site.<br>e) Emissions associated with waste or residual materials exported from the site:<br>GHG emissions associated with storing or disposing of waste or residual materials, whether on- or off-site, must be estimated and included as an emission when determining the ResponsibleSteel crude steel GHG emissions intensity performance of the site. |
| 10.4.7. | The following GHG emissions accounting rules apply for captured process gases and waste energy for power and steam generation, re-use or recycling, and carbon capture use or storage (CCU/CCS):<br>a) The site determines and records the direct (Scope 1) GHG emissions ($CO_2e$) associated with process gases, such as coke oven gas, blast furnace (BF) gas, and basic oxygen furnace (BOF) gas that are emitted to the atmosphere or flared under 10.4.3.<br>b) The site determines and records the GHG emissions ($CO_2e$) that would have occurred if process gases that are captured for use, export or storage had been flared instead. This is referred to as the captured process gas baseline GHG emissions for the site.<br>c) The captured process gas baseline GHG emissions for the site are included in determining the total GHG emissions of the site for the purpose of reporting the GHG |

emissions intensity when producing crude steel, minus any credits that are assigned for the subsequent use or storage of the process gases, as specified in 10.4.7.d to 10.4.7.g.

d) Credit for the use of process gas and waste energy for power and steam generation:

(i) Where process gases are captured and subsequently used either on- or off-site for power generation, and/or where waste energy is recovered and used either on- or off-site for power generation, e.g. in a top-pressure recovery turbine, which recovers the blast furnace's top pressure, and coke dry quenching, which recovers coke sensible heat, the site's captured process gas baseline GHG emissions is reduced by the allocation of a GHG emissions credit on the following basis:

(ii) The amount of power generated from the use of process gases is recorded in MWh (= A MWh)*.

(iii) The amount of power generated from the use of waste energy (heat and pressure) is recorded in MWh (= B MWh)*.

(iv) The amount of power used by the site upstream of crude steel production is recorded in MWh (= C MWh).

(v) The amount of power used by the site upstream of crude steel production (C) is deducted from the total amount of power generated from the use of process gases and waste energy (A + B). The site is allocated a GHG emissions credit equal to A + B – C, multiplied by the most recent global grid intensity ($CO_2e$/MWh) as determined by the International Energy Agency (IEA). If electricity demand exceeds supply from process gases and waste energy, net production within the systems boundary (A + B – C) will be negative and no credit is applied (instead Scope 2 emissions are positive.

*If primary data for the amount of power generated is not available, it may be estimated using the current worldsteel default value for the amount of waste heat required to generate 1 MWh of power.

e) Credit for the re-use or recycling of process gas or waste heat:

- Where process gases or waste heat are captured and reused either on- or off-site for purposes other than generating power, the captured process gas baseline GHG emissions for the site is reduced by the allocation of a GHG emissions credit on the following basis:

(i) When process gas or waste heat is used on-site, upstream of crude steel production, its use reduces the site's energy-related indirect (Scope 2) GHG emissions and/or its upstream (Scope 3) GHG emissions associated with producing crude steel, and no further reduction of GHG emissions is applicable.

(ii) When process gas or waste heat is used on- or off-site, downstream of crude steel production, the site is allocated a GHG emissions credit equal to the GHG emissions that would have been generated through the use of natural gas for the same purposes.

f) Credit for the use of process gas for producing co-products (CCU):

- Where process gases are captured and used either on- or off-site to produce co-products, the captured process gas baseline GHG emissions for the site is reduced by a GHG emissions credit, calculated as the sum of:

(i) the net GHG emissions sequestered in the co-product based on a life cycle assessment, which are determined as follows:

- The full life cycle product carbon footprint for the co-product is determined and verified in accordance with the requirements of a specified international standard**, including any direct (Scope 1) and indirect (Scope 2) GHG emissions associated with further processing, using a zero value for the embodied GHG emissions (i.e. upstream indirect (Scope 3) GHG emissions) for the process gas itself, and including downstream indirect (Scope 3) GHG emissions through to ultimate end-of-life disposal

(ii) the difference in GHG emissions between producing the co-product from process gases and producing the same (or similar) product using other production methods, which are determined as follows:

- The GHG emissions associated with producing the co-product are determined and verified in accordance with the requirements of a specified international standard** for determining the product carbon footprint of the co-product from cradle-to-gate, using a zero value for the embodied GHG emissions for the process gas itself.
- The global average GHG emissions for producing the same (or similar) product using other production methods has been determined and verified in accordance with the requirements of a specified international standard** for determining the product carbon footprint of a product from cradle-to-gate.

(iii) The captured process gas baseline GHG emissions for the site may be reduced by the GHG emissions reduction determined under (i) in addition to the GHG emissions reduction determined under (ii).

- The maximum allowable reduction of the captured process gas baseline GHG emissions from (i) and (ii) combined is equal to the direct (Scope 1) GHG emissions determined in 10.4.7.b.

**Both the product carbon footprint assessment reports for the co-product and the same (or similar) product through other production methods must be publicly available and reference the international standard used.

g) Credit for carbon capture and storage (CCS) of process gas constituents:

- Where constituents of process gases are captured for permanent storage, the captured process gas baseline GHG emissions for the site may be reduced as follows:

(i) The GHG emissions associated with operating carbon capture technology must be estimated and included when determining the ResponsibleSteel crude steel GHG emissions intensity performance of the site. This includes direct (Scope 1) and energy-related indirect (Scope 2) GHG emissions associated with the energy used to compress process gas constituents, and GHG emissions associated with the capture, transport, and storage.

(ii) The captured process gas baseline GHG emissions for the site is reduced by the amount of emissions that are claimed to be permanently captured minus any emissions associated with operating carbon capture technology.

| | |
|---|---|
| | • The site must provide a public report that:<br>(i) Describes the technology used for storage<br>(ii) Quantifies the GHG emissions that are claimed to be captured and stored permanently<br>(iii) Justifies the claim that the captured emissions will be stored permanently<br>(iv) Includes an explicit statement confirming that the site will monitor leaks from the stored GHGs, and publicly report any detected leaks.<br>• In the event of subsequent leaks from the storage site, the associated GHG emissions ($CO_2e$) will be attributed to steel production at the certified site in the year when the leak occurs. |
| 10.4.8. | Downstream indirect (Scope 3b) GHG emissions<br>Downstream life cycle considerations, such as product GHG emissions in use and emissions associated with end-of-life disposal of products, except as specified above, are excluded from the calculation of the ResponsibleSteel crude steel GHG emissions intensity performance of the site. |

## 1.1.b. Guidance Material (from the Guidance & Annexes Document)

### Criterion 10.4: Determination of site-level GHG emissions for the purpose of reporting GHG emissions intensity when producing crude steel

Where companies or sites report GHG emissions results determined using different methodologies they should provide an accompanying explanation for any resulting differences in the reported figures.

(10.4.1.a) The GHGs listed in 10.4.1.a are as specified in the GHG Protocol (revised edition, 2015). The potential influence of all the listed GHGs must be considered. If an initial review shows that the potential influence of a particular GHG is not material (less than 0.5% of the direct (Scope 1) GHG emissions (CO2e) for the site or less than 5% of the total embodied GHG emissions for a source of upstream indirect (Scope 3) GHG emissions then it is not required to include further consideration of that GHG in the determination of the site's GHG emissions. The 100-year time horizon is used for consistency with most other GHG measurement methodologies and data. The potential to move to 20-year time horizons will be kept under review.

The GWP factors for the major greenhouse gases as specified in the most recent IPCC Assessment Report 6 (Table 7.SM.7) for 20-year and 100-year time horizons are as follows:

| species | GWP-20 | GWP-100 |
|---|---|---|
| carbon dioxide ($CO_2$) | 1. | 1. |
| methane ($CH_4$) | 81.2 | 27.9 |
| nitrous oxide ($N_2O$) | 273 | 273 |

GWP factors for other GHGs are listed in the IPCC Assessment Report 6 Table 7.SM.7.

(10.4.1.c) ISO 14064-3:2019 Greenhouse gases – Part 3: Specification with guidance for the verification and validation of greenhouse gas statements defines two possible levels of assurance: verification at a 'reasonable level of assurance', and verification at a 'limited level of assurance'. Verification must be provided at least at the 'limited level of assurance'. Under 10.7.1 the site is required to report the level of assurance provided.

GHG accounting rules should be applied consistently with the aim to provide a true picture of the total annual GHG emissions for the production of steel. For example, emissions for material such as sinter produced on site might be allocated to steel production at the time the sinter is produced, or at the time the sinter is used for the production of steel. Whichever approach is adopted, it must be applied consistently over time.

(10.4.2.b) Downstream indirect (Scope 3) GHG emissions outside the site boundary do not need to be considered, with the exception of emissions associated with the disposal of waste (see 10.4.6.e).

(10.4.2.b, 10.4.2.c) The end point of the scope boundary for the determination of the product carbon footprint for steel products, co-products and by-products exported from the site may be different to the end point of the scope boundary for the determination of the site's ResponsibleSteel crude steel GHG emissions intensity performance. GHG emissions associated with the further processing of crude steel after first casting should be accounted for and recognised in the determination of the product's product carbon footprint.

(10.4.3) The requirements of Criteria 10.4.6 and 10.4.7 apply to the determination of direct (Scope 1) GHG emissions. These requirements will differ in some respects from those of the regional or international standard adopted by the site for other purposes. In all cases, the requirements of Criterion 10.4.6 or 10.4.7 as applicable take precedence, for the purpose of determining the ResponsibleSteel crude steel GHG emissions intensity performance for the site, and for the purpose of determining the allocation of the site's total GHG emissions to products, co-products and by-products, respectively.

(10.4.3.a) The direct (Scope 1) GHG emissions associated with the use of charcoal, bio-coal, bio-coke, other biological sources of carbon, used plastic, used tyres and waste/ reclaimed wood etc for iron- or steelmaking must be counted in full, as for all direct (Scope 1) GHG emissions.

(10.4.3.b) GHG offsets are not recognised for the purpose of determining the site's GHG emissions intensity, in relation to its direct (Scope 1), energy indirect (Scope 2) or upstream indirect (Scope 3) GHG emissions. Likewise, carbon sequestration associated with land-use (e.g. forest management) whether on- or off-site, is not recognised for the purpose of determination of the site's crude steel GHG emissions intensity. Carbon sequestration associated with biomass production is considered in 10.4.5.c, below. ResponsibleSteel recognises that the role of offsets will need to be considered in relation to definitions and standards for 'net zero' steel, and will consult with its membership and other stakeholders on these issues as required.

(10.4.3a & 10.4.4) ResponsibleSteel currently recognises the following international or regional standards for this purpose:

- The GHG Protocol and EN 19694 (parts as applicable) for measurement of GHG emissions by steelmaking and other sites.
- ISO 14404 (parts as applicable) for the measurement of CO2 emissions by steelmaking sites, as applicable.

(10.4.4.a) Imported electricity generated from the use of the site's process gases and waste energy and used upstream of the production of crude steel is excluded. This ensures that the utilisation of process gases and waste energy for power generation is recognised even if the energy is generated off site and is re-imported. See 10.4.7.d.i for further details on the GHG accounting of process gas used for power generation.

(10.4.5.b) the embodied GHG values referenced by ResponsibleSteel differ from the 'upstream emission factors (Scope 1, Scope 3)' referenced in the worldsteel CO2 Data Collection methodology in that the ResponsibleSteel embodied GHG values include consideration of GHGs other than CO2, and also include consideration of the GHG emissions associated with the extraction and transportation of the input materials. The embodied GHG value also differs from the 'direct emission factors' referred to in ISO 14404. Direct emission factors are an estimate of the CO2 or CO2e emitted to the atmosphere when an input material containing carbon is used for the production of steel. In contrast, the embodied GHG value is an estimate of the upstream 'cradle to gate' GHG emissions associated with the production of the input material prior to its use.

(10.4.5.b) Non-ferrous metals and ferro-alloys

A default value equivalent to the ResponsibleSteel Decarbonisation Progress Level 1 performance threshold value for the primary production of steel from iron ore without multiplication by the conservative factor of 1.2 (currently equal to 186 2.8 tonnes CO2 e/ tonne crude steel) shall be used as a replacement value for the determination of the upstream indirect (Scope 3) GHG emissions for all non-ferrous metal and ferro-alloy additives, as specified in Table A1. If primary data shows that the upstream embodied GHG value for a non-ferrous metal or ferro-alloy is higher than the replacement value, the replacement value shall still be used. If primary data shows that the upstream embodied GHG value for a non-ferrous metal or ferro-alloy is lower than the replacement value, the lower value may be used. See Guidance to 10.6.4.c for an explanation.

(10.4.5.b) Except as specified above in the case of non-ferrous metals and ferro-alloys, when the steelmaker has received primary data from a supplier for the embodied GHG value for the supplied input material the steelmaker must use these data for the determination of its upstream indirect (Scope 3) GHG emissions and may not use the default embodied GHG value for the material even if the default value is lower.

(10.4.5.b) If a steelmaker has primary data provided by some but not all suppliers, primary data must be used for the proportion of the material for which primary data is available, and default embodied GHG values must be used for the proportion of the material for which primary data is not available.

(10.4.5.c) For the different categories of upstream indirect (Scope 3) GHG emissions see: Corporate Value Chain (Scope 3) Accounting and Reporting Standard: Supplement to the GHG Protocol Corporate Accounting and Reporting Standard, GHG Protocol, 2011. The eight categories of upstream indirect (Scope 3) emissions are: 1. Purchased goods and services; 2. Capital goods; 3. Fuel- and energy-related activities (not included in direct (Scope 1) or energy indirect (Scope 2) GHG emissions; 4. Upstream transportation and distribution; 5. Waste generated in operations; 6. Business travel; 7. Employee commuting; 8. Upstream leased assets. For steelmakers the key categories for indirect (Scope 3) GHG emissions considered in this standard are categories 1, 3, 4 and 5. For mining companies they are categories 1, 3 and 7.

(10.4.5.c) ResponsibleSteel-recognised international standards to support the determination of the embodied GHG values for input materials are currently:

- ISO 14040:2006, Environmental management – Life cycle assessment – Principles and framework
- ISO 14044:2006, Environmental management – Life cycle assessment – Requirements and guidelines
- ISO 14067:2018, Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification
- PAS 2050:2011, Specification for the assessment of the life cycle greenhouse gas emissions of goods and services

(10.4.5.c) Supply specific primary data may be an average value for the embodied GHG emissions of the specified material supplied by the company, or may be more specific. More specific data should be used where this is available.

(10.4.5.c) Data provided by a third party (e.g. company- or site-specific data listed on a third party database) may be used if it meets the requirements listed in 10.4.5.c and is explicitly confirmed by the company that produces the relevant material.

(10.4.5.c) Mined materials

For mined materials the supplier's estimate of its own upstream indirect (Scope 3) GHG emissions for the material must include consideration of GHG Protocol Scope 3 categories 1, 3 and 7:

1. Purchased goods and services
3. Fuel- and energy-related activities (not included in direct (Scope 1) or energy indirect (Scope 2) GHG emissions
7. Employee commuting.

NOTE: Category 7 includes the emissions associated with 'fly-in fly-out' working at mine sites.

Where a supplier of mined materials has previously determined the direct (Scope 1) and energy indirect (Scope 2) GHG emissions of the supplied input materials in accordance with a ResponsibleSteel recognised international standard, but has not yet included their upstream indirect (Scope 3) GHG emissions, an estimate of their upstream indirect (Scope 3) GHG emissions must be included in the total reported emissions. The estimate may be provisional.

Primary data may be provided as an average for the specified material for the supplying company, or it may be specific to the mine or a group of mines of origin, including, for example, mines within a defined geographical area such as a country.

ResponsibleSteel recommends that suppliers of mined materials/ metals follow the recommendations of Santero and Hendry (2016) in relation to the partition of GHG emissions between different product streams or categories (Santero, N and Hendry, J. Harmonization of LCA methodologies for the metal and mining industry, The International Journal of Life Cycle Assessment (2016) 21: 1543 – 1553). Independently verified data which applies another allocation methodology would be considered acceptable.

In the case of mine sites that are owned and/or operated by the steelmaker, the specifications for the determination of emissions associated with the extraction and transportation of input materials apply on the same basis as if the input materials were supplied by a third party.

(10.4.5.c) Natural gas, LNG

Primary data for the supply of natural gas may be specific to the supplying company, to a country from which the gas is sourced, or to a more granular level where such data is available.

(10.4.5.c) Charcoal and other input materials of biological origin

The default upstream embodied GHG value for input materials from biological sources (including the GHG emissions related to land use, management, harvesting and processing of materials) is zero (see Annex 5, Table A1). These input materials may be assigned a negative upstream embodied GHG value (i.e. recognising the carbon sequestered during biological growth) only if the supplier provides primary data for the GHG emissions for the supplied material determined in accordance with either:

- ISO 14067:2018, Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification
- PAS 2050:2011, Specification for the assessment of the life cycle greenhouse gas emissions of goods and services

The determination must include explicit accounting for the GHG emissions associated with land use change and forest/agricultural management for at least 20 years prior to harvest, as well as the GHG emissions associated with harvesting and further processing and transportation of the input material.

(10.4.5.c) Scrap and post-consumer reclaimed material

The use of primary data is not applicable in the case of scrap and post-consumer reclaimed material, for which the default embodied GHG value of zero always applies.

(10.4.5.c, d) It is the responsibility of the purchaser to ensure that an estimate for the GHG emissions associated with transportation of the input material up to the point of delivery has been provided in accordance with the point of delivery specified in the purchase contract (e.g. free on rail at mine gate, free on board, or including carriage, insurance and freight). The purchaser is responsible for determining any additional estimated GHG emissions associated with further carriage of the material by the purchaser.

Estimates should consider the transportation distance, mass of material and the mode of transportation (road, rail, ship) and the related carrier type. Emissions may be estimated using LCA software such as GaBi by Sphera.

In the case of scrap and other recycled or reclaimed materials the GHG emissions associated with transportation should be estimated from the commercial collection point to the ResponsibleSteel certified site gate.

(10.4.6) The site must follow the requirements specified in 10.4.6 for the determination of the ResponsibleSteel crude steel GHG emissions intensity performance for the site. Different GHG accounting rules may be applicable to the determination of the product carbon footprint for products manufactured at the site, in conformity with the specific standard the site has selected for this purpose under Requirement 10.6.4.

(10.4.6.a) Examples of carbon embedded in final products include the carbon in carbon steels, and carbon embedded in slag.

(10.4.6.b) The allocation of GHG emissions refers to the partition of GHG emissions between a range of products, co-products on or by-products. GHG emission credits for the capture and utilisation or storage of process gases are considered separately in 10.4.7.

(10.4.6.c) The deduction of GHG emissions for the export of intermediate products must be determined on the basis of the proportion of exported intermediate product by mass and is not related to the value of the intermediate product.

(10.4.7) Process gases that are captured and subsequently utilised either on- or off-site, for example for the generation of electricity, as inputs for further production, for carbon capture and long-term storage, or for other uses are accounted for as described in this section of the Production Standard. The accounting for the GHG emissions associated with process gases from the production of steel follows the general approach of the worldsteel CO2 Data Collection methodology (worldsteel CO2 Data Collection, User Guide, version 10, 24 February 2021). In general terms:

- Process gases that are emitted to the atmosphere are accounted for as direct (Scope 1) emissions under 10.4.3.
- The GHG emissions that would have resulted from the release of the process gas to the atmosphere if the process gases were not captured is determined and used as a baseline (referred to as 'Scope 1.1' emissions in the worldsteel CO2 methodology)
- The baseline level of emissions is then reduced by assigning a 'credit' that recognises the system level reduction of GHG emissions from the utilisation or storage of these gases.

The intent is to incentivise actions and investments that reduce system level GHG emissions through their recognition in the ResponsibleSteel crude steel GHG emissions intensity performance measure.

In the case of credits for energy generation, and credits for carbon capture and utilisation, the value of the credits will decrease over time as the global grid intensity and GHG emissions intensity for alternative production methods decreases.

(10.4.7.a) The following direct emission factors, as stipulated in ISO, are to be utilised for the calculation of process gas emissions.

| Emission source | Direct emission factor (t CO2e/kNm3) |
|---|---|
| Coke oven gas | 0.836 |
| Blast furnace gas | 0.891 |
| Basic oxygen furnace gas | 1.512 |

(10.4.7.d.i) Credit for the use of process gases and waste energy for power generation:

- Where electricity is generated on-site and used upstream of the production of crude steel this results in a reduction of the quantity of imported energy, and a consequent reduction in the site's upstream indirect (Scope 2) GHG emissions. Where electricity is generated from the use of the site's process gases off-site and is re-imported, the upstream indirect (Scope 2) emissions for this imported energy is excluded from the determination of the site's upstream indirect (Scope 2) GHG emissions under 10.4.4.a.
- The most up-to-date worldsteel default value must be used. As of June 2022 the worldsteel default value is that 9.8 GJ of process gas generates 1 MWh of power, equivalent to a 37% conversion efficiency.
- The GHG emissions credit associated with the production of crude steel must use the most recent global grid intensity as estimated by the IEA. The most recent global $CO_2$ intensity from electricity generation at the time of publication of this document is the value for 2023, 455 $gCO_2$/kWh (https://www.iea.org/reports/electricity-2025).

(10.4.7.e) the internal re-use or recycling of process gases may have further advantages in terms of efficiency improvements (e.g. in relation to reduced reductant requirements), but these are considered to be sufficiently accounted for through general reductions in direct (Scope 1), indirect (Scope 2) and/or upstream indirect (Scope 3) GHG emissions, and are not considered separately.

(10.4.7.f) Examples of co-products that may be manufactured from captured process gases include: building materials such as concrete or carbonate aggregates; chemical intermediates such as methanol, formic acid or syngas; fuels such as aviation fuels, fuel ethanol or methane; food additives; polymers; carbon fibres; and other products.

(10.4.7.f.ii and iii) The site may select what it considers to be the most appropriate international standard for the purpose of determining the product carbon footprint as referred to in 10.4.7.f.ii and iii. The ResponsibleSteel **Production** Standard does not specify which international standard is likely to be the most appropriate, but specifies that the report on the determination must be published and so be subject to public scrutiny.

(10.4.7.g) Carbon capture and storage refers to the capture of constituents of process gases for permanent storage (for example in geological formations).

(10.4.7.g.i) Upstream indirect (Scope 3) emissions associated with the CCS project (including emissions associated with capital goods) are not included in the crude steel GHG emissions intensity determination.

# 1.2. Determination of crude steel GHG emissions intensity

## 1.2.a. Requirements of the Production Standard

| | Criterion 10.6 | Progress |
|---|---|---|
| 10.6.1. | Measurement of GHG emissions, crude steel production and scrap use:<br>a) The site measures and records on a consistent basis:<br>• Its annual production of crude steel (saleable tonnes)<br>• The GHG emissions (tonnes $CO_2e$) associated with producing crude steel in accordance with the requirements specified in Criterion 10.4 of this Standard.<br>b) The site's data is collated and recorded for the site's previous year of operation. | |
| 10.6.2. | The site calculates and records its ResponsibleSteel crude steel GHG emissions intensity performance in accordance with the equation:<br>*ResponsibleSteel crude steel GHG emissions intensity performance (tonne $CO_2e$/tonne) = total GHG emissions (tonnes $CO_2e$) for the previous year of operation divided by saleable tonnes of crude steel produced in the previous year of operation (tonnes)* | |

## 1.2.b. Guidance Material (from the Guidance & Annexes Document)

| Criterion 10.6 | Progress |
|---|---|
| (10.6.1.a) For the purpose of determining the ResponsibleSteel GHG emissions intensity for crude steel, crude steel production is measured at the point that continuous casting or ingot casting has been completed, and prior to any further processing such as roughing or hot rolling. 'Tonnage' means 'saleable tonnage' (see Glossary: Crude steel).<br>(10.6.1.b). Site-specific data must be for a specified year of operation and be representative of current production. The year of operation may be defined as a calendar year, or in relation to a reporting year for the site. The completed year immediately prior to the audit shall be used as the default period, but if an earlier year is used this shall be reported and justified. | |

# 1.3. GHG emissions disclosure and reporting

## 1.3.a. Requirements of the Production Standard

### Criterion 10.7: GHG emissions disclosure and reporting

Core + Progress

**Key measures of the site's GHG emissions performance are publicly disclosed.**

| | |
|---|---|
| 10.7.1.<br>Core | The site has collated and submitted the following information (or in the case of a defined portfolio of sites, as defined in the Glossary, information for each site within that portfolio):<br>a) The total GHG ($CO_2e$) or $CO_2$ emissions for each site, calculated in accordance with the requirements of Criterion 10.3 and in accordance with the specifications defined in Criterion 10.4, where applicable.<br>b) The basis for determining the total GHG emissions for each site, including:<br>(i) The international or regional standard(s) used<br>(ii) Whether or not the determination has been prepared in conformity with the requirements specified in Criterion 10.4<br>(iii) Whether the determination includes the purchase of renewable energy certificates or similar mechanisms, such as power purchase agreements, virtual power purchase agreements, or green tariffs paid in relation to the sourcing of the site's electricity, and, if so, a description of the source and quantity of certificates or agreements<br>(iv) A clear description of the scope boundary for the determination, including which emissions associated with extracting, preparing, processing and transporting input materials have been included or excluded in the determination<br>(v) An explanation of the GHGs that the determination accounts for, or, if only $CO_2$ emissions have been considered, a clear statement to this effect<br>(vi) The level of assurance provided by the verification body for the site's determination of the reported GHG emissions, in accordance with the definitions and specifications for the level of assurance as specified in ISO 14064-3:2019 Greenhouse gases – Part 3: Specification with guidance for the verification and validation of greenhouse gas statements<br>(vii) The date of the determination<br>(viii) An explanation of variations in figures reported using different measurement standards, if the site has used more than one standard and has reported different figures as a result.<br>c) In the case of a portfolio of sites (as specified in 10.5.1) the basis for determining the total GHG emissions should include all the elements listed in 10.7.1a and 10.7.1.b, plus:<br>(i) The number of sites in the defined portfolio<br>(ii) The names of the sites in the defined portfolio<br>(iii) A consolidated summary of each of the elements listed in 10.7.1a to 10.7.1b, for the portfolio as a whole.<br>d) The time-specific medium-term targets for GHG emissions for the site or the defined portfolio of sites as determined to meet the requirements of 10.5.1 and 10.5.2. |

| | |
|---|---|
| 10.7.2.<br>Progress | Crude steel GHG emissions intensity performance<br>a) The site has collated the following information for each site (including for individual sites in a group, if applicable, as specified under 10.7.2.b):<br>(i) Name of the site<br>(ii) Annual production of crude steel (saleable tonnes) for the site<br>(iii) Proportion of scrap used as an input for crude steel production at the site (as determined in 10.6.1)<br>(iv) The site's ResponsibleSteel crude steel GHG emissions intensity performance (metric tonnes of $CO_2e$/metric tonne crude steel), as determined in conformity with the requirements of Criterion 10.4 and 10.6<br>(v) The ResponsibleSteel crude steel GHG emissions intensity Decarbonisation Progress Level (1, 2, 3 or 4) as specified in 10.6.3.c that the site has achieved<br>(vi) The level of assurance provided by the verification body for the site's determination of its reported GHG emissions, in accordance with the definitions and specifications for level of assurance specified in ISO 14064-3:2019 Greenhouse gases – Part 3: Specification with guidance for the verification and validation of greenhouse gas statements<br>(vii) Date of the determination<br>(viii) Whether the site's crude steel GHG emissions intensity performance will be reported publicly for the individual site, or as a weighted average with other sites.<br>b) In the case of a site that wishes to disclose its crude steel GHG emissions intensity performance as a weighted average with other sites, the site has collated the following information, in addition to the elements listed in 10.7.2a:<br>(i) Number of sites to be included in the group average<br>(ii) Names of the sites to be included in the group average<br>(iii) Name of the strategic business unit under which the sites are managed<br>(iv) Type of steel produced by the sites: carbon and low alloy steels (<8% alloys and other elements); stainless steels (≥10.5% chromium); high alloy steels (≥8% alloys and <10.5% chromium)<br>Evidence demonstrating that the listed sites produce the same type of steel and are managed as a strategic business unit. |

**Mandatory guidance for 10.7.1**

(10.7.1.b) ISO 14064-3:2019 Greenhouse gases – Part 3: Specification with guidance for the verification and validation of greenhouse gas statements defines two possible levels of assurance: verification at a 'reasonable level of assurance', and verification at a 'limited level of assurance'. Preferably, verification should be provided at the reasonable level of assurance but must be provided at least at the limited level of assurance. Either way, under this requirement, the site must report the level of assurance provided for the verification of its GHG emissions data.

**Mandatory guidance for 10.7.2**

The ResponsibleSteel crude steel GHG emissions intensity Progress Level for a group of sites may be a weighted average of the crude steel production volume (saleable tonnes) for each member of the group where:

- All the sites within the group are managed within the same strategic business unit and produce the same type of steel: carbon and low alloy steels (<8% alloys and other elements); stainless steels (≥10.5% chromium); or high alloy steels (≥8% alloys and <10.5% chromium) and
- Each site within the group must be successfully audited against the Core Site Certification requirements and must itself have achieved the Progress Level requirements for the responsible sourcing of input materials and climate change and GHG emissions, at least to Progress Level 1, where levels are specified.

(10.7.2.b) The steelmaker must be able to demonstrate that the sites within the group are managed as a strategic business unit (see Glossary), meet customer orders through a collective production schedule and do not market their own products as separate entities.

(10.7.2.b) Sites within a group may use different steelmaking technologies, including, for example, EAF and BF/ BOF sites within one group of sites reporting an averaged GHG emissions intensity for its crude steel production.

# Section 2: ResponsibleSteel classification system for decarbonisation progress

## About this section

ResponsibleSteel has published this universally applicable classification system to assess the decarbonisation progress of all steelmaking sites on a level playing field. ResponsibleSteel's Decarbonisation Progress Levels (DPLs) have been designed to support propagation of lower and near-zero emissions steel markets, and deliver global sectoral decarbonisation outcomes.

A steelmaking site's DPL can be determined using the site-level crude steel GHG emissions intensity (refer to Section 1) and scrap percentage (as outlined in this Section), according to the requirements set out by ResponsibleSteel.

The first version of the Decarbonisation Progress Levels was published in 2022 in Version 2.0 of the Production Standard, and following a 12-month consultation period, was revised and published with minor updates in Version 2.1 of the Production Standard in 2024. The DPLs were developed based on considerable discussions with the ResponsibleSteel membership and other stakeholders. DPL 1 represents the industrial average, determined based on extensive emissions modelling using site-specific data for approximately 300 steelmaking sites covering all key geographies (in partnership with CRU Group), and validated using real steelmaker data. DPL 4 represents near-zero emissions and has been aligned with the International Energy Agency (IEA)'s proposed threshold for 'near-zero emission production' of steel. The intermediate DPLs 2 and 3 have been aligned with the proposed IEA performance ranges and are equidistant step-changes between DPL 1 and DPL 4. For more details on the design of the DPLs, refer to the Understanding ResponsibleSteel's Decarbonisation Progress Levels guide.

This section contains two parts, each with mandatory requirements from the Production Standard and guidance material from the Guidance & Annexes document:

(iv) Scrap percentage calculation and classification system for decarbonisation progress (excerpts from Criterion 10.6)
(v) GHG emissions disclosure and reporting (excerpts from Criterion 10.7)

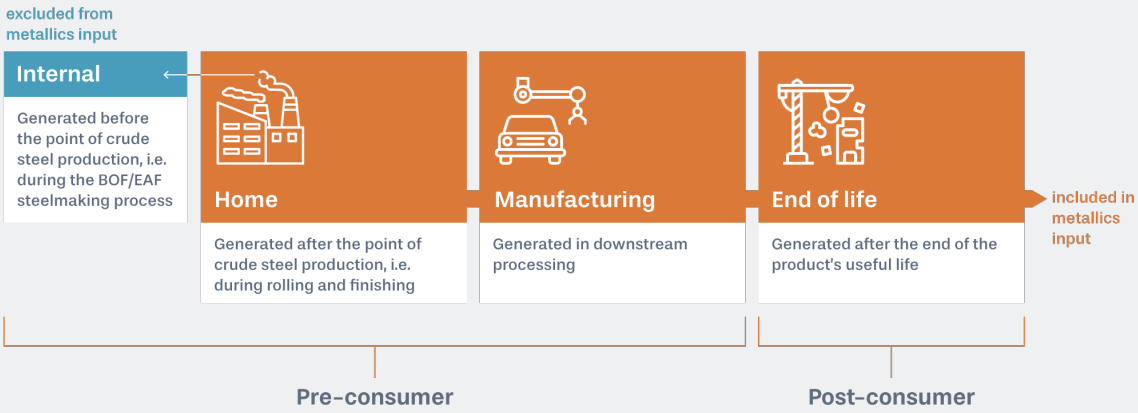
**A note about DPL requirements for ResponsibleSteel certified sites**

Within the broader ResponsibleSteel certification system, there is a mandatory achievement of at least DPL 1 to achieve Steel Certification. A steelmaking site's advancement towards more ambitious DPLs is required in line with its corporate-level decarbonisation pathway and transition action plan (required in Criterion 10.1) and site-level emissions reduction targets and planning (required in Criterion 10.5). Decarbonisation progress is therefore not only classified in the Production Standard, but also incentivised and driven towards achieving DPL 4 'near zero'.

# 2.1: Scrap percentage calculation and classification system for decarbonisation progress

## 2.1.a. Requirements of the Production Standard

| | **Criterion 10.6:** Progress |
|---|---|
| 10.6.1. | Measurement of GHG emissions, crude steel production and scrap use:<br>a) The site measures and records on a consistent basis:<br>• Its annual production of crude steel (saleable tonnes)<br>• The quantity of iron, steel scrap and other scrap metals used in its annual production of crude steel (tonnes)<br>• The GHG emissions (tonnes $CO_2e$) associated with producing crude steel in accordance with the requirements specified in Criterion 10.4 of this Standard.<br>b) The site's data is collated and recorded for the site's previous year of operation. |
| 10.6.2. | The site calculates and records its ResponsibleSteel crude steel GHG emissions intensity performance in accordance with the equation:<br>*ResponsibleSteel crude steel GHG emissions intensity performance (tonne $CO_2e$/tonne) = total GHG emissions (tonnes $CO_2e$) for the previous year of operation divided by saleable tonnes of crude steel produced in the previous year of operation (tonnes)* |
| 10.6.3. | a) The GHG emissions intensity of the crude steel produced at the site has been determined in accordance with the requirements of 10.4.<br>b) The GHG emissions intensity (metric tonnes of $CO_2e$/metric tonne crude steel) of the crude steel produced at the site is at least ResponsibleSteel Decarbonisation Progress Level 1, as specified in accordance with the formula:<br>$y \leq 2.8 - 2.3\,(x)$<br>Where:<br>*y = the determined GHG emissions intensity for crude steel production (tonne $CO_2e$/ tonne crude steel) at the site*<br>*x = the proportion of scrap used as an input material for producing crude steel at the site, specified as the percentage of the total metallics input* |
| | **(10.6.3.b) Mandatory guidance:**<br>*Figure 3 – Scrap Definitions* |




Note: definitions of types of scrap are aligned to ISO 20195: 2019(E) Life cycle inventory calculation methodology for steel products; and the definition of scrap has been extended to include other metals in addition to iron and steel scrap.

The proportion of scrap used as an input material is specified as the percentage scrap share of the total metallics input for crude steel production, according to the following equation:

$$\text{Scrap share of metallic inputs (\%)} = \frac{\sum_{s=1}^{N}(f_{met,s} * Q_{in,s})}{\sum_{p=1}^{N}(f_{met,p} * Q_{in,p}) + \sum_{s=1}^{N}(f_{met,s} * Q_{in,s})}$$

Where:

$Q_{in}$ = quantity of material input into steelmaking (tonnes).

$f_{met}$ = metallic fraction of the input material, which in the absence of primary data can be assumed to be 98% for scrap, 94% for DRI/HBI, and 94% for pig iron (as defined in the SBTi Steel Sector Guidance).

s = secondary metallic-containing materials, defined as home scrap, manufacturing scrap and end-of-life (EOL) scrap (i.e., excluding internal scrap), inclusive of both ferrous scrap and non-ferrous scrap.

p = primary metallic-containing materials, including pig iron, DRI, HBI, ferro-alloys, and non-ferrous metals.

Note: if scrap is the only input material, then the scrap input specified as the percentage share of the metallics input will be 100%. If the proportion of scrap were to be measured as a percentage of the saleable production of crude steel, the proportion of scrap would be greater than 100%, as some metallic material is lost during processing, and so it takes more than one tonne of metal in scrap to produce one tonne of saleable production.

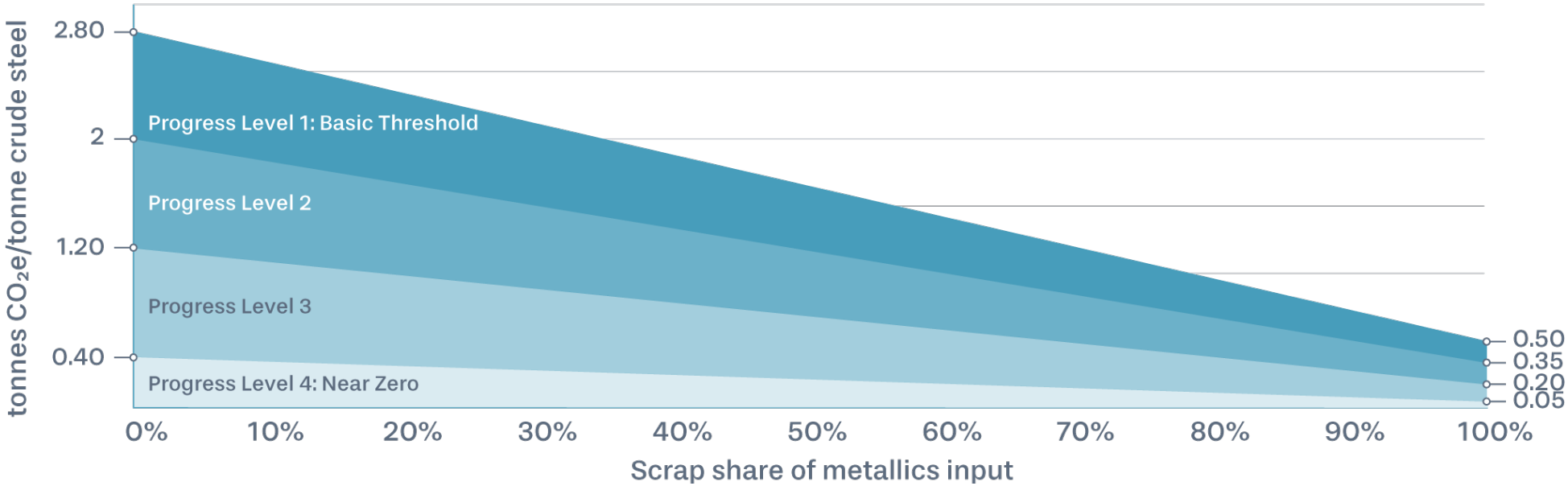
c) the ResponsibleSteel GHG emissions intensity for crude steel production (tonnes $CO_2e$/tonne crude steel) (y) has been verified as being below the applicable ResponsibleSteel Decarbonisation Progress Level for the proportion of scrap used at the site as input material (x), according to the values of (m) and (b) shown in the table below and the formula:

$$y \leq b - m(x)$$

*Table 1 – ResponsibleSteel Decarbonisation Progress Level formulae*

| | b: ResponsibleSteel crude steel GHG emissions intensity performance using 0% scrap as input (tonne $CO_2e$/ tonne crude steel) | m: gradient | ResponsibleSteel crude steel GHG emissions intensity performance using 100% scrap as input (tonne $CO_2e$/ tonne crude steel) |
|---|---|---|---|
| ResponsibleSteel Decarbonisation Progress Level 1 | 2.80 | 2.30 | 0.50 |
| ResponsibleSteel Decarbonisation Progress Level 2 | 2.00 | 1.65 | 0.35 |
| ResponsibleSteel Decarbonisation Progress Level 3 | 1.20 | 1.00 | 0.20 |
| ResponsibleSteel Decarbonisation Progress Level 4 | 0.40 | 0.35 | 0.05 |

*Figure 4 – ResponsibleSteel Decarbonisation Progress Levels*



## 2.1.b. Guidance Material (from the Guidance & Annexes Document)

### Criterion 10.6

(10.6.1.a) For the purpose of determining the ResponsibleSteel GHG emissions intensity for crude steel, crude steel production is measured at the point that continuous casting or ingot casting has been completed, and prior to any further processing such as roughing or hot rolling. 'Tonnage' means 'saleable tonnage' (see glossary: Crude steel).

(10.6.1.a) For the purpose of determining the ResponsibleSteel GHG emissions intensity for crude steel, the quantity of scrap used in the annual production of crude steel includes end of life (EOL) scrap, manufacturing scrap and home scrap, but excludes internal scrap (see glossary). Crude steel that is rejected for quality reasons before the point at which the crude steel saleable tonnage is determined and which is returned to the steelmaking process is considered to be internal scrap. Metal waste that is generated after the point of measurement of crude steel saleable tonnage, and which is returned to the steelmaking process is considered to be home scrap.

(10.6.1.b). Site-specific data must be for a specified year of operation and be representative of current production. The year of operation may be defined as a calendar year, or in relation to a reporting year for the site. The completed year immediately prior to the audit shall be used as the default period, but if an earlier year is used this shall be reported and justified.

**Notes on ResponsibleSteel's Decarbonisation Progress Levels:**

The specification of the ResponsibleSteel Decarbonisation Progress Level 1 has been subject to extensive discussions with the ResponsibleSteel membership and other stakeholders since 2018. The final specification is based on the scope boundaries and GHG accounting rules specified in Criterion 10.4. It has been determined taking account of: existing publicly accessible estimations on GHG emissions for steel production; site-specific data made available to ResponsibleSteel by its steelmaker member organisations, following both the worldsteel CO2 data methodology and the worldsteel LCI methodology; site-specific data for approximately 300 steelmaking sites around the world modelled by the consultancy organisation CRU; and the crude steel GHG emissions intensity reference values determined by IEA for steel production using pulverised coal injection (PCI) and electric arc furnace (EAF) technologies in the IEA report 'Achieving Net Zero Heavy Industry Sectors in G7 Members' (May 2022).

Finally, the threshold for the ResponsibleSteel 'near zero' Decarbonisation Progress Level 4 has been aligned with the IEA's proposed threshold for 'near zero emission production' of steel, and the intermediate Decarbonisation Progress Levels 2 and 3 have been aligned with the proposed IEA performance ranges.

Review and revision of ResponsibleSteel Decarbonisation Progress Levels

The specified Progress Levels will be reviewed on a five-yearly basis and may be revised with the specific objective "to achieve the fastest global transition to a near zero steel sector". The review will be carried out by ResponsibleSteel with the support of a working group of ResponsibleSteel members comprising equal numbers of business and civil society members, in accordance with a process to be agreed and overseen by the ResponsibleSteel board of directors.

The review will include consideration of:

i. Projections at the time for the sectoral transition required to achieve the goals of the Paris Agreement;

ii. Available data on the progress of the steel sector worldwide in reducing GHG emissions intensity for the production of crude steel;

iii. Projections for further reductions based on progress in the commercialization of new technologies, and public commitments by steelmakers worldwide;

iv. The status of demand side commitments to purchase/ support 'low GHG'/ 'near zero'/ 'net zero' steel, including consideration of public procurement commitments, private sector commitments, finance sector commitments and relevant policies in relation to trade, carbon pricing, etc.

Revised Decarbonisation Progress Levels, if agreed, will be applicable after a 2-year transition.

Sites producing high alloy and stainless steels

The Decarbonisation Progress Levels in 10.6.3.b and 10.6.3.c have been specified excluding sites specialising in the production of high alloy and stainless steels, and excluding the contribution of upstream indirect (Scope 3) GHG emissions associated with the use of non-ferrous metal and ferro-alloys. The Progress Levels and thresholds are therefore based on global performance for steel production excluding the GHG emissions associated with the use of non-ferrous metals in steelmaking.

Technical specifications and Decarbonisation Progress Levels applicable to the ResponsibleSteel certification of high alloy steels and stainless steels are subject to ongoing discussion with stakeholders. They will be developed following the ResponsibleSteel Standard Development Procedures and will be submitted for member approval once finalised.

Pending finalisation of technical specifications and Decarbonisation Progress Levels applicable to the ResponsibleSteel certification of high alloy and stainless steels a replacement value for the upstream indirect (Scope 3) GHG emissions for non-ferrous metals and ferro-alloy input materials shall be used for the determination of the upstream indirect (Scope 3) GHG emissions for the crude steel produced at the site. The replacement value is equivalent to the ResponsibleSteel default embodied GHG value for 'Cold iron, generic', as specified in Table A1. This is intended to have the effect of removing variability in the measurement of the GHG emissions intensity determination of a site related to variations in its use of non-ferrous metals and ferro-alloy input materials.

Sites producing stainless and high alloy steels may apply for certification using the current Decarbonisation Progress Levels. If a site meets the specified Progress Level it may market and sell steels products that are produced at the site and that contain less than 8% alloy content as ResponsibleSteel Certified steel products, in accordance with ResponsibleSteel claims guidance (forthcoming).

However, sites are not permitted to market or sell steel products that are made from steel that contains more than 8% alloy content as ResponsibleSteel certified until the technical specifications and Decarbonisation Progress Levels for high alloy and stainless steels have been finalised and approved.

Sites that produce both high alloy or stainless steels and lower alloy steels in different production lines, or through batch processing, and that are able to determine the GHG emissions intensities separately for crude steel production lines or batches, will in future be permitted to market steels with less than 8% alloy content as ResponsibleSteel certified in accordance with the Decarbonisation Progress Level achieved for the production line or batch, subject to the development of guidance by ResponsibleSteel on the application of this approach.

This approach is intended to allow sites that are producing a range of different steels to take part in the programme at the earliest opportunity. It ensures that high alloy steels are not marketed as ResponsibleSteel certified when a major part of their GHG emissions profile, associated with their use

of non-ferrous metals and ferro-alloys, has not been subject to any evaluation or comparison. And finally, it ensures that high alloy steels produced at sites that specialise in producing high alloy steels only are not unfairly disadvantaged in comparison to similar steels produced at sites that produce high alloy steels together with lower alloy steels.

## 2.2. GHG emissions disclosure and reporting

### 2.2.a. Requirements of the Production Standard

**Criterion 10.7: GHG emissions disclosure and reporting**

**Key measures of the site's GHG emissions performance are publicly disclosed.**

Core + Progress

| | |
|---|---|
| 10.7.2. Progress | Crude steel GHG emissions intensity performance<br>a) The site has collated the following information for each site (including for individual sites in a group, if applicable, as specified under 10.7.2.b):<br>(i) Name of the site<br>(ii) Annual production of crude steel (saleable tonnes) for the site<br>(iii) Proportion of scrap used as an input for crude steel production at the site (as determined in 10.6.1)<br>(iv) The site's ResponsibleSteel crude steel GHG emissions intensity performance (metric tonnes of $CO_2e$/metric tonne crude steel), as determined in conformity with the requirements of Criterion 10.4 and 10.6<br>(v) The ResponsibleSteel crude steel GHG emissions intensity Decarbonisation Progress Level (1, 2, 3 or 4) as specified in 10.6.3.c that the site has achieved<br>(vi) The level of assurance provided by the verification body for the site's determination of its reported GHG emissions, in accordance with the definitions and specifications for the level of assurance specified in ISO 14064-3:2019 Greenhouse gases – Part 3: Specification with guidance for the verification and validation of greenhouse gas statements<br>(vii) Date of the determination<br>(viii) Whether the site's crude steel GHG emissions intensity performance will be reported publicly for the individual site, or as a weighted average with other sites.<br>b) In the case of a site that wishes to disclose its crude steel GHG emissions intensity performance as a weighted average with other sites, the site has collated the following information, in addition to the elements listed in 10.7.2.a:<br>(i) Number of sites to be included in the group average<br>(ii) Names of the sites to be included in the group average<br>(iii) Name of the strategic business unit under which the sites are managed<br>(iv) Type of steel produced by the sites: carbon and low alloy steels (<8% alloys and other elements); stainless steels (≥10.5% chromium); high alloy steels (≥8% alloys and <10.5% chromium) |

| | |
|---|---|
| | (v) Evidence demonstrating that the listed sites produce the same type of steel and are managed as a strategic business unit. |

**Mandatory guidance for 10.7.2**

The ResponsibleSteel crude steel GHG emissions intensity Progress Level for a group of sites may be a weighted average of the crude steel production volume (saleable tonnes) for each member of the group where:

- All the sites within the group are managed within the same strategic business unit and produce the same type of steel: carbon and low alloy steels (<8% alloys and other elements); stainless steels (≥10.5% chromium); or high alloy steels (≥8% alloys and <10.5% chromium) and
- Each site within the group must be successfully audited against the Core Site Certification requirements and must itself have achieved the Progress Level requirements for the responsible sourcing of input materials and climate change and GHG emissions, at least to Progress Level 1, where levels are specified.

(10.7.2.b) The steelmaker must be able to demonstrate that the sites within the group are managed as a strategic business unit (see Glossary), meet customer orders through a collective production schedule and do not market their own products as separate entities.

(10.7.2.b) Sites within a group may use different steelmaking technologies, including, for example, EAF and BF/ BOF sites within one group of sites reporting an averaged GHG emissions intensity for its crude steel production.

# Section 3: ResponsibleSteel requirements for GHG emissions intensity declarations at product level

## About this section

ResponsibleSteel has published product-level requirements for GHG emissions calculation and disclosure separately, as necessary complements to the site-level GHG emissions metrics highlighted in Sections 1 and 2.

The product-level GHG emissions intensity calculation is stipulated on a 'cradle-to-gate' basis and communicated as a Global Warming Potential (GWP) figure. The methodology must follow a life cycle assessment (LCA) approach, and the results published as a Product Carbon Footprint (PCF) or Environmental Product Declaration (EPD), according to the rules set out in a regionally or globally recognised standard (or multiple of). The GWP value within modules A1-A3 of the LCA (including raw material supply, transportation, and product manufacture), expressed in tonnes $CO_2e$ per tonne of steel product, is essential for downstream steel consumers to determine their own upstream scope 3 emissions.

A plethora of standards exist that facilitate the calculation of a steel product's GHG emissions intensity. Although useful, product-level data cannot be compared due to the heterogeneity of emissions accounting methodologies across standards, programme operators, regions, products, and companies. Product Category Rules (PCR) were introduced to support harmonisation of emissions accounting rules across products with a similar function or used within the same downstream market (e.g. steel construction products). Nevertheless, significant flexibility still exists within PCRs. ResponsibleSteel notes there are industry wide initiatives to harmonise across product-level methodologies, for example, please see the IDDI Guidance Material on PCR Harmonisation (2024) related to construction PCRs.

The inherent lack of comparability across steel product-level emissions intensity values led ResponsibleSteel to develop the crude steel GHG emissions intensity methodology at site-level (Section 1) and the related Decarbonisation Progress Levels (Section 2). Nevertheless, product-level GHG emissions are important to valorise given their emissions inclusivity, and are required under the ResponsibleSteel framework. The discrete but complementary nature of the site-level and product-level emissions metrics required for ResponsibleSteel Steel Certification are detailed in Figure D.

| GHG measurement | Decarbonisation Progress Levels | Product Carbon Footprint/EPD |
|---|---|---|
| Comparability | ✓ Consistent and comparable unit of measurement across entire global industry | ✗ Not comparable across the industry due to different products and accounting methodologies |
| Emissions inclusivity | ✗ 'Cradle-to-crude' steel (to ensure comparability across all steel products), missing emissions downstream of crude steel | ✓ At least 'cradle-to-gate' emissions (Modules A1-A3) - end-of-life emissions may also be considered |
| Transparency around scrap usage | ✓ Mandatory declaration of scrap % | ✗ No mandatory declaration of scrap utilisation |
| Support for push to near zero | ✓ Scrap variable scale prevents carbon leakage, driving global, sector-wide progress to near zero | ✗ Useful to the customer to help reduce scope 3 emissions, but on its own will not deliver climate outcomes we all seek |
| *Measurement rules* | *ResponsibleSteel V2 Criterion 10.4, which builds on the worldsteel CO2 methodology and ISO 14404 series* | *Internationally/regionally-recognised standards, e.g. PAS 2050, EN 15804, ISO 14067/14025/20915* |
| Required for ResponsibleSteel Progress Level Certification | ✓ | |

*Figure D: Comparison between site-level Decarbonisation Progress Levels (Section 2) and Product Carbon Footprints/Environmental Product Declarations (Section 3).*

This section contains three parts, each with mandatory requirements and guidance material:

(i) Product carbon footprint scope boundaries (excerpts from Criterion 10.4)
(ii) Determination of the product carbon footprint (excerpts from Criterion 10.6)
(iii) Product carbon footprint disclosure and reporting (excerpts from Criterion 10.7)

## 3.1. Product carbon footprint scope boundaries

### 3.1.a. Requirements of the Production Standard

**Criterion 10.4** — Progress

| | |
|---|---|
| 10.4.2. | Scope boundaries:<br>c) The scope boundary for determining the product carbon footprint for steel products, co-products and by-products exported from the site is defined in accordance with the applicable international or regional standard(s) used (see 10.6.4). |

### 3.1.b. Guidance Material (from the Guidance & Annexes Document)

**Criterion 10.4**

Progress

(10.4.2.b, 10.4.2.c) The end point of the scope boundary for the determination of the product carbon footprint for steel products, co-products and by-products exported from the site may be different to the end point of the scope boundary for the determination of the site's ResponsibleSteel crude steel GHG emissions intensity performance. GHG emissions associated with the further processing of crude steel after first casting should be accounted for and recognised in the determination of the product's product carbon footprint.

## 3.2. Determination of the product carbon footprint

### 3.2.a. Requirements of the Production Standard

**Criterion 10.6**

Progress

| | |
|---|---|
| 10.6.4. Progress | The product carbon footprint for steel products, co-products or by-products to be marketed or sold as ResponsibleSteel certified is determined:<br>a) In conformity with the applicable requirements of specified regional or international standards for reporting the product carbon footprint.<br>b) Inclusive, as a minimum, of the 'cradle-to-gate' emissions associated with extracting and processing raw materials, transportation of materials to site, and product manufacturing (i.e. life cycle Modules A1-A3). If other additional life cycle stages are included, e.g. downstream re-use or recycling (i.e. life cycle Module D), that form a 'cradle to cradle' assessment, these must be reported separately. |

### 3.2.b. Guidance Material (from the Guidance & Annexes Document)

**Criterion 10.6**

(10.6.4) The requirement allows for co-products to be sold as ResponsibleSteel certified if the site wishes. The Production Standard requires that the product carbon footprint is determined and declared if the product/ co-product is to be marketed or sold as ResponsibleSteel certified. It is not a requirement when this is not the case.

NOTE: the determination and disclosure of the product carbon footprint is intended to ensure that GHG emissions associated with the processing of crude steel after its production are accounted for, and to provide customers with a full picture of the carbon footprint for the steel products they buy or specify.

A number of standards, methodologies and tools may be used to support the determination and reporting of the product carbon footprint, either as a unique attribute, or as one part of a broader assessment that considers other environmental aspects in addition to GHG emissions (for example as one aspect of an Environmental Product Declaration [EPD] or Life Cycle Analysis [LCA]). These include:

Standards that focus specifically on the product carbon footprint:

- The GHG Protocol Product Life Cycle Accounting and Reporting Standard
- ISO 14067:2018, Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification
- PAS 2050:2011 Specification for the assessment of the life cycle greenhouse gas emissions of goods and services

Standards that cover a broader range of environmental aspects:

- EN 15804:2012 + A2:2019, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- ISO 14025:2010 Environmental labels and declarations. Type III environmental declarations. Principles and procedures
- ISO 14040:2006, Environmental management – Life cycle assessment – Principles and framework
- ISO 14044:2006, Environmental management – Life cycle assessment – Requirements and guidelines
- 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 products and services.

**Additional supporting tools and methodologies:**

- EUROFER Methodology Report: Life Cycle Inventory on Stainless Steel Production in the EU, 2019
- The European Union Product Environmental Footprint (PEF) methodology (currently in transition phase of development)
- The CARES EPD Tool, for application to construction products
- The International Stainless Steel Federation (ISSF) Life Cycle Inventory / Analysis of Stainless Steel
- The worldsteel life cycle inventory methodology (see 'Life cycle inventory methodology reports for steel products', World Steel Association, 2017, ISBN 978-2-930069-89-0)

(10.6.4) The rules of the applicable international or regional standard apply in relation to 10.6.4. ResponsibleSteel requirements (and in particular the requirements of Criterion 10.4) apply in relation to the determination of the ResponsibleSteel crude steel GHG emissions intensity performance for the site. The respective GHG accounting rules applied by the site for the determination of the product carbon footprint may differ to those applied for the determination of the ResponsibleSteel crude steel GHG emissions intensity performance for the site. Sites and auditors must be mindful of such differences when preparing or verifying GHG emissions data for the different purposes of the determination of the product carbon footprint for specific product categories or for the determination of the ResponsibleSteel crude steel GHG emissions intensity performance for the site.

# 3.3. Product carbon footprint disclosure and reporting

## 3.3.a. Requirements of the Production Standard

### Criterion 10.7: GHG emissions disclosure and reporting

Core + Progress

| | |
|---|---|
| 10.7.3. Progress | The product carbon footprint for any product, co-product or by-product that is marketed or sold as ResponsibleSteel certified as determined in 10.6.4 is made publicly available, together with:<br>a) Reference to the specific international or regional standard that has been used as the basis for determining the product carbon footprint for the product, co-product or by-product<br>b) The declaration of the ResponsibleSteel crude steel GHG emissions intensity performance Decarbonisation Progress Level (1, 2, 3 or 4) for the crude steel that the product is made from, where applicable. |

## 3.3.b. Guidance Material (from the Guidance & Annexes Document)

### Criterion 10.7: GHG emissions disclosure and reporting

In the case of the product carbon footprint the information should be readily accessible via the certificate holder's website.

(10.7.3) The declaration of the product carbon footprint (cradle to gate emissions) for the product must be communicated clearly and be clearly distinguished from the consideration of GHG emissions related to further product life cycle considerations taking place beyond the production site gate, for example in relation to emissions associated with the product's use and/or end of life disposal, and/or potential benefits associated with its reuse, recovery, or recyclability.

(10.7.3) The declaration of the product carbon footprint of the product will follow the rules for disclosure and reporting as specified in the applicable international or regional standard(s) referenced in 10.6.4. The rules for averaging emissions across product categories or sites will also be as required by the applicable international or regional standard(s) and are independent of the rules for determining and reporting the GHG emissions intensity for crude steel production as specified in 10.7.2.

# Annex 5 (mandatory for 10.4): ResponsibleSteel default embodied GHG values

Table A1. ResponsibleSteel default embodied GHG values. The current table of emission factors as published by ResponsibleSteel at www.responsiblesteel.org must be used to determine the crude steel GHG emissions intensity performance of the site.

| | Unit | Original data source | Basis for default (see notes) | Default embodied GHG value ($tCO_2e$/unit) |
|---|---|---|---|---|
| **Ferrous-containing materials** | | | | |
| Cold iron, charcoal based | t | CRU methodology for ResponsibleSteel | a | 2.350 |
| Cold iron, generic | t | CRU methodology for ResponsibleSteel | a | 2.623 |
| Direct reduced iron (DRI), coal-based | t | CRU methodology for ResponsibleSteel | a | 2.623 |
| DRI, gas-based | t | CRU methodology for ResponsibleSteel | a | 1.219 |
| Granulated pig iron (GPI) | t | CRU methodology for ResponsibleSteel | a | 2.623 |
| Hot briquetted iron (HBI) | t | CRU methodology for ResponsibleSteel | a | 1.219 |
| Iron ore | t | 2024.1 GaBi database from Sphera* | a | 0.025 |
| Pellets | t | CRU methodology for ResponsibleSteel | a | 0.235 |
| Scrap | t | NA | b | 0.000 |
| Sinter | t | CRU methodology for ResponsibleSteel | a | 0.365 |
| Steel slab, basic oxygen furnace (BOF) | t | ResponsibleSteel Progress Level 1 for steel production with 15% scrap input | a | 2.460 |

| | | | | |
|---|---|---|---|---|
| Steel slab, electric arc furnace (EAF) | t | ResponsibleSteel Progress Level 1 for steel production with 95% scrap input | a | 0.620 |
| **Alloys and metallic additives** | | | | |
| A replacement value equivalent to the ResponsibleSteel default embodied GHG value for 'Cold iron, generic' shall be used to determine the upstream indirect (Scope 3) GHG emissions for all non-ferrous metal and ferro-alloy additives. | | | | |
| Non-ferrous metal and ferro-alloy additives replacement value | t | ResponsibleSteel embodied GHG value for 'Cold iron, generic (without conversative factor of 1.2 applied) | NA | 2.186 |
| PROVISIONAL VALUES FOR INFORMATION ONLY: | | | | |
| Aluminium | t | 2024.1 GaBi database from Sphera | a | 20.063 |
| Copper | t | 2024.1 GaBi database from Sphera | a | 4.647 |
| Ferro-chromium | t | 2024.1 GaBi database from Sphera | a | 8.170 |
| Ferro-manganese | t | 2024.1 GaBi database from Sphera | a | 5.640 |
| Ferro-molybdenum | t | IMOA 2022 | a | 9.648 |
| Ferro-nickel | t | ISSF LCI 2022 | a | 13.519 |
| Ferro-silicon | t | 2024.1 GaBi database from Sphera | a | 13.098 |
| Ferro-vanadium | t | 2024.1 GaBi database from Sphera | a | 90.193 |
| Lead | t | 2024.1 GaBi database from Sphera | a | 1.946 |
| Magnesium | t | 2024.1 GaBi database from Sphera | a | 39.850 |
| Manganese | t | 2024.1 GaBi database from Sphera | a | 15.995 |
| Molybdenum oxide | t | IMOA 2022 | a | 6.000 |
| Nickel metal | t | 2024.1 GaBi database from Sphera | a | 13.162 |
| Nickel oxides | t | 2024.1 GaBi database from Sphera | a | 24.335 |
| Nickel pig iron | t | worldsteel $CO_2$ methodology | a | 6.240 |
| Silico manganese | t | 2024.1 GaBi database from Sphera | a | 7.084 |
| Silicon metal | t | 2024.1 GaBi database from Sphera | a | 11.698 |
| Tin metal | t | 2024.1 GaBi database from Sphera | a | 6.929 |
| **Auxiliary materials** | | | | |
| Argon | $kNm^3$ | 2024.1 GaBi database from Sphera | a | 0.244 |
| Burnt dolomite | t | 2024.1 GaBi database from Sphera | a | 1.478 |
| Burnt lime | t | 2024.1 GaBi database from Sphera | a | 1.478 |

| | | | | |
|---|---|---|---|---|
| Crude dolomite | dry t | 2024.1 GaBi database from Sphera | a | 0.005 |
| Limestone | dry t | 2024.1 GaBi database from Sphera | a | 0.005 |
| Nitrogen | $kNm^3$ | worldsteel $CO_2$ methodology | a | 0.124 |
| Oxygen | $kNm^3$ | worldsteel $CO_2$ methodology | a | 0.426 |
| Graphite electrodes | t | worldsteel $CO_2$ methodology | a | 0.780 |
| **Solid fuels** | | | | |
| Materials of biological origin (e.g. charcoal, bio-coal, bio-coke) | dry t | NA | b | 0.000 |
| Coal | dry t | 2024.1 GaBi database from Sphera | c | 0.443 |
| Coke | dry t | CRU methodology for ResponsibleSteel | c | 1.022 |
| Post-consumer materials (e.g. used plastic, tyres, reclaimed wood) | t | NA | b | 0.000 |
| **Liquid fuels** | | | | |
| Heavy oil | $m^3$ | worldsteel $CO_2$ methodology | a | 0.331 |
| Kerosene | $m^3$ | worldsteel $CO_2$ methodology | a | 0.296 |
| Light oil | $m^3$ | worldsteel $CO_2$ methodology | a | 0.296 |
| Liquefied petroleum gas (LPG) | t | worldsteel $CO_2$ methodology | a | 0.638 |
| **Gas fuels** | | | | |
| Hydrogen | kg | 2024.1 GaBi database from Sphera | a | 13.916 |
| Natural gas | $kNm^3$ | worldsteel $CO_2$ methodology | c | 1.064 |
| **Other input materials for steelmaking** | The embodied GHG emissions of other input materials not listed must be included in the site's assessment of its upstream indirect (Scope 3) GHG emissions if its evaluation indicates that the material is likely to contribute to more than 5% of its total upstream (Scope 3) GHG emissions associated with steelmaking. Where this is the case, the materials must be assigned a default embodied GHG value using primary data or data from a publicly accessible and referenced source. | | | |

*original data sourced from Sphera's 2024.1 GaBi database are used by worldsteel in their LCI data collection.

Notes for basis for default:

a. source data multiplied by default factor of 1.2
b. ResponsibleSteel assignation

c. source data multiplied by default factor of 1.6 to reflect known high variability

## Guidance Material for Annex 5

(Table A1) ResponsibleSteel has applied a 'burden of the doubt' approach rather than a 'benefit of the doubt' approach to the use of default data when primary data is not available, in line with the recommendations of ISO 21930:2017: Sustainability in buildings and civil engineering works –– Core rules for environmental product declarations of construction products and services, which state that conservative assumptions should be applied to fill data gaps.

The default embodied GHG values specified by ResponsibleSteel are, therefore, conservative. This may constitute a top decile figure, the top end of the error bars for a range of Life Cycle Assessment (LCA) data within a database, or a default additional percentage (e.g. +20%, +60%) on top of reported average LCA data for a category of input material. Suppliers with worse than average performance should, therefore, not generally benefit from claiming an average level of GHG emissions for the material they supply. Suppliers that have invested resources in measuring their actual GHG emissions should expect to benefit from this in the majority of situations.

### Materials of biological origin

ResponsibleSteel requirements for the responsible sourcing of input materials, including materials of biological origin, are specified under ResponsibleSteel Principle 3 (Responsible Sourcing of Input Materials).

Materials of biological origin that do not meet the requirements of Principle 3 are excluded from further consideration. Materials that meet the requirements of Principle 3 are assigned a default embodied GHG value of zero.

### Post-consumer materials

ResponsibleSteel requirements for the responsible sourcing of input materials, including post-consumer materials, are specified under ResponsibleSteel Principle 3 (Responsible Sourcing of Input Materials).

Post-consumer materials that do not meet the requirements of Principle 3 are excluded from further consideration. Post-consumer materials that meet the requirements of Principle 3 are assigned a default embodied GHG value of zero.

### Steel (non-scrap)

If steel other than scrap is imported to the site as an input for production of crude steel at the site, and if primary data for its upstream emissions is not available, it is assigned a default upstream emission factor as for other ferrous input materials as listed in Table A1. If steel is imported to the site for further downstream processing, the upstream emissions associated with its production are not included when determining the crude steel GHG emissions intensity for the site.

# Glossary of Key Terms

## (excerpt from the ResponsibleSteel Glossary V2.3)

| Term | Definition |
|---|---|
| By-product or co-product | Output of steelmaking other than steel or steel products which is produced as an integral part of the production process (for example, slag, processes gases, sludges and dust). Co-products are usually planned, desirable outputs from the manufacturing process. In comparison, by-products are materials of value that are produced as a residual of, or incidental to, the production process. The distinction between co-products and by-products is often unclear, and categorisations may change over time. |
| Carbon dioxide equivalent, $CO_2e$ | Unit for comparing the radiative forcing of a GHG to carbon dioxide. (Adopted from ISO/CD 19694-1:2016 Stationary source emissions. Determination of greenhouse gas (GHG) emissions in energy-intensive industries – Part 1: General aspects) |
| Crude steel | Steel in the first solid state after melting, suitable for further processing or for sale (adopted from worldsteel).<br>**Note:** For the purpose of determining the ResponsibleSteel GHG emissions intensity for crude steel, the end point for measurement of the GHG emissions associated with crude steel production is measured at the point at which continuous casting or ingot casting has been completed, and prior to any further processing such as roughing or hot rolling.<br>The crude steel tonnage figure used to calculate the site's crude steel GHG emissions intensity shall be the saleable tonnage, after quality control. Saleable tonnage may also be referred to as 'financial tonnage', or 'net tonnage'. There may be some variation between sites, depending on their configuration, as to the exact point at which saleable tonnage is measured. In all cases the earliest point of measurement is preferred. |
| Direct (Scope 1) GHG emissions | GHG emissions ($CO_2$ equivalent) that result from production facilities and fuel consumption within the physical site boundary. Direct emissions correspond to 'scope 1' emissions as referred to in the GHG Protocol. (Adapted from Scope 1 definition for an organisation, applied to the site. From GRI Standards, GRI 305: Emissions. Global Sustainability Standards Board, 2016.) |
| Downstream indirect (Scope 3) GHG emissions | GHG emissions associated with the activities of the site that occur outside of the site boundary and downstream of its activities. |
| Embodied carbon (cf embodied GHG emissions) | GHG emissions associated with a product's life cycle, including at least the emissions associated with raw material extraction, transportation, raw material processing, and product manufacturing, reported per functional unit. |
| Embodied GHG emissions | The GHG emissions associated with a product's life cycle, including the emissions associated with raw material extraction, transportation, raw material processing, and product manufacturing, reported per functional unit. The term is synonymous with the term embodied carbon (cf), but preferred in |

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| | this Standard in relation to the determination of the embodied GHG emissions for input materials used for steelmaking: 1) to emphasise that the determination is not limited to the consideration of $CO_2$ and includes GHGs such as methane, and 2) to avoid confusion in relation to the carbon contained in a product such as charcoal, bio-coke, metallurgical coal or anthracite that may be emitted when the material is used in steelmaking. |
| **Embodied GHG value** | The value of the embodied GHG emissions of an input material in terms of the $CO_2e$ per unit.<br><br>**Note 1**: the embodied GHG values referenced by ResponsibleSteel differ from the 'upstream emission factors (Scope 1, Scope 3)' referenced in the worldsteel CO2 Data Collection methodology in that the ResponsibleSteel embodied GHG values include consideration of GHGs other than $CO_2$, and also include consideration of the GHG emissions associated with the extraction and transportation upstream of the supplier's point of sale of the input materials. The ResponsibleSteel system also requires that emissions from transportation of the input materials from the point of purchase to the site are included in addition to the embodied GHG values.<br><br>**Note 2**: the embodied GHG value is not the same as the 'direct emission factors' referred to in ISO 14404. Direct emission factors are an estimate of the $CO_2$ or $CO_2e$ emitted to the atmosphere when an input material containing carbon is used for the production of steel. In contrast, the embodied GHG value is an estimate of the 'cradle to gate' GHG emissions associated with the production of the input material prior to its use in iron and steelmaking. |
| **End-of-life (EOL) scrap** | Scrap from after the end-of-life of final products. (Source: ISO 20915: 2019(E) Life cycle inventory calculation methodology for steel products.)<br><br>**Note:** End-of-life scrap is also known as post-consumer, obsolete or old scrap. |
| **Energy indirect (Scope 2) GHG emissions** | GHG emissions that occur outside of the site boundary and that result from the generation of purchased or acquired electricity, heating, cooling, and steam consumed by the site. (Adapted from Scope 2 definition for an organisation, applied to the site. Source GRI Standards, GRI 305: Emissions. Global Sustainability Standards Board, 2016.) |
| **Final product** | Product that requires no additional transformation prior to use. (Source: ISO 20915: 2019(E) Life cycle inventory calculation methodology for steel products.)<br><br>**Note:** Final products may be steel products, or composite products (e.g., automobiles and buildings). |
| **GHG emission Offsets** | Carbon/GHG/emissions offsets are discrete GHG reductions used to compensate for (i.e., offset) GHG emissions elsewhere, for example to meet a voluntary or mandatory GHG target or cap. Offsets are calculated relative to a baseline that represents a hypothetical scenario for what emissions would have been in the absence of the mitigation project that generates the offsets. To avoid double counting, the reduction giving rise to the offset must occur at sources or sinks not included in the target or cap for which it is used. (Adopted form The Greenhouse Gas Protocol.) |
| **Greenhouse gas (GHG)** | Gaseous constituent of the atmosphere, both natural and anthropogenic, that absorbs and emits radiation at specific wavelengths within the spectrum of |

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|---|---|
| | infrared radiation emitted by the Earth's surface, the atmosphere and clouds. (Adopted from ISO/CD 19694-1:2016 Stationary source emissions. Determination of greenhouse gas (GHG) emissions in energy-intensive industries – Part 1: General aspects.)<br>**Note:** GHGs include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride ($SF_6$). |
| **Home scrap** | Scrap from a downstream steel production process within the steelworks (e.g. rolling, coating) that is returned to steelmaking processes (e.g. BOF or EAF). (Source: ISO 20915: 2019(E) Life cycle inventory calculation methodology for steel products.) That is, metal waste that is generated after the point of measurement of crude steel saleable tonnage, and which is returned to the steelmaking process. |
| **Intermediate product** | Intermediate product output from a unit process that is input to other unit processes that require further transformation within the system. (Source: ISO 14040:2006.)<br>**Note:** Intermediate products may be steel products, or composite products (e.g., car doors, ball bearings). |
| **Manufacturing scrap** | Scrap from the manufacturing processes of intermediate as well as final products. (Adapted from ISO 20915: 2019(E) Life cycle inventory calculation methodology for steel products.) |
| **Metallics input** | The total amount of metallics input to the steelmaking process, including the metallics input from secondary materials (i.e. scrap metal) as well as from primary materials (ores, pellets, ferro-alloys, etc). The amount of metallics input is the mass of the metal atoms in the input materials.<br>**Note 1:** The metallics input includes non-ferrous metallics input from non-ferrous metals, non-ferrous scrap and ferro-alloys.<br>**Note 2:** The metallics input will be greater than the total saleable quantity of metal produced, as some metal is incorporated into slag and so lost as waste. |
| **Metric tonne (T)** | Equivalent to 1,000 kilograms or 2,204.6 pounds or 1.1023 short ton. (Adapted from worldsteel.) |
| **Net GHG emissions** | The total GHG emissions ($CO_2$ equivalent) assigned to a product, process, or activity minus the total GHG emission reductions claimed by the site as carbon offsets or through other mechanisms. |
| **Permanent storage** | Permanent storage is defined as the expectation that the storage site is very likely to retain over 99% of the stored GHGs for over 100 years and likely to retain over 99% of the stored GHGs for over 1000 years. 'Very likely' is a probability of 90 to 99%. 'Likely' is a probability between 60 and 99%.<br>Derived from: IPCC, 2005: IPCC Special Report on Carbon Dioxide Capture and Storage. Prepared by Working Group III of the Intergovernmental Panel on Climate Change [Metz, B., O. Davidson, H. C. de Coninck, M. Loos, and L. A. Meyer (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 442 pp. |
| **Portfolio (of sites)** | A group of sites from within the same Strategic Business Unit. |
| **Post-consumer scrap** | See end-of-life scrap. |

| | |
|---|---|
| **Pre-consumer scrap** | Scrap generated in steel production processes and in the manufacturing processes of intermediate and final products, prior to the use of final products. Includes home scrap, internal scrap, and manufacturing scrap. |
| **Public/publication** | This means that information is either accessible by the public (e.g. through information published on the site's website or through information published on a regulatory website) or that information could be accessed through legal public means (e.g. through information requests to regulators). |
| **Scrap** | Iron, steel and other metallic material that is recovered in multiple life cycle stages (including steel production processes, the manufacturing processes of intermediate and final products, and the end-of-life of final products) for recycling as an input material for steel production. (Adapted from ISO 20915: 2019(E) Life cycle inventory calculation methodology for steel products.)<br>**Note 1:** The definition of scrap has been extended in this Standard to include other metals in addition to ferrous scrap.<br>**Note 2:** The broad categories for scrap are pre-consumer and post-consumer. Within pre-consumer scrap there is home scrap, internal scrap, and manufacturing scrap, whilst post-consumer scrap is generally referred to as end-of-life scrap. |
| **Site** | The physical facility under management or control. A single site may consist of multiple processing facilities and related plants for the integrated production of steel, including, for example, coke ovens, sinter or pellet plants, furnaces, rolling mills and coating facilities, or may consist of freestanding facilities that produce specific input materials for steelmaking, such as coke or pig iron, or a freestanding rolling mill. |
| **Strategic Business Unit (SBU)** | A strategic business unit is a profit centre which focuses on product offering and market segment. SBUs typically have a discrete marketing plan, analysis of competition, and marketing campaign, even though they may be part of a larger business entity. An SBU may be a business unit within a larger corporation, or it may be a business into itself or a branch. Corporations may be composed of multiple SBUs, each of which is responsible for its own profitability. SBUs are able to affect most factors which influence their performance. Managed as separate businesses, they are responsible to a parent corporation. |
| **Third-party certification** | Means that a fully independent and approved or accredited certification body has provided assurance that specific criteria defined in a standard have been met. |
| **Upstream indirect (Scope 3) GHG emissions** | GHG emissions associated with the activities of the site that occur outside of the site boundary and upstream of its activities. |

Responsible Steel™ | standards & certification

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