Rulebook for the classification system of the Low Emission Steel Standard (LESS)

Disclaimer

The data and calculation methods given in this rulebook and its annexes are only intended to enable the categorisation and classification of low-emission steel.

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Version no.	Date	Details
v1.0	April 2024	
v1.1	March 2025	Implementation of feedback from the robustness-check with certification bodies leading to minor clarification of outlined rules: - Legal notice to slag allocation. - Credits specification for electricity production for EU-and non-EU-based companies. - Clarification to assign total annual production as an average to a product group - Previous Part III can be found in the document “Certification body guidelines for the Low Emission Steel Standard (LESS)”

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Part 1: Presentation of the classification system of the Low Emission Steel Standard (LESS)

Terms and abbreviations

List of abbreviations

ASTM	ASTM International standards organisation
BOF	Basic Oxygen Furnace
BST	Structural and Reinforcing steel
CO_2e	Carbon dioxide equivalent)
CEM I	Portland cement
DEHSt	German Emissions Trading Authority
DIN	German Institute for Standardization e.V.
DR	Direct Reduction
DRI	Direct Reduced Iron
EAF	Electric Arc Furnace
EN	European norm
EU	European Union
EU ETS	European Union Emissions Trading System
GHG-Protocol	Greenhouse gas protocol
G7	Group of Seven
HBI	Hot Briquetted Iron
IA	Internal audits
IEA	International Energy Agency
ISO	International Organization for Standardization
CS	Classification System
LF	Ladle furnace
OSBF	Open slag bath furnace
PCF	Product Carbon Footprint
PCI	Pulverised Coal Injection
QST	Quality steel
RSH	Stainless, acid- and heatresistant

SAF	Submerged Arc Furnace
SEP 1920	Ultrasonic testing of rolled semi-finished products on internal material discontinuities
TEHG	German Greenhouse Gas Emissions Trading Law
THG	Greenhouse gas
VD	Vacuum Degassing

Terms

Structural and reinforcing steel

Steel with an elemental metallic alloy content of less than 8% and a corresponding steel content at a level that limits its use to applications not requiring high surface quality and processing capability; steel that does not meet any of the alloy content and quality criteria for quality steel.[1]

Quality steel

The criteria for quality steel (QST) are based on the EU and/or DEHSt criteria for classification of EAF high-alloy steel and EAF carbon steel.[2]

Steel with an elemental metallic alloy content of 8% or more or for applications requiring high surface quality and processing capability. This definition also includes stainless steel in terms of the classification system. See Annex 7.1 for a more detailed definition.

Classification system (CS)

System for classifying steel industry products in the context of the introduction of lead markets. The system makes provisions for an independently verified classification of products according to uniform rules depending on the direct, indirect and significant upstream greenhouse gas emissions from production as well as the scrap share. It thus allows the user of a lead market instrument to uniformly classify products across a variety of different production processes and product qualities.

Carbon dioxide equivalent

The relevant greenhouse gases to be accounted for are defined in line with the Kyoto gases: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), partially halogenated hydrocarbons (HFCs), hydrocarbons (HFCs) and sulphur hexafluoride (SF6).3 Their global warming potential (GWP) must be converted in relation to the GWP of CO2e (carbon dioxide equivalents) to provide a basis for comparison. This period is set at 100 years (GWP100). The GWP of the individual greenhouse gases can be found in the IPCC Sixth Assessment Report.[4]

Note: The Scope 1 and Scope 2 emissions to be recorded are currently limited to CO_2 in line with the EU ETS. Scope 3 emissions also include all other greenhouse gases mentioned above.

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[1] See the European Commission definition of carbon in the Official Journal of the European Union: *Commission Delegated Regulation (EU) 2019/331 of 19 December 2018 determining transitional Union-wide rules for harmonised free allocation of emission allowances pursuant to Article 10a of Directive 2003/87/EC of the European Parliament and of the Council*, page 37

[2] See definition and criteria "EAF high-alloy steel" EU-COM: Guidance Document n°9 on the Harmonised free allocation methodology for the EU ETS post 2020, page 31ff and DEHSt Guide: *Allocation 2021 – 2030 Part 3 c – Specific allocation rules for the application of product emission values – Definition of accounting limits and specific data requirements*, as of 2019, page 21f.

[3] Source UNFCCC (1998): *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, page 19

[4] See IPCC: *Climate Change 2021 The Physical Science Basis, Working Group I Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, page 1017

CS process:

Equivalent value / equivalent value (after adjustments)

A value determined according to the adjustment rules for classification of steel products under the classification system.

Determination model

The determination model is methodically based on the monitoring plans in the EU ETS and documents a company's internal methodology for determining emissions and their assignment to products under the CS as well as their implementation.

Classification groups

Classification groups permit the producer to subdivide its production for a more individualised classification within the CS.

CS management system

All a steel producer's procedures and processes that ensure conformity with the system requirements and guarantee compliance with the minimum data quality requirements as a basis for generating classification warranties.

CS warranties

Warranties of its products' classification issued by a producer participating in the CS.

Producer

A steel producer participating in the CS whose steel products are classified according to the CS.

Product

The product as defined by the CS is hot-rolled steel.

Scrap share

The value to be determined depending on the scrap input in relation to the total input of scrap, pig iron, DRI and HBI.

Threshold value

The threshold values demarcate the individual classification levels from each other and are based on normative specifications pertaining to reference plants regarding the various production routes. A threshold value describes the transition from one class to the next higher class for a defined scrap share.

System owner

The system owner is the body responsible for the CS and its processes. The latter receives the "rulebook" proposal and must be given the powers (decision-making powers) required to perform its tasks.

Note: The rulebook does not contain any requirements for a system owner, nor does it suggest which institution should perform this function. Potential tasks are described. This does not exclude the possibility of applying or testing the proposed system in practice until a system owner is established.

Intermediate product

Intermediate products within the meaning of the CS are process products from plants that are subject to the CS excluding the final product of hot-rolled steel.

Validation / verification / verification:

Validation

Confirmation by audit of objective substantiation that the determination model meets the requirements for intended use.

Verification

Confirmation by verifying objective evidence that the issued CS warranties meet the system requirements.

Initial verification

Assurance that the producer's CS management system includes all necessary processes and certifies its ability to produce verifiable classification warranties that conform to the system. Refers to a product/product group.

Verification, follow-up verification

Assurance regarding the plant operator's maintenance of the management system since the last verification, proper preparation of the CS warranties and accurate accounting for the product weight assessment. Refers to a product/product group.

<u>CS certification body, CS auditor / CS audits:</u>

CS certification body

A legal entity accredited to perform CS audits in accordance with the principles outlined in this document.

CS audit program

The CS audit program includes all the rules, procedures and management principles for conducting CS audits.

CS auditor

An individual performing CS audits under a contractual arrangement with a CS certification body.

CS audits

The totality of all inspections, validations, verifications and verifications conducted in connection with the acquisition or confirmation of audit certificates, audit marks and credentials, and substantiation relating to the classification system.

1. The classification system: Objective of the rulebook and introduction

1.1. Background

Lead markets for climate-friendly products are seen as a central component of the German government's steel action plan from July 2020 to support the decarbonisation of the steel industry. These markets should help to stimulate the demand for climate-friendly raw materials in order to relieve the burden on government start-up funding, which have a supply-side effect. In the future, state start-up financing is to be completely replaced once markets for climate-friendly raw materials have developed.

However, markets for climate-friendly products can only develop and the concept of green lead markets can only be operationalised if there are clear and internationally compatible definitions and rules for classifying products and their production methods in terms of their "emissions-related characteristics".

The international debate on the appropriate definition of low emission steel is highly dynamic. In particular, the proposal presented by the International Energy Agency (IEA) in May 2022 for a classification system that distinguishes between low-emission and Near-Zero steel is leading the way and was seen by the G7 as a robust starting point.

Last year, the German Steel Federation also developed a concept that incorporates many of the design features of the IEA proposal but has further developed it in a practical manner[5]. Moreover, in April 2023, the German Steel Federation became the first organisation ever to present a fully elaborated draft of a rulebook[6]. This rulebook outlines how emission values are to be determined in order to classify steel products within a declaration system. Both the proposal for a classification system and the associated rulebook together create a basis for declaring green products, thereby contributing to the establishment of green lead markets.

In 2023, the German Steel Federation extensively discussed and further developed its proposal with various stakeholders, particularly engaging with the Federal Ministry for Economic Affairs and Climate Action within the framework of the stakeholder process “Lead markets for climate-friendly basic materials”. This necessitated adjustments to the rulebook. The outcome of these discussions is presented in the current document.

1.2. Proposal for a six-stage classification system

The transition to climate neutrality in the steel industry occurs in stages, also dependent on the increasing availability of green electricity and climate-neutral hydrogen. A classification system needs to be capable to depict this **phased transformation process** and strategically incentivize and support the efforts and additional expenses associated with each individual transformation step. Therefore, the produced steel is categorised into different levels of process ambitions and emission intensity.

For this purpose, the International Energy Agency (IEA) has **proposed a six-level classification system**, which:

- restricts the scope to the raw steel production phase,
- considers Scope 1 and 2 emissions as well as the 3-upstream emissions limited only to the balance boundary,

[5] Green Lead markets and Key Building Blocks of a Green Steel Definition | German Steel federation (stahl-online.de)

[6] Classification system for green steel | German Steel Federation (stahl-online.de)

- normatively sets the thresholds for Near-Zero steel production based on the political target specified in accordance with the Paris Agreement[7] for the considered process stages.

Against this background

- the present proposal takes up the IEA's six-stage model and the normative approach,
- but at the same time extends the scope of the balance sheet to include steel refining, casting and hot rolling as the first further processing stage, including initial reheating (1st heat).

Consequently, alloying elements and thus Scope 1 to 3-upstream emissions are practically fully captured. **The threshold values are normatively set based on the IEA proposal**. In this current proposal, these expansions are implemented by applying a surcharge compared to the IEA threshold proposal for the baseline Near-Zero/Class A threshold. The determination of further threshold values is then achieved by multiplying them with the baseline.

However, this alone would not be sufficient for product classification. It is also necessary to establish how emission values for product classification are determined. The present rulebook defines this aspect with clear methodological guidelines, also utilizing defined reference facilities.

1.3. Key elements of the classification system

Since the classification system aims to determine which thresholds products must meet to qualify for lead market instruments, the requirements can be increased over time without adjusting the thresholds. This provides an incentive for greater efforts in and rewards for climate protection measures.

The proposed classification system here aims at categorizing products for lead markets. The rulebook does not present a fully comprehensive set of rules for Product Carbon Footprints (PCF) for all steel products. By its nature, guidelines for calculating emissions in this rulebook overlap with requirements from steel customers for PCF or an Environmental Product Declaration (EPD). However, these can and should be utilised in that context. Complete PCF for the respective end products, such as processed products, will often have to be supplemented by additional components and emission sources that are not part of this rulebook despite its broad scope. The same analogy applies to EPD.

The boundary framework (Scope) is designed to encompass not only direct emissions (Scope 1, CO_2) and indirect emissions from energy consumption (Scope 2, only CO_2) but also the most relevant Scope 3-Upstream categories (all GHG).

The system largely relies on the comprehensive and accurate data from facility operators from the European Emissions Trading System (EU-ETS), thereby acknowledging the existing reporting obligations for European plant operators. This ensures, among other things, a very high level of accuracy in capturing the relevant Scope 1 emissions.

Figure 1 illustrates the schematic progression of the classification system for categorizing products based on their greenhouse gas intensity and scrap ratio. It is worth noting that the existing significant differences due to the scrap ratio diminish as ambition increases.

[7] Paris Agreement – United Nations Framework Convention on Climate Change

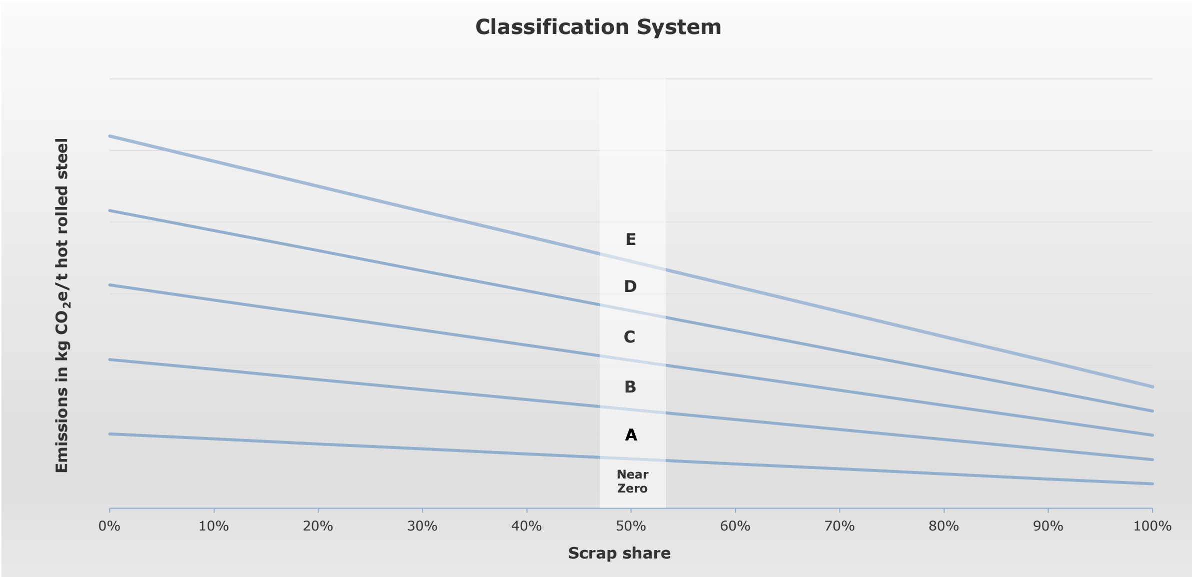


Figure 1: The classification system.

Thus, a core element of this proposal is also considering the use of steel scrap under the auspices of a concept known as a **"Sliding-Scale"**[8]. This means that the CO_2e-intensity per produced ton of steel is compared and considered using a sliding scale. This accounts for the fact that the availability of steel scrap is limited worldwide, and no clear boundary criterion exists for distinguishing between both routes (primary and secondary) in the future. This aligns with other proposals defining low emission steel, as notably done by the **IEA** as well.[9]

All values below the respective reference threshold of Near-Zero/Class A can be defined as **"Near-Zero steel"**. Achieving these values requires high efforts from producers and the implementation of all currently known technological measures as well as emission reductions throughout the supply chain.

The various classification levels of the system illustrate the gradual transformation towards climate neutrality, especially depending on the increasing availability of green electricity and climate-neutral hydrogen. In order to be classified in the highest level, additional emission reductions in the supply chain must be ensured. By determining reference values for specific CO_2e-emissions of relevant production routes, both the current status and a transformative evolution of the industry can be differentiated as necessary.

The classification system aims to support the establishment of lead markets for the transformation of steel production. Consequently, it places high demands on the system.

A specific proposal for a classification system and a definition for low emission steel production is presented. The data foundation, calculation models, and rules are outlined. The proposal for the classification system builds upon existing suggestions, notably that of the IEA, and pragmatically extends it [10]. Regarding the Sliding-Scale, it is noteworthy that not only the IEA but also Responsible Steel[11] and the Science Based Targets Initiative incorporate the methodological element of considering scrap usage in their proposals.

[8] With respect to the "sliding scale", see also: Federal Ministry for Economic Affairs and Climate Action (BMWK, 2022): The G7 route to green industry, highlights of economic policy (August 2022)

[9] Achieving Net Zero Heavy Industry Sectors in G7 Members", Mai 2022 | IEA-Report

[10] Any differences compared to the IEA are understandable and result in particular from our selection of a broader accounting framework and bottom-up method.

[11] See: ResponsibleSteel (2022): "ResponsibleSteel International Standard", Version 2.0, September 2022

Figure 2: Requirements for a classification system

1.4. Aim of the rulebook

The present proposal aims to align with international initiatives and promotes the national as well as European implementation of the concept of lead markets as a climate protection instrument.

The objective of this proposal is **to standardize methodological and computational guidelines for categorizing products within the classification system**. The rulebook regulates the practical implementation of the classification system by establishing relevant accounting rules. The top priority is thereby the comparability of the results of different manufacturers. Consequently, the classification of real products within the classification system must be certified by an independent auditor.

The present proposal of the rulebook contains the necessary provisions for this purpose.

Guiding this draft is the overarching objective to support the introduction and utilisation of lead markets while considering the above-mentioned principles. The rules required for this purpose overlap with the determination of PCF, although depending on the product they may not replace the development of complete PCF according to established standards (such as GHG Protocol and ISO standards 14064/14067[12]).

The focus of the classification system is on mapping the process transformation. In order to classify products according to the set of rules proposed here, a specific value must be determined according to this rulebook. This does not imply the creation of a generally valid basis on the product side for the calculation of a PCF, even if large parts of the essential work results presented here can be used for a PCF. Especially, with regard to particularly relevant emission sources.[13]

1.5. Information on the structure and layout of the rulebook

In line with the above objectives, the first chapter describes general design elements and principles of the classification system as well as an overview of the procedure.

[12] See: ISO 14067:2018 and https://www.iso.org/standard/71206.html in the valid version

[13] It is reasonable to report the (e.g. with extended scope higher) PCF in addition to the specific value of this classification system.

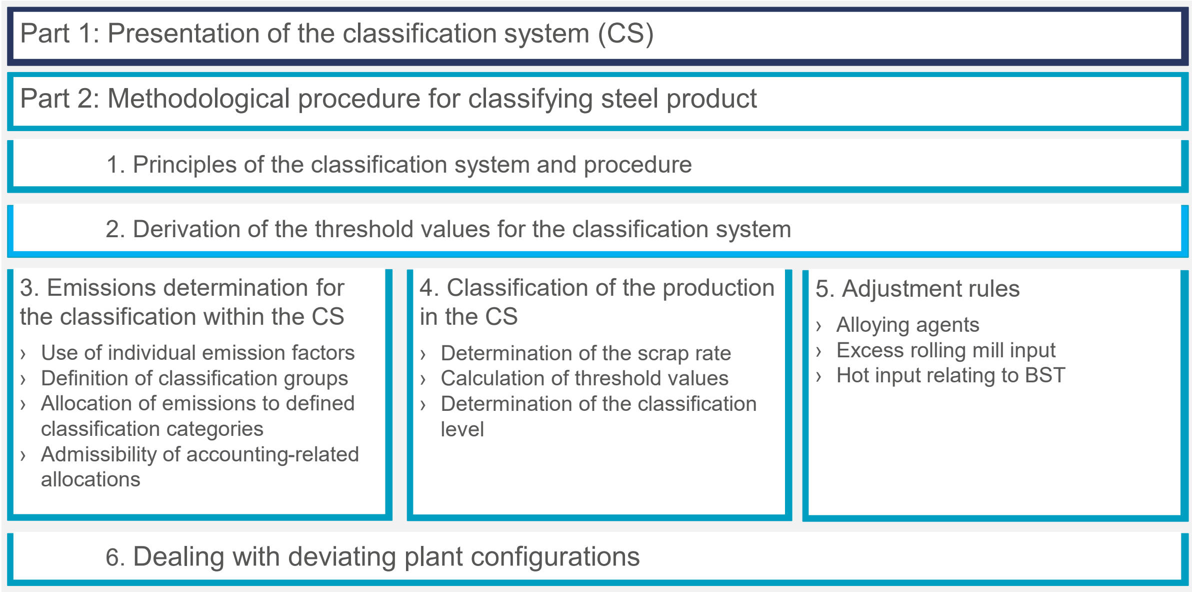


Figure 3: Schematic structure of the rulebook

The second chapter describes the specific mathematical and methodological requirements. It starts includes the principles, the derivation of threshold values, and the determination of emissions. Furthermore, the classification of products is presented, taking into account adaptation rules and deviating system constellations.

The process for testing, verification, verification, and product declaration as well as the requirements for certification bodies are also of particular importance. This is described in a detailed manner in the Certification Body guidelines for the Low Emission Steel Standard (LESS).

Appendices and directories belonging to a specific chapter are explained within the respective chapters.

2. Verification system

A verification system is introduced to assist the lead market. This involves independent third parties and therefore gives all market participants the assurance that a product declared under this system meets all the criteria for such classification - and that the customer or end user can obtain traceable substantiation of this by means of a product declaration.

A verification system is typically organized by a **system owner** who is responsible for

- A legally watertight stipulation of the conditions for participation in the verification system
- The development and maintenance of technical rules within the verification process
- The approval of verification bodies
- The management of information regarding certificate holders, certificates and audits conducted (registers) and
- The design and enforcement of a sanction mechanism in the event of non-compliant implementation by system participants

This information must be available to market participants (in this case in particular to the buyers of steel products declared in accordance with the CS, but also to the initiators of lead market systems) to enable assessment of the intrinsic value of the classified products or provide substantiation in the course of trade in goods.

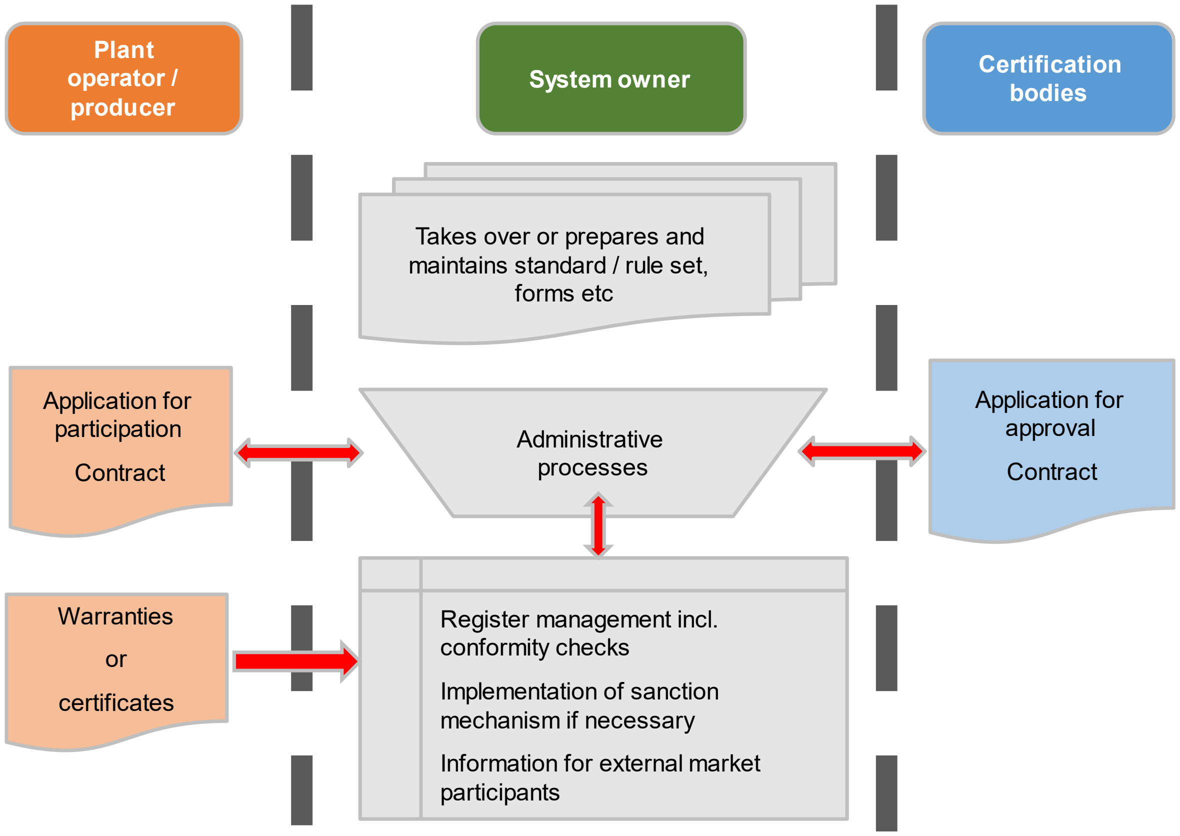


Figure 4: The role of the system owner within a verification system.

Traded certificates, guarantee certificates or evidence of origin, quality or other attributes are generally created as the valuable output of a verification system. These virtual products are recorded in a publicly accessible register, which enables the original owner, the producer, to substantiate their production quality and the purchaser to confirm their intrinsic value. This confirmation via the register can then be used as the basis for a further transfer or – as here – as evidence that voluntary use complies with the formal verification criteria or legal obligation, such as in a lead market system.

In analogy to the quality assurance system when trading material goods, impartial third parties perform an independent functionality evaluation of the manufacturing process and proper measurement/ evaluation of the virtual product; in our specific case this is done by approved verification bodies. The verification process verifies that all technical regulations are correctly applied. A positive verification gives downstream users of the certificates or guarantee certificates the legally binding assurance that they can be used for the purposes intended and that there is no requirement for any further control steps.

The participation conditions, which the system owner stipulates to the producers and verification bodies, ensure compliance with the requirements for creation of certificates, warranties or guarantee certificates. A sanction mechanism generally obliges the creator of the virtual product to provide substitute services in the event of unjustified issuance of certificates or guarantee certificates, or to accept sanctions that ensure compliance with the purpose of the verification system irrespective of any existing violation of the regulations and that assure the intrinsic value of already issued certificates, substantiation or guarantee certificates. Similarly, sanctions against a verification body do not have a retroactive effect on the intrinsic value of attestations and guarantee certificates issued by an auditor, but they do impact the certification body personally in the event of an improper audit – with implications up to and including the denial of approval rights.

3. Classification system (CS)

The basic elements of this classification system jointly form a reliable, verifiable and transparent process for declaring hot-rolled steel as a classified product upon exiting a hot rolling mill based on a classification warranty. A multi-stage verification process for each production plant and the production or partial production to be classified (detailed description in the Certification body guidelines for the Low Emission Steel Standard (LESS)) initially defines the procedure and data basis for determining allocation of the products within the classification system. Classification warranties for the products allocated in the CS are generated using the **weight assessment approach**, i.e. the warranty is based on the production quantity and allocation class but is independent of the actual delivered product quantity/ batch and the underlying production process. The production information is used to classify the steel produced, but classification in the CS does not include an assessment of steel qualities or production processes.

Weight assessment must be used to warrant that the product placed on the market and declared with classification warranties corresponds to the production quantities used for classification and that any double counting or unauthorised preparation of classification warranties can be excluded.

The greenhouse gas emissions attributable to a product are to be determined based on the application of a determination model to be validated by a verification body and be similar to the monitoring plans approved by the competent authority in the EU ETS. Insofar as it can be demonstrated that the variability of relevant parameters over a longer operating period or through clearly defined production campaigns is small enough to allow unequivocal allocation to a CS class, then there is no longer a need to conduct batch-specific determination of these parameters and an appropriate, longer determination period can be applied instead.

A determination model stipulates the following procedures, parameters, and information for use in classification:

- General plant operator information.
- The system owner's registration number (if available).
- Nomination of those responsible for implementing the CS within the company and at each production site where applicable.
- Information on the technical equipment relating to each plant/ plant component within the limits of the classification system.
- A description of the data management system with procedures to ensure correct application of the CS stipulations and process steps.
- A description of any production segmentation required for CS class allocation (in other words aspects such as total production, specific product groups, products or batches) and at what time interval (at least annually) classification warranties are to be created; the individual segments are referred to as the classification group. The system limits relating to the Scope 1 and Scope 2 emissions from each production line.
- A description[14] of the procedures for determining and allocating specific production volumes and Scope 1 and Scope 2 emissions.
- Information regarding redundant data gathering in the context of emission reporting as part of EU emissions trading and/or a certified energy management system.
- The system limits for Scope 3 emissions as stipulated in the Certification body guidelines for the Low Emission Steel Standard (LESS).
- In the case of pure hot rolling mills: a description of the processes (including any contractual agreements) which ensure that upstream Scope 3 emissions attributable to the crude steel are

[14] Descriptions of these procedures will in many places coincide with the EU ETS monitoring plans which can then be referenced.

collated and certified in line with the directives in the rulebook relating to the steel production process prior to hot rolling.

- A description of the procedures for determining and allocating Scope 3 emissions as stipulated in Part 2.
- Designation of the external sources when using default values as stipulated in Parts 2 and 3.
- A description[15] of measuring equipment and associated quality assurance procedures insofar as these are required for determining the Scope 1, Scope 2 or Scope 3 emissions.
- The definition of calculation methods for determining the classification levels pertaining to all defined partial production as stipulated in Part 2.
- The procedures for securing data and information relating to the preparation of classification warranties.
- The following minimum requirements apply to the procedure descriptions and data management in analogy to the EU ETS:
- Description of the procedure for assigning warranty tasks in the CS and for managing the skill levels of the personnel involved,
- A description of the procedure for periodic evaluation of the adequacy of the determination model,
- A description of data flow activities,
- A description of the IT infrastructures and data archives for managing product weight assessment used by both production and sales teams (in the case of sales, to the extent that sold quantities have been classified according to this system) and
- A description of control activities.

The plant operator is responsible for creating the identification model as a document in free form, but with the contents stipulated above. Validation by an approved verification body confirms that the current determination model complies with this rulebook's or the system owner's requirements and that the plant operator has properly described all technical equipment and internal procedures and is able to apply these correctly in normal operation.

Initial validation can occur as an independent process upon submission of a determination model but can also be performed as part of initial verification. At the request of the system owner, the validated determination model should ideally be stored in one of the system owner's confidential data areas and, with the consent of the plant operator, be capable of being retrieved by another (possibly newly commissioned) verification body.

The determination model requires amendment if

- Transformation processes, especially those due to technical plant changes, mean that the methods for classifying production quantities and/or
- Scope 1, Scope 2, or Scope 3 emissions need to be redefined.
- Amendment is also required if
- The description of individual elements (including procedures or measuring equipment) is no longer consistent.
- A new segmentation is selected or
- The plant operator switches from using default values to production-specific data gathering or individual emission factors.

[15] Descriptions of the measuring equipment used in the determination model will in many places coincide with the EU ETS monitoring plans which can then be referenced.

Substantial modification of a determination model requires validation of the new model before it is used as a basis for creating classification warranties. In addition to the depiction of technological transformations, significant modifications are to be understood as all revisions to the determination model that concern a calculation approach towards greenhouse gas emissions relating to individual products that has not been previously applied there, or a product category that has not yet been depicted there. A steel producer that is a new system participant must undergo initial verification after registration within a period to be determined by the system owner. This process involves validation of the determination model and an audit (verification) of the operating company to confirm that it:

- Has - if implemented - entered into a contractual obligation with the system owner to meet the CS requirements,
- Is capable of applying the procedures defined in the determination model in an ongoing and reproducible manner,
- Can determine or obtain the necessary parameters by means of measurement,
- Can as necessary allocate these to the production process with partial production accuracy,
- Has implemented a process for correctly allocating partial production to the corresponding category and is documenting and archiving this as a reproducible allocation,
- Can/will prepare classification warranties in line with the system owner's requirements and record them in a register as necessary,
- Has established a procedure to decide whether the determination model needs to be amended and
- Is providing the necessary resources to ensure sustainable participation in the CS.

It is impossible to make reference to already issued classification warranties within the scope of initial verification, so the plant operator allows the commissioned verification body to access its database for the last 12 calendar months (or at least 3 months for new plants) or its previous accounting year. These production data are then used to apply and evaluate the determination model. This also automatically records the plant operator's initial position at the start of system participation, which makes the documentation of the impact/ success of future transformational measures possible. After successful initial verification, the certification body creates an attestation (a certificate), which is also stored in the system owner's CS together with the verification report. Initial verification certifies that the plant operator is immediately able to allocate partial production to the correct classification during production. The operator is therefore authorised – subject to an **obligation to maintain the necessary documentation and data archives – to prepare classification warranties, to declare its products accordingly and to include the certificates in the register if required**. The system owner must upon successful verification enable downstream cross-examination by market participants by publicly circulating each steel producer's attestation/ certificate permitting classification warranties to be issued.

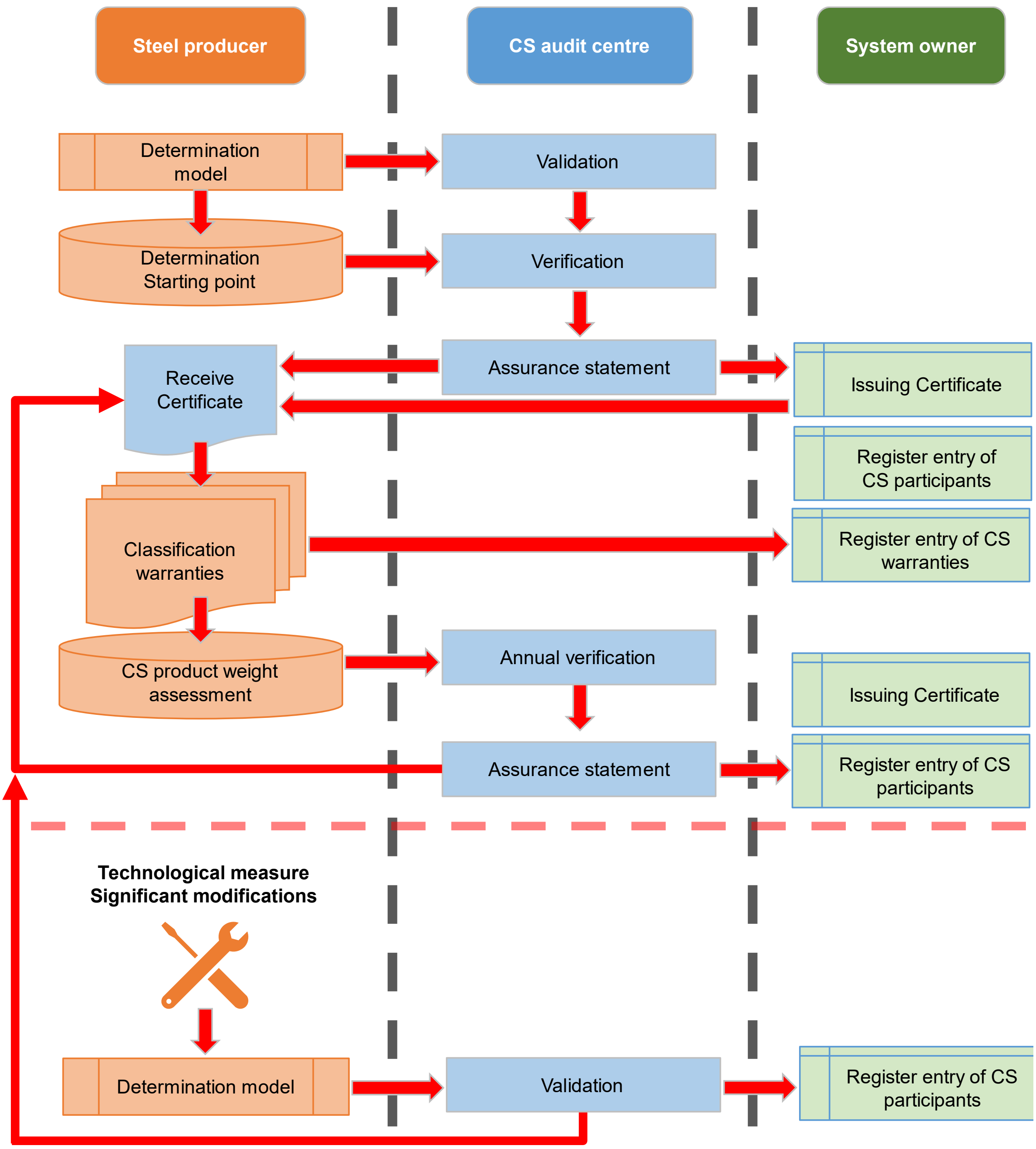


Figure 5: Schematic representation of the production, audit and documentation processes regulated by the classification system.

The plant operator is to issue the classification warranties relating to the quantity of product to be declared as soon as possible after production, but at the latest when the product is placed on the market. The sale of products allocated to a classification warranty is as necessary to occur with an indication of the batch number and the plant operator's CS certificate ID on the invoice and/or other suitable delivery documents (including delivery notes, delivery contracts). Subject to the selected segmentation in the determination model, the plant operator's designated (authorised) representatives are to transmit to the system owner the information pertaining to inclusion of the classification warranties in a register at time intervals (monthly, quarterly, but at least annually) determined by the system owner. These steps ensure that the quantity of classification warranties does not exceed that of the quantity produced and declared.

The plant operator is recertified at annual intervals after initial verification. This must be completed no later than 12 months after the previous verification, whereby corresponding notifications must again be sent to the system owner. Rather than auditing the starting point as described above, follow-up verification involves the commissioned verification body verifying the correctness of classification warranties issued in the last calendar year based on the product weight assessment per location. In addition to auditing the emission calculation, correct allocation to classification groups and proper issuance of CS warranties, verification also includes reviewing whether the maximum quantities of classified steel for which corresponding warranties were available were placed on the market. The term of the certificate will be extended by twelve months once compliant implementation of the process can be confirmed. Should deviations be detected and/or follow-up verification not be successfully completed, appropriate notifications are to be sent to the system owner who is ultimately responsible for the enforcement of possible sanctions.

Transformative activities in the steel industry

The purpose of the CS is to provide a customer, a lead market and its participants with the opportunity to opt for steel products involving reduced emissions. This also gives the steel producer an incentive to implement transformative measures toward achieving emission-free technologies and processes. The design of the CS permits the producer to directly declare its product in terms of carbon efficiency given the respective production process together with "verification" by the CS.

The producer can use transformative measures to achieve allocation of its product/ products to a higher classification level. This requires a distinction to be made between variable transformations and permanent transformations.

Variable transformations are those not associated with complex, technical changes in plant design and are also reversible given controlled processes (such as electricity procurement). They also frequently give the producer an opportunity to produce the same product quality with different emission intensity, but also different costs. This mainly involves alterations in Scope 2 and Scope 3 emissions (including the use of green electricity and the purchase of raw materials with a lower emission intensity), but there are also conceivable impacts in Scope 1 (including the use of biogenic substances). The determination model must identify any of the producer’s variable transformations. Tracking such transformations does not usually require an adjustment to the determination model, but rather results from the use of materials or sources of energy with lower emission factors.

Permanent transformations are associated with transformative measures involving plant alterations (i.e. conversion to direct reduction, conversion of a rolling mill to hydrogen) which cannot be considered to be reversible due to the high level of investment. These alterations can cause a significant, multi-step jump within the classification system and result in amendment of the determination model for Scope 1 and Scope 2 emissions at the site, and mostly also Scope 3 emissions given the implications regarding composition and type of input materials.

It is advisable that the new determination model be validated prior to commissioning, since a time-consuming conversion or initial installation of at least one production line is required in the event of plant-related alterations. The system owner can request that the certificate's validity period be restarted as soon as it is commissioned. In the case a new plant, initial verification is performed based on validation of the determination model and an audit of the plant operator's management system and procedures. It is not necessary to examine the starting point in the absence of historically comparable values.

4. Reviews

Reviews relating to the ongoing design of the rulebook are planned. As necessary, these can take into account any new general conditions, broader applications and findings from practical application.

Regular Reviews

A regular review of the system is to be conducted (every three years) to ensure that it is up to date and as necessary to take general developments into account. The system owner is to add any appropriate stipulations, which may also be based on the participation of stakeholders.

The subject of the review is all the stipulations contained herein.

An adjustment of the threshold values is to be avoided. In particular, decreasing emission factors in the upstream chain do not justify an adjustment of the threshold values, as these are already taken into account for the "Near-Zero" threshold.

Regular reviews particularly relate to generalizable developments with an impact on the calculation systems contained in this rulebook and the factors used for this purpose. Examples of these include:

- Significant reductions in pre-chain emissions relating to used materials, such as alloy elements or lime.
- Significant reductions in the transportation of used materials or energy (hydrogen).
- Significant changes in fall-back factors for the procurement of energy (for example in Germany due to the further expansion of renewable energies with a lowering effect of the emission factor).
- The addition of new emission factors to the list of standard factors.
- New mitigation technologies and associated emission factors are to be included, e.g. inclusion of carbon capture and storage (CCS) or carbon capture and utilisation (CCU) technologies.

Event-related reviews

In addition to the regular reviews, event-related reviews can also be conducted under the responsibility of the system owner. These may not impact the rules as a whole, but only individual components.

Events could include changes in fundamental regulatory requirements or a broader spatial or factual scope.

It is also conceivable that the warranty system be extended to other products, such as cold-rolled strip, forged products, tool steel and RSH steel[16].

[16] RSH steel refers to a group of stainless steels (resistant to rust, acid and heat)

Part 2: Methodological procedure for classifying steel

1. Principles of the classification system and procedure

The methodology of the classification system is based on a **bottom-up method** to determine the individual values for classifying products:

- The scope is stipulated and defines the process steps as well as the direct, indirect, and upstream emission sources that are to be taken into consideration.
- Virtual reference plants and associated reference grades have been defined based on the work that already exists in the sector and on intense discussion with experts from the steel industry.
- This allows the determination of reference values for classification using virtual reference plants based on the technical feasibility.
- It enables the determination of equivalent values after the application of adjustment rules, particularly with regard to other product qualities.
- And finally, it allows the classification of individually determined values based on the rules in this rulebook into the top-down, normatively derived classification levels based on the associated threshold values.

To derive the reference and threshold values, a distinction must be established between primary and secondary routes due to the historical availability of data.

Scope
One of the most important principles is to define the emission sources that must be taken into account within the classification system. Scope 1 and Scope 2 emissions from the process steps considered must be accounted for in all cases. This also applies in particular to all emissions from the considered processes which are reported in the European emission trade. Further Scope 1 and Scope 2 emissions that are directly connected to these must also be taken into account.[17].

The classification system pursues a cradle-to-gate approach with regard to the Scope 3 emissions. This means that none of the downstream emissions are considered. The upstream focus is on the essential drivers of the emissions. These comprise the following:

- Scope 3.1: materials (raw materials) that flow directly into steel production or are required for this purpose. These are in particular scrap, ore, alloying agents, slag forming agents, refractory materials, industrial gases and other consumables.
- Scope 3.3: upstream energy (also greenhouse gases other than CO2, for instance in the case of natural gas and biogas).
- Scope 3.4: transportation of the above materials to the required site.

These emission sources cover the **primary** portion of upstream emissions from steel production. The sources not considered are somewhat less important.

Here, similar to the commonly applied standards (in particular ISO, GHG Protocol) within the specified system limits, a **cut-off criterion of 10%** is applied to limit the amount of time and effort involved in data collection, both for the virtual reference plants and for application in actual production plants.

In other words: **the emission sources included comprise (at least) 90% of the total emissions, including those upstream from Scope 3**.

Figure 6 indicates the relevant accounting range for the reference plants.

[17] This also applies to Scope 1 emissions from internal logistics, unless the cut-off criterion is applied.

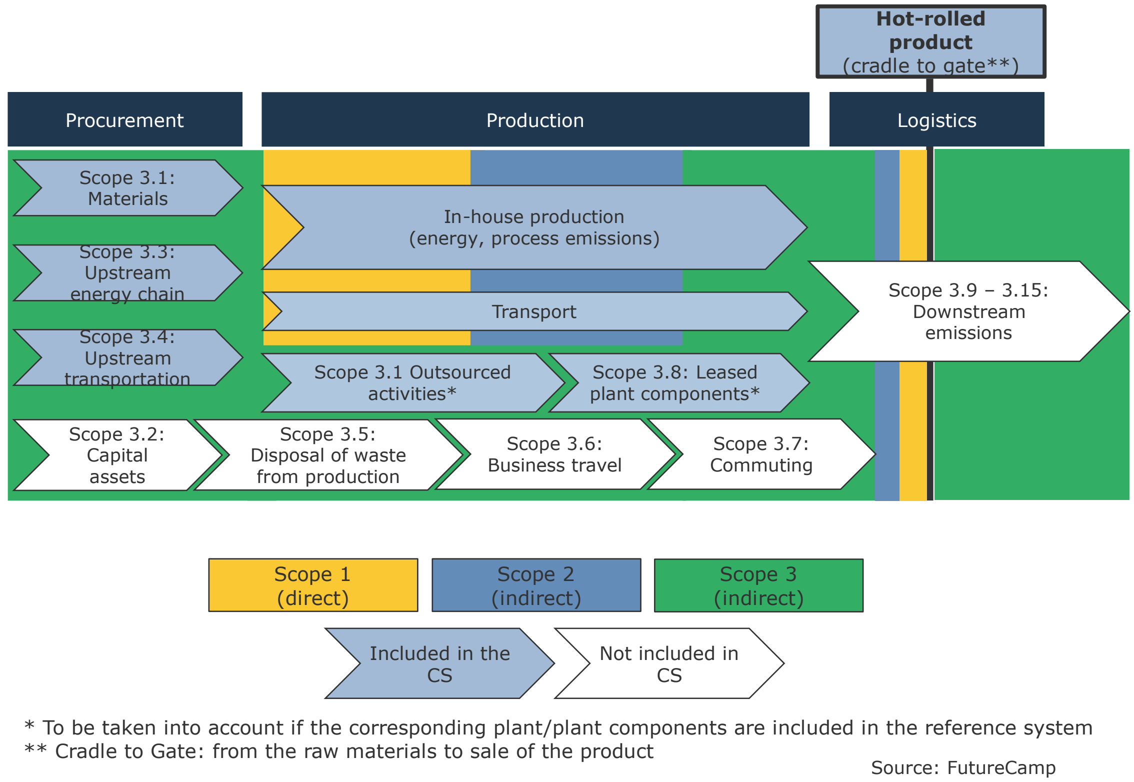


Figure 6: Emissions included in the classification system

Accounting for the defined accounting range is always to be performed at the level of a single asset, or of a location for several assets.

Subcontracted activities are treated separately. Should process steps be covered by the virtual reference plants according to the following definition, yet not form an integral part of a real plant, then these emissions should be taken into account in another scope (such as Scope 3 rather than Scope 1). This ensures that significant emission sources are not excluded from consideration due to a different plant arrangement.

Enabling account to be taken of the opportunities for reducing emissions in both production routes means that the classification system does not relate to crude steel, but to a **hot-rolled product** (single heating) **without** any further treatment, such as further heat treatment. Metallurgy is also taken into account. This applies both to (normative) derivation of the threshold values and to the actual classification of production within the system.

Products requiring further heat treatment or other subsequent processing steps not included in the accounting range defined here may be designated as " **based on classification level X**" without taking into account the emissions associated with the additional processing steps. Corresponding, non-conclusive examples include cold rolled strip, forged products, tool steel and RSH steel. The direct inclusion of such products can occur during a review.

Virtual reference plants – primary route

An emissions calculation model for the primary route has already existed in the form of a virtually integrated steelworks. This is mainly based on the final report entitled "Waste heat utilisation potentials in the plants of integrated steelworks in the steel industry" (Abwärmenutzungspotenziale in Anlagen integrierter Hüttenwerke der Stahlindustrie)[18]. The emissions are determined according to corresponding emission factors for both direct and indirect emissions, and a scrap input of 20%. The

[18] Marten Sprecher, Dr. Ing. Hans Bodo Lüngen, Dr. Ing. Bernhart Stranzinger, Dr. Ing. Holger Rosemann, Dr. Ing. Wolfgang Adler (2019), "Abwärmenutzungspotenziale in Anlagen integrierter Hüttenwerke der Stahlindustrie".

calculation model is subdivided into the individual process steps and therefore permits conclusions to be drawn about the emissions in each process step. In particular, it is used to determine the values for classification levels prior to transformative activities and for methodological clarity. At the same time, it forms the basis for the other variants.

The model was used to derive two variants in relation to direct reduction plants (DR plants); DRI EAF (electric arc furnace) and DRI SAF (submerged arc furnace), which here too ensures openness to technology. Data for the newly considered process steps are based on publicly available sources and our own calculations[19]. A 20% scrap input was assumed for the DR plant variants to ensure vertical comparability with the reference and calculation model for the virtual, integrated steelworks. The resulting adjustments required to certain utilisation quantities were made in the course of preparing this rulebook.

The following process steps in relation to the primary route are thus directly covered by the classification approach:

- Coking plant
- Sintering plant
- Blast Furnace
- Steel mill process (converter)
- Secondary metallurgy
- Continuous casting / block casting
- Hot rolling mill
- Power plant

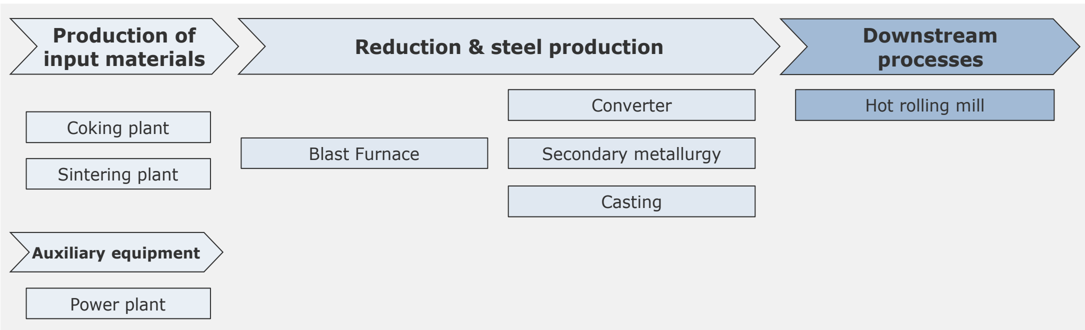


Figure 7: Main process steps relating to the primary route – integrated steelworks

For transformative activities and very ambitious classification levels (approx. C and above), the situation changes for the primary route due to the switch to direct reduction. It now essentially covers the following:

- Direct reduction unit (DR)
- Steel mill processes – electric arc furnace (EAF) or smelting reduction furnace (SAF) and converter (basic oxygen furnace – BOF)
- Secondary metallurgy
- Continuous casting / block casting
- Hot rolling mill

[19] Pasquale Cavaliere, Angelo Perrone, Alessio Silvello, Paolo Stagnoli and Pablo Duarte (2022), "Integration of Open Slag Bath Furnace with Direct Reduction Reactors for New-Generation Steelmaking" in Metals 2022, 12, 203

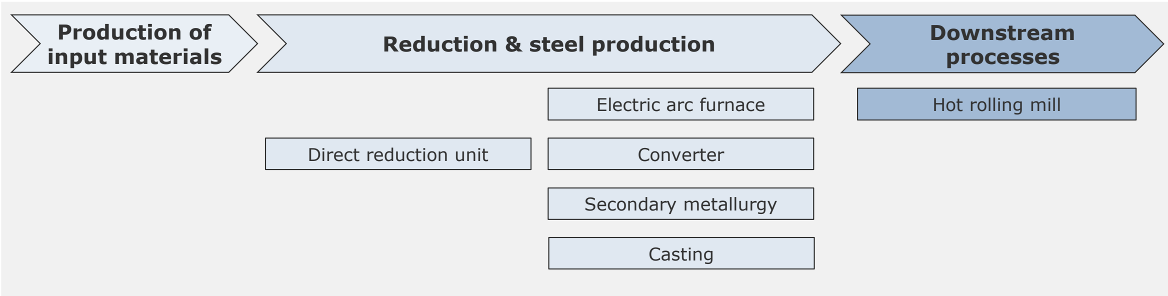


Figure 8: Main process steps relating to the primary route – DRI EAF

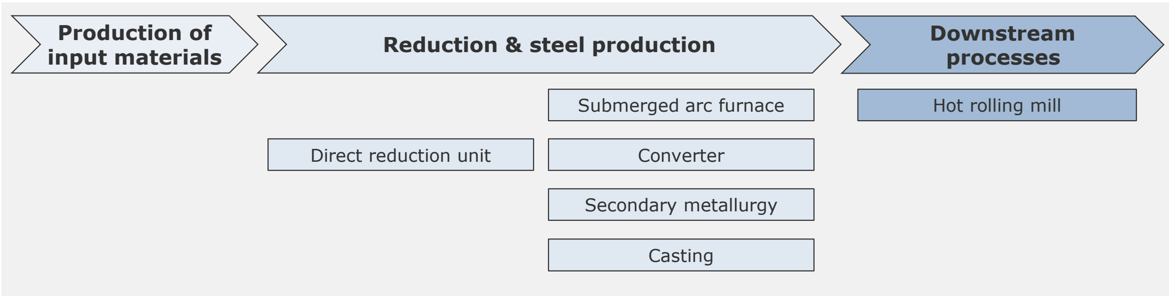


Figure 9: Main process steps relating to the primary route – DRI SAF.

Virtual reference plants – secondary route

There is no comparable calculation model for the secondary route on which the determination of virtual reference values could be based. Therefore, a new calculation model was created, whereby the data required were collated per data query with FutureCamp acting as an independent third party[20]. These data were additionally supplemented with research data from publicly accessible sources. This collation focused on key emission drivers relating to the secondary route. This too is in line with the 10% cut-off criterion defined above.

On the side of the secondary route, there are no differences in the methodology of determining the emission value for classification with regard to the recorded process steps. The following are in each case recorded there:

- Steel mill process with EAF
- Secondary metallurgy via
  - Ladle furnace (LF)
  - Vacuum equipment
  - Rinsing unit
- Continuous casting / block casting
- Hot rolling mill

[20] FutureCamp generated averages from the feedback received from companies in the summer of 2022, some of which are weighted by quantity. An identification or retroactive accounting to actual values from individual companies was thus securely prevented.

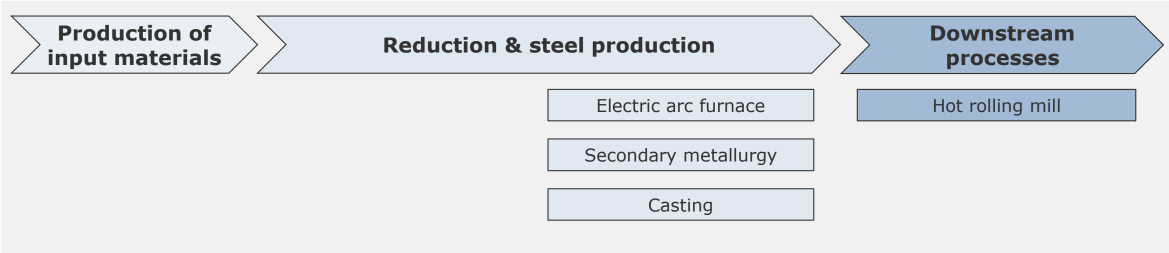


Figure 10: Main process steps relating to the secondary route.

Product quality

Product quality has a significant influence on the specific emissions associated with an individual product, which may for example be due to the use of different alloying agents in different quantities or due to higher energy requirements during production.

In other words: even given the complete transformation of production processes, very high quality products will exhibit significantly higher emissions and a significantly higher PCF than products with lower requirements in terms of specific product characteristics.

Structural and reinforcing steel mills on the secondary route currently operate with similar scrap input levels, but they cause significantly lower emissions due to their different qualities, associated deviations in the production process and lower use of alloy material.

It is therefore generally insufficient to define classification system thresholds solely with respect to the scrap share. An adjustment for the steel grade actually produced is indispensable and appropriate; higher or lower specific emission values (as in the case of structural and reinforcing steel) can therefore be shown as **equivalent** to the defined reference value. The corresponding value is referred to as the **equivalence value**.

Establishing comparability via the scrap input curve required the definition of two reference grades for both sides of the spectrum (20% and 100% scrap input) to enable derivation of the threshold values.

These are steel grades C22 (primary route) and C45 (secondary route)[21].

Design elements at a glance

The classification system's relevant design elements are summarised in Table 1; they are explained below and in subsequent sections.

[21] These reference grades formed the basis for deriving the values relating to the reference plants. The input materials taken into account are listed in Annex 7.2.

Table 1: Overview of the design elements in the classification system

Design element	Stipulations
1 Accounting limit	Scope 1 and 2, and substantial Scope 3 upstream for defined reference plants, also includes adjustment rules for individually deviating plant composition
2 Environmental impact considered	CO_2e
3 Scrap input	Differentiation of threshold values along the scrap share
4 Processing stage	Hot-rolled product
5 Classification object	Product. Includes adjustment rules, in particular to account for different product qualities and the opportunity of using approaches based on weight assessment
6 Offsetting or other mitigation contributions outside the defined scope	Not permissible for product classification
7 Credits	For defined purposes only
8 Threshold value reference	External benchmark relating to transition from level E to D and full transformation in the case of level A.
9 Verification instance	Conducted by independent third parties
10 Verification procedures and requirements	2-step procedure, requirements for auditing and auditors in line with the DIN/EN ISO 17029 standard[22]

Reference is made here to points 1–4 above, with additional reference to the subsequent description of the adjustment rules (in Section 5).

A **partial transformation** may be depicted in the classification system. This means for example that if a primary route producer were to replace one blast furnace with a direct reduction unit, it would only be permitted to use direct reduction emissions for this part of production and blast furnace emissions for the remaining production. A similar case is the proportionate usage of purchased or self-produced green electricity in the primary or secondary route[23]. A producer can thus offer products with different classifications within the classification system. The relevant quantities must then be presented to the auditor in a clear and understandable manner. This way of depicting a partial transformation means that the remaining production must be accounted for using the actual emissions relating to the remaining, unclassified (conventional) production. A vendor is free to choose whether to use this option or to consider the emission-reducing impact of a partial transformation across all products. **However, under no circumstances should double counting in relation to reductions occur**.

The classification system is therefore fundamentally based on the physical accounting-related eligibility of measures in production facilities at one location. The option of using weight assessment is only permitted within a narrow and clearly defined boundary. This includes the case of partial transformation within a single production site. The representation of partial transformations is also

[22] DIN EN ISO 17029 Conformity assessment – General principles and requirements for validation and verification bodies; February 2020

[23] Explicitly not permitted is the allocation of the green electricity component contained in the general electricity mix.

necessary in order to be able to present a lead market-capable offer at all during the transition phase of the transformation.

The use of emission reduction or carbon credits[24] outside the inherent value chain or accounting range chosen here does **not** form part of this classification system, so they **cannot** be offset against the specific values to be determined.

In relation to their customers, manufacturers must in any event apply the CO_2 credits autonomously, in particular the allocation of CO_2 emissions between main and by-products, according to their own individual considerations and methodological requirements.

The proposed classification system permits the application of **credits** for substances and energies that are dispensed beyond the accounting limits, but **exclusively** for:

- Granulated slag or comparable by-products, regardless of the production route, which are sold as clinker substitutes for cement production: A credit of 0.100 t CO_{2e}/t[25] is given for granulated slag or comparable by-products.
- Use of domed gases for the generation of electricity or heat (similar to the EU ETS) consumed outside the plants: the credit can only be awarded upon actual consumption. Electricity is credited using the latest (even if these are still subject to uncertainties) emission factor for the EU Member States national electricity mix officially published by the EU Member State's national authority (e.g. in Germany Federal Environment Agency UBA). For non-EU countries, verified data are required and must be accepted by EU as official data.
- Energy supplied to third parties or plants outside the classification system from inherent production (including heat, electricity): the credit for heat is based on the valid heat benchmark from the EU ETS.

Credits are not awarded for other by-products.

Like all other design elements, the consideration of credits can be adjusted in the course of future reviews, both in principle and with respect to the values to be applied. Credits have already been taken into account in the primary route when the threshold values are derived, so this may also result in adjustments.

With respect to items 8–10 in the table above, please refer to the explanations in the following sections.

2. Derivation of the threshold values for the classification system

Threshold values for the classification system levels should remain unchanged over time. The derivation takes place in the following normative steps:

- The basic reference is the IEA proposal with the target state of virtually emission-free production. Values for quality and construction steel are derived from this.

[24] This comprehensive designation means that all forms of emission allowances or certificates are derived from existing project-related mechanisms irrespective of any standard or new cooperation mechanisms, such as in a further elaboration of Articles 6.2 or 6.4 of the Paris Agreement. This applies both to financial compensation and to other forms, such as payments or contributions towards the achievement of other protagonists' climate protection targets, regardless of whether or not these individual companies have defined this as part of their climate protection strategies. This serves to clarify the classification system and to focus on lead markets with the aim of transforming steel production, with no evaluative statement about the use of market mechanisms.

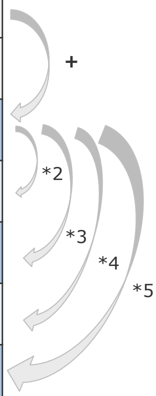
[25] The emission factor for slag was determined in consultation with the BMWK Scientific Advisory Board as part of the BMWK stakeholder process "Lead markets for climate-friendly basic materials". See also source: Infoblatt zu den CO2-Faktoren der Bundesförderung für Energie- und Ressourceneffizienz in der Wirtschaft – Zuschuss, 2021.

- As a broader scope is selected here, particularly with regard to the inclusion of additional emission sources in Scope 3, partial surcharges compared to the IEA approach are necessary.
- Due to the extended scope compared to the IEA up to hot-rolled steel, further partial surcharges are necessary, which take into account the additional production processes.
- The total surcharge[26] is estimated by comparing the IEA approach for the Near-Zero class with values derived using a bottom-up approach for a reference plant with the latest technology using largely climate-neutral energy sources and a reduction of around 50% in Scope 3 upstream emissions. The total impact calculated for QST is therefore 120 kg CO_2e/t of rolled steel and 70 kg CO_2e/t of rolled steel for BST.
- This results in the values per tonne of rolled steel - separately for quality and construction steel as well as according to scrap content - for the target classification level "Near-Zero”.
- Based on this target value, multiplications are made by a factor for each of the levels A - D; all values above this are qualified as "E".
- Nevertheless, the levels from "Near-Zero" to "E" should also be suitable for enabling meaningful distinctions for the necessary classification of products in order to be able to map gradual transformations in lead market instruments.

The following tables and diagrams illustrate the normative derivation of the threshold values for the classification of products in the CS and also specify them.

Table 2: Determination of the threshold values kg CO_2e/t rolled steel.

Quality steel		
	Srap use 20 %	Scrap use 100 %
IEA-approach	330	50
Surcharge	+120	+120
Near Zero	450	170
A	900	340
B	1350	510
C	1800	680
D	2250	850



Structural and reinforcing steel		
	Scrap use 20 %	Scrap use 100 %
IEA-approach	330	50
Surcharge	+70	+70
Near Zero	400	120
A	800	240
B	1200	360
C	1600	480
D	2000	600

Based on the values in Table 2 above, sliding scale values can be calculated for all scrap quotas in such a way that it is always possible to classify products depending on the scrap quota. This is important as today's large differences between the routes will become significantly smaller as the industry transforms, e.g. if DRI is also used in the secondary steel route or larger quantities of steel scrap are used in the primary steel route.

[26] The surcharge was determined in consultation with the BMWK Scientific Advisory Board as part of the BMWK stakeholder process "Lead markets for climate-friendly basic materials".

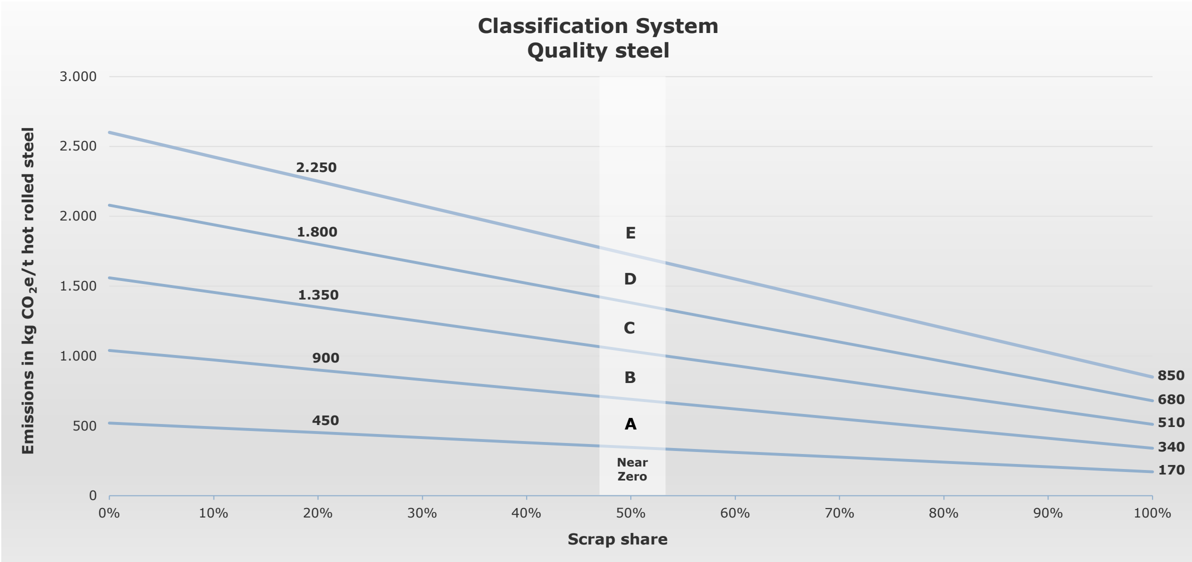


Figure 11: Slopes of the threshold value for QST

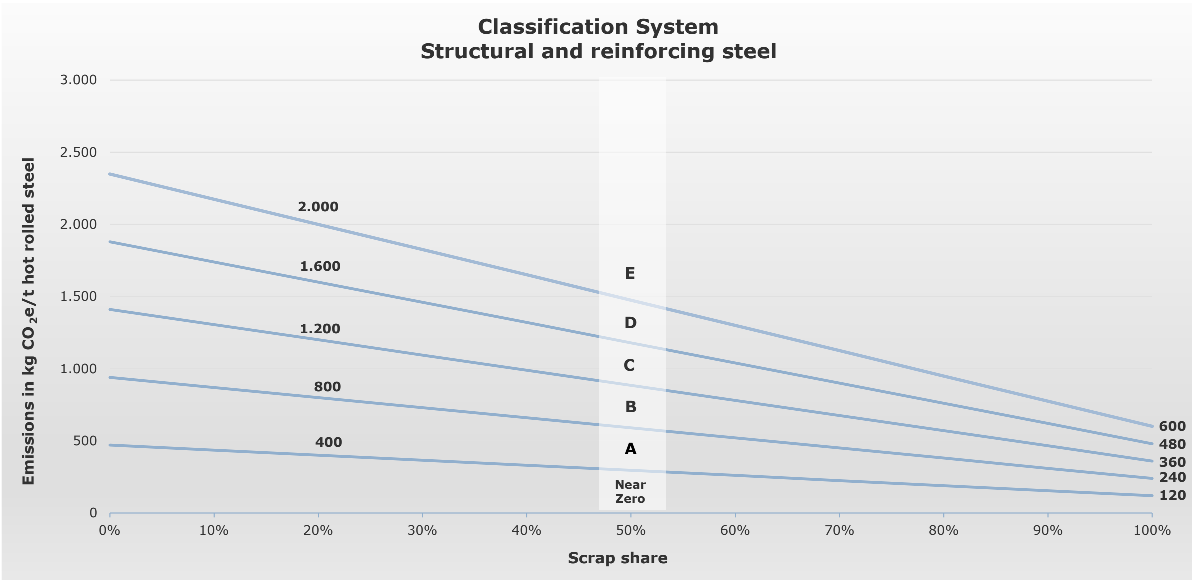


Figure 12: Slopes of the threshold value for BST

Based on this, the straight lines shown in Figure 11 and Figure 12 result for quality steel or structural and reinforcing steel. These adequately depict the progression over the entire sliding scale. Other initiatives such as IEA and Responsible Steel also rely on straight lines in their systems. Subsequently, this progression ensures compatibility.

In order to test the applicability and appropriateness of the normative threshold values, some reference plants are classified according to the system.

The threshold value from E to D presents state-of-the-art

The D/E threshold is intended to reflect a state-of-the-art level. The starting point for an integrated steelworks and the secondary route thus represents an ambitious emission level, which can be achieved with current procedures and corresponding management. At this stage, there are no transformative efforts. No transformative efforts are required to reach this level.

On the primary route, the value of the integrated steelworks at 20% scrap ratio is the fixed point for determining the value. For the secondary route, the virtual reference plant QST was used for classification[27].

The applicability of stage D/E is therefore tested with the values of the virtual reference plants Integrated Steelworks (at 20% scrap ratio) and EAF QST (at 100% scrap ratio).

The individual models are included in Annex 7.2. These also contain the emission factors used, along with corresponding source references.

Integrated steelworks

The value for the virtual integrated steelworks is 2,489 kg CO_{2e}/t of rolled steel according to the rules set out here and at a scrap share of 20%. This includes credits from only 82 kg CO_2e/t of rolled steel for the export of electricity and the sale of granulated slag as a substitute for cement clinker[28]. Around 77% of the emissions for the defined virtual reference plant arise in Scope 1 (taking into account the credits in Scope 3). The remainder is attributable to Scope 3. Scope 2 emissions do not arise, since the entire electricity requirement can be covered by in-house generation from domed gases. This calculation shows that the transition from E to D can already be considered ambitious due to the high proportion of Scope 1 emissions.

EAF QST

This calculation is the basis for all further calculations for the EAF QST. All calculations for the secondary route are based on a scrap ratio of 100%. Without transformative activities, the emissions for the reference plant amount to around 805 kg CO_2e/t of rolled steel. Here, 26% of the emissions are distributed across Scope 1, 36% across Scope 2 and 38% across Scope 3. The distribution of the emission shares shows the dependence on the availability of green energy and primary products, especially for higher ambition levels, so that the value can still be considered appropriate here.

Calculations for DRI-EAF and EAF-QST are also shown below to illustrate the transformation of the steel industry. The scrap quotas are identical to the initial situation.

DRI EAF under ideal condition from today's viewpoint

It is assumed that all reductions which can be directly influenced by the steel industry have been implemented. At the same time, however, the supply chain has not undergone the developments that would be required for Near-Zero hot rolled steel. Under these conditions, emissions of 626 kg CO_2e/t of rolled steel were determined, which would lead to an A classification. The emissions in this calculation mainly arise from the upstream chain of the pellets, hydrogen, dolomite lime and aluminium[29] used (→ Scope 3). Direct emissions are mainly caused by the carbon content of the pellets and electrodes.

EAF QST under ideal condition from today's viewpoint

The assumptions made result in emissions of 264 kg 264 kg CO2e/t of rolled steel, which would allow a classification in stage A. This also includes the assumption that all reductions which can be directly influenced by the steel industry have been implemented. The remaining emissions largely also originate from the upstream chain, in particular from burnt lime and alloying materials. The largest remaining direct emissions are caused by the graphite electrodes and the carbon content of alloying elements.

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[27] QST and BST deliver considerably different emissions with the same level of scrap input. An adjustment based on the defined reference values is therefore indispensable in ruling out any preference or disadvantage regarding a plant type.

[28] Under the current approach, integrated steelworks usually apply higher credits. Based on the BMWK stakeholder process "Lead markets for climate-friendly basic materials", a value of 100 kg CO_2e/t slag is applied. See also source: Infoblatt zu den CO2-Faktoren der Bundesförderung für Energie- und Ressourceneffizienz in der Wirtschaft – Zuschuss, 2021.

[29] Used as a deoxidiser.

The following table and graphs give an overview of the calculated values, show the distribution of emissions by scope, and classify the reference plants according to the CS.

Furthermore, it shows that the threshold values of the classification system, derived from the IEA proposal, are appropriate and ambitious.

Table 3: Emission reference values subdivided by scopes in kg CO_2e/t of rolled steel

Annex	Scope 1	Scope 2	Scope 3	Sum 1-3[30]	Classification in CS
Reference plant Integrated steelworks	1.904	0[31]	585[32]	2.489	Stage E
Reference plant EAF QST	207	294	304	805	Stage D
DRI-EAF under ideal conditions	16	0	529	544	Stage A
EAF-QST under ideal conditions	18	0	246	264	Stage A

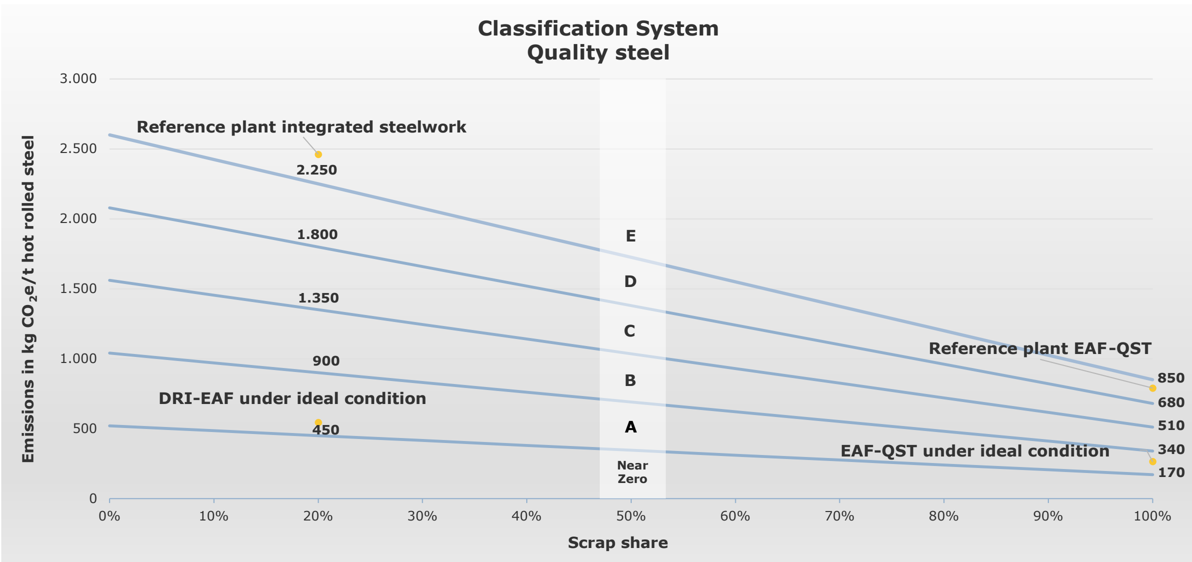

Figure 13: Levels and ranking of reference plants quality steel (QST) for the classification system.

Modification for BST

The simpler production process of structural and reinforcing steel (BST) results in the emission load being much lower here than with respect to quality steel. A scrap share of 100% is also assumed in the EAF processes relating to structural and reinforcing steel (BST).

[30] The values of the individual scopes are rounded to the nearest kilogram. The sum is determined from the exact values and then also rounded to kilograms. This may result in deviations from the sum of the individual values.

[31] The integrated steelworks covers its electricity requirements by converting the by-product gases into electricity in its own power plant. Therefore, no electricity is purchased and the Scope 2 emissions are equal to zero.

[32] Taking into account the credit balances.

EAF BST

In this case the emissions amount to 547 kg CO_2e/t of rolled steel at a scrap share of 100% compared to 805 kg CO_2e/t of rolled steel for QST. Here, a classification in category D would also apply. Similar to QST, the proportion of Scope 2 emissions at 42 % and Scope 3 emissions at 38 % is very high.

EAF BST under ideal condition from today's viewpoint

The additional assumption here is that all reductions that can be directly influenced by the steel industry have been implemented. This results in emissions of 170 kg CO_2e/t rolled steel. This would lead to a classification into level A.

The following graphic illustrates the levels and classification of reference plants for structural and reinforcing steel for the classification system.

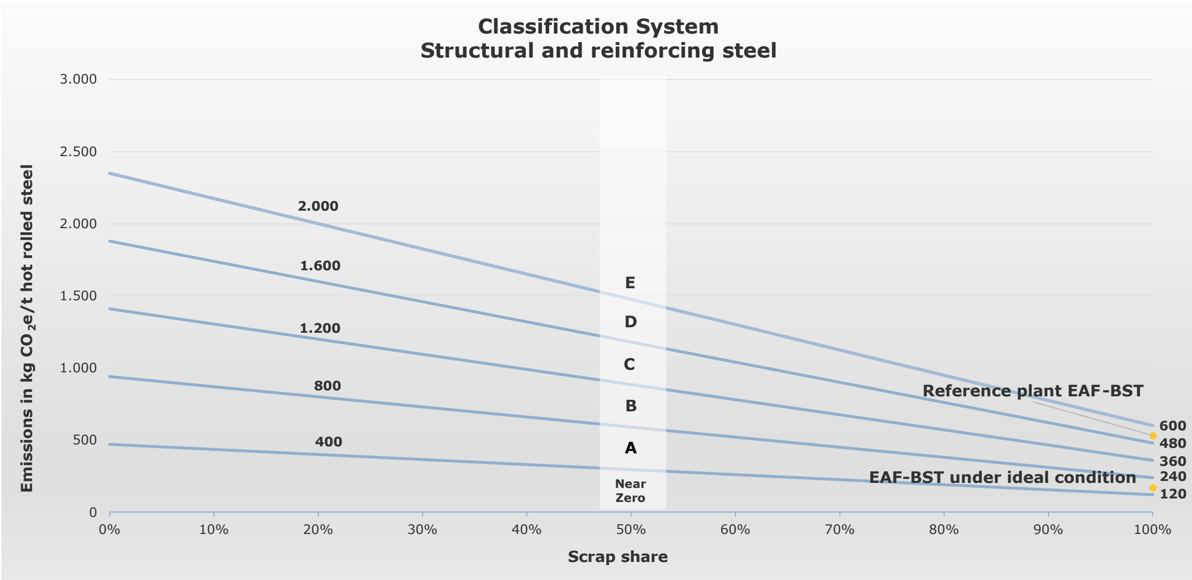

Figure 14: Levels and ranking of reference plants structural and reinforcing steel (BST) for the classification system.

The classification system supports the transformation goal in clearly identifiable steps.

Key transformation steps and challenges are depicted. Both routes include particularly ambitious stages, whereby level A and "Near-Zero" in particular can only be achieved by means of complete transformational efforts. It is conversely ensured that partial transformation steps also lead to products being differentially categorised according to the classification system. There is simultaneously assurance that the requirements placed on the climatic properties of products by future policy instruments can increase in defined steps.

The system thus provides clear incentives to invest in equipment to enable achievement of about level C on the primary route, for example. This ensures the ability to reach the higher classification level in a technology-open manner. Should direct reduction be based on climate-neutral hydrogen, then both DRI variants can be classified in classification level B without further changes. Incentives are thus also set to make greater efforts to reduce emissions without compromising on openness to technology.

The emission factor of the electricity used in the secondary route plays a decisive role in the classification system. This is also the largest influencing factor upon which producers can make a direct impact. If 50% renewable electricity is used instead of the current German electricity mix, the reference plant could already reach level C. With 100% green electricity level B is the also achievable - but not level A. To reach this higher level, additional efforts such as the use of hydrogen or biogenic coal are necessary.

It should again be pointed out that the above calculated reference values apply to virtual reference plants and defined qualities **before** applying the adjustment rules described below to determine equivalent values, such as for other product qualities.

3. Determination of emissions for inclusion in the classification system

The emissions are to be recorded according to a validated[33] determination model. Determination of Scope 1 and 2 emissions is to include all steel production facilities as far as they are present at the site, as listed below:

- Coking plant
- Sintering plant
- Blast Furnace (BF)
- Direct reduction unit (including clarification what approach is taken to onsite production of DRI)
- Steel mill processes – electric arc furnace (EAF) or smelting reduction furnace (SAF) and converter (basic oxygen furnace – BOF)
- Secondary metallurgy (via Ladle furnace (LF), Vacuum equipment, Rinsing unit)
- Continuous casting / block casting
- Hot rolling mill
- Power plant

Auxiliary installations and infrastructure facilities used to operate the nominated plants are always to be included in the determination[34]. This includes equipment like air separation units or cranes for moving the material that is used. The emissions are to be allocated in a comprehensible manner based on real relationships if auxiliary installations are also used to operate equipment not included in the classification system. Transporting intermediate products between plants on the site forms part of the emissions to be recorded, unless subject to the cut-off criterion.

Non-production activities and facilities such as administrative buildings or research facilities are not included within the determination. Processing and finishing steps downstream from the hot rolling mill are not taken into account, including heat treatment or the production of cold drawn steel. Only the initial pass in the hot rolling mill (first heat) is relevant in determining the emissions, since only this case is depicted in the reference products. Further passes should not be taken into account.

The use of data and factors already verified under the EU ETS or related instruments (such as electricity price compensation) is a principle that applies to both the determination of emissions and activity rates (e.g. like in the DEHSt Allocation Data Report). Data from the EU ETS is to be used wherever possible when collating Scope 1 emissions. Weight assessment approaches similar to the EU ETS are permitted when recording Scope 1 emissions. Comprehensible individual emission factors (from internal analysis or provided by suppliers) or current official emission factors with regional relevance (such as standard values from the EU ETS, perhaps the DEHSt list, and possibly also from the German Fuel Emissions Trading Act (Brennstoffemissionshandelsgesetz – BEHG)) are to be used to determine Scope 1 emissions from fuels not covered by the EU ETS.

If electricity is purchased by the operator, the determination of Scope 2 emissions requires the real emission factor from the actual electricity mix used by the plant operator to be applied.

[33] For stipulations regarding auditing, please see in the Certification body guidelines for the Low Emission Steel Standard (LESS).

[34] Unless they can be omitted due to the cut-off criterion shown above. Smaller emission sources become increasingly relevant as the classification level becomes more demanding.

Also utilizing accounting-related allocations relating to the use of energy sources and the resulting emissions is expressly permitted[35], provided that guarantees of origin from officially recognised registers are referenced. Currently and with significance for the CS, these are: Guarantees of origin for green electricity purchased on an accounting-related basis and not physically delivered (German Environment Agency Register), accounting-related procurement of biogas (German Biogas Register, German Energy Agency). It may also be permissible in the course of reviews to include additional guarantees of origin as necessary in relation to systems currently under construction (such as hydrogen), provided that this is also technically expedient. The Scope 3 upstream emissions from operating the equipment, including auxiliary installations, are moreover to be recorded within the described limits. In terms of the classification system this involves recording:

- Energy-related Scope 3 emissions (Scope 3.3)
- Scope 3 emissions for the provision of the raw materials, auxiliary materials and operating materials used (Scope 3.1) and precursors including their transport to the plants (Scope 3.4); where applicable such transports are to be included directly via the selected emission factors.

Further Scope 3 emissions do not form part of the classification system. This applies in particular to capital goods (construction of new or replacement of existing equipment, Scope 3.2), waste disposal from production (Scope 3.5), business travel (Scope 3.6), employee commuting (Scope 3.7) and all downstream emissions (Scopes 3.9 – 3.15).

Should plant components covered by the classification system be leased, their emissions must nevertheless be accounted for (Scope 3.8).

Scope 3 emissions are to be determined based on utilisation quantities and emission factors. Individual Scope 3.1, Scope 3.3 and Scope 3.4 emission factors may be used under certain conditions (see Section 3.1). A list of alternative standard factors or their source is provided in Annex 7.6. These factors also form the basis for calculation of the reference plants.

3.1. Use of individual emission factors for Scope 3

Individual emission factors for determining Scope 3 emissions must be equally as effective as the values for Scope 1 and Scope 2. They may be used if one of the following criteria is met:

- The emission factors for the input materials are provided by the supplier and are determined in the course of a product carbon footprint assessment according to the GHG Protocol Product Standard, ISO 14040/14044, 14064 or ISO 14067 and checked by a certification body. All significant Scope 3 upstream emissions must be included in the calculation.
- The emission factors for the input materials are provided by the supplier and are determined in the course of a product carbon footprint assessment according to the GHG Protocol or ISO 14064. The supplier provides all the necessary data to the certification body commissioned by the plant operator to conduct CS verification, so that the certification body can review and confirm the correctness of the determined Scope 3 emission factors.

A plant operator that produces the input materials itself is in this context deemed to be a supplier.

The fallback emission factors listed in the Annex to this rulebook are to be used if an input material does not have an emission factor that meets one of the above criteria. The use of other emission factors, from other databases for example, is expressly prohibited for reasons of comparability.

Where there is no value for scope 3 emissions for a particular material (e.g. SiMn) available in EcoInvent, then the operator should be required to obtain a (conservative) value from another credible source.

[35] As long as no other specifications or requirements have been defined at EU level.

3.2. Definition of classification groups

Individual emission factors for determining Scope 3 emissions must be equally as effective as the values for Scope 1 and Scope 2. They may be used if one of the following criteria is met:

The plant operator must decide whether and how its production is segmented for classification within the classification system for each site.

The corresponding procedure is to be documented in the determination model. Such segmentation may be necessary or expedient for two main reasons:

- To differentiate between products with different emission intensity impacts or
- To depict permanent or variable partial transformations

Example 1: classification groups for different product groups

A steel producer only produces grades A and B at the site. Its operational experience suggests that it can produce Grade A in a more energy-efficient manner. It decides to introduce two classification groups to differentiate grade A from grade B.

Classification group I thus comprises grade A in all dimensions produced and classification group II grade B in all dimensions produced.

Example 2: classification groups for different product groups

A steel producer produces 20 defined grades of rods in dimensions up to 200 mm in diameter. Its operational experience suggests that its rolling process is above average in efficiency when producing large diameters. It decides to introduce two classification groups within the classification system to only reflect this advantage in this particular group. Classification group I covers all grades and dimensions smaller than 150 mm, classification group II covers all grades and dimensions from 150 mm to 200 mm.

Example: classification groups in the event of partial transformation

A steel producer produces the same product range at its site, once via the blast furnace and once via a direct reduction unit. It chooses two classification groups, each of which includes one of the two methods.

In addition to such differentiations, classification groups must indicate in which aggregation the respective data are collated. This can for example occur in batches, for defined partial productions or as an annual average. The plant operator's design of classification groups thus significantly depends on its available data quality and granularity. Expenditure on data preparation in particular can also be managed to a certain extent by selecting classification groups that facilitate higher aggregations up to total annual production. This then however invalidates the option for classifying lower-emission products – if they are produced – in higher levels than is the case for average production.

The determination model is to describe the basis for allocating material and energy inputs, and output quantities, to the classification groups. Different approaches for different flows may even be chosen within classification groups; for example where certain data are available in a batch-specific form, but others only as annual quantities. This may never result in the exclusion of emissions falling within the scope of the system.

Example: different approaches to allocating emissions to classification groups

A steel producer subdivides its production into classification groups according to the grades produced. It is able to break down its electricity use in the EAF to its production in batches and proceeds accordingly. It is unable to break down its infrastructure facilities in the steel mill to its production in batches or grades. It therefore distributes the total amount of electricity used for infrastructure proportionally based on its production volumes.

A uniform procedure is always required within a classification group. The choice of different approaches may not result in certain classification groups being systematically placed in a better position than they actually are.

A classification group must also always contain information on:

- The products or product groups involved (such as the grades and dimensions that are included)
- The level achieved by this classification group

CS warranties are to be related to the site and to a defined classification group. The products or product groups included within a classification group are to be made available to the buyer in a certified form. A CS warranty issued for a specific classification group applies to all products at the site covered by that classification group.

The classification groups are to be initially defined when a determination model is first created. This should involve the production range being selected from the period relevant to initial verification or the calendar year of the initial verification. The annual verification is to include a review as to whether the classification groups correctly reflect the production range. In the case of less frequently produced products, classification models can depict the plant's potential production range to obviate the need for constant revision of the determination model and the associated follow-up verification. Warranties are always to be issued based on actual production and the arising emissions. Should the product range be extended without major plant engineering modifications being performed, it must be demonstrated in the context of a revalidation that the classification groups continue to achieve the designated classes. A revalidation of this nature may be limited to an examination of these facts. Any CS warranties issued for the additional product range may only be taken into account once the revalidation has been completed. Revalidation of the determination model can alternatively be conducted in the context of the annual follow-up verification if the product range is extended. In this case, the CS warranties for the new product range can only be used after follow-up verification.

It is permitted to assign the total annual production as an average to a product group.

A product group always represents the average of the products included in it, unless the system operator makes use of subgroups. In this case, subgroups represent the average of the production recorded therein.

A very large number of different classification groups would be required if the focus were on products or very restricted product groups. An easement is therefore in place for this purpose. Should more than ten classification groups be required for correct representation of the products or product quantities, classification groups may instead define the overriding conditions for multiple products or product groups (subgroup delimitation).

Admissibility of subgroups:

A steel producer produces 25 different grades and wants to classify its products in a differentiated manner by grades within the classification system. More than 10 classification groups would be required, so forming subgroups is permissible. In this case, it describes the grade-dependent recording and allocation of input materials, energies and emissions, and then applies the same methodology to the individual grades.

The products or product groups within the classification group must be uniformly defined and emissions must also be uniformly allocated. **A produced product quantity may only be assigned to one classification group at a time.**

A classification group can in this case be valid for the following subgroups:

- Defined grades in all produced dimensions
- Defined dimensions for all produced grades
- Defined products (combination of defined grade and defined dimension)
- Individual batches

Different levels can in this case be achieved within a classification group. The classification group may thus show more than one level, but must describe what can cause such differences. CS warranties issued based on such classification groups must contain a specific reference to the chosen subdivision. CS warranties with subdivision are only valid for products covered by that subdivision.

Example of a classification group with subdivisions:

For classification purposes, a steel producer chooses the special case of subdivision within classification groups, since it wants to subdivide its classification based on the grades it produces. It produces 10,000 t of C22 and issues the corresponding warranties. These warranties may also only be used for this C22.

A detailed revalidation is generally not required if, in the case of a subdivision, the product range is extended by introducing a new subgroup that does not alter the configuration of the previous subgroups, but only increases the number.

Classification groups must cover the entire production at the site covered by the classification system. Should products or intermediate products be produced at the site on plant components that are subject to the classification system but not (yet) covered by the system, a description of this component and the flows attributable to it must also be documented to enable clear demarcation from classified products. It must be impossible for accordingly demarcated components to contain emissions from items produced under classified production. In the context of an audit, it is sufficient to exclude that the demarcated components contain emissions relating to classified production. The total emissions from the demarcated plant components are not necessarily to be collated and audited.

3.3. Allocation of emissions to defined classification groups

The plant operator is responsible for segmenting the individual classification groups. It must ensure that the determined emissions are allocated comprehensibly, completely and consistently among its chosen classification groups. The corresponding procedure is to be described in the determination model. Consistency in this context means in particular that the allocation methodology among individual classification groups is not differently selected without a valid reason. Should different methods nevertheless be used, due to insufficient data or unacceptable effort for example, the choice of different methods may never result in emissions not being taken into account. In other words, the total emission quantity when using different methods may not be smaller than the total emission quantity when using uniform methods. Uniform methodology must be applied within a classification group.

Example:

The operator of an electro-steel plant chooses the following segmentation: A batch-precise view and classification relating to (a few) selected products is selected in the classification system (classification group I), the remaining production is classified with an average value (classification group II). The EAF can be used to evaluate the electricity consumption in batches. This is used for Group I. To maintain consistency, the batch-precise evaluation should also be used for Group II. The plant operator would like to refrain from doing so, however, since it would be very costly in this case. Albeit the plant operator may not simply use the average EAF electricity consumption as the basis for calculating Group II, since this does not ensure that all emissions from the EAF's electricity consumption are taken into account. This would not be the case if the Group I power consumption were lower than the overall average. One option would be to deduct the Group I electricity consumption from the total EAF consumption and to use the residual quantity as the basis for determining the Group II emissions.

The allocation of emissions to classification groups ought in principle to reflect the real relationship between the input materials required for the respective group and the energy use and resulting emissions. The differentiation of emissions between classification groups is thus achieved via:

- Different input materials (such as biogenic coal rather than conventional coal, ferrochrome with a demonstrably lower emission factor rather than conventional ferrochrome),
- Different quantities of the same materials,
- Different fuels (including biogas rather than natural gas or hydrogen rather than natural gas) or differences in the provision of energy sources (renewable electricity rather than grey energy, renewable hydrogen rather than grey hydrogen),
- Different energy use and/or
- Differences in application.

Therefore, real reference to the products in the respective classification group must always be made; the allocated material use or energy use must always be technically possible and must actually be implemented at the plant. The arbitrary, purely accounting-related shift of emissions from one group to another is not permitted.

Example:

A plant operator produces 100,000 t of rolled steel with an average of 2.0 t CO_2/t, i.e. a total of 200,000 t of CO_2e. It wants to divide its production into two groups of 50,000 t each. Without any differentiation in the manufacturing process, it would like to classify Group I with 1.0 t CO_2/t and Group II with 3.0 t CO_2e/t. This procedure is not permitted, although the total amount of emissions is correctly included at 200,000 t of CO_2e.

3.4. Admissibility of accounting-related allocations

Weight assessment approach to the allocation of materials

The allocation of input materials may occur in the form of weight assessments. This applies in particular to materials that can be used identically but have different emission intensities. These materials may be divided in an accounting-related manner among the classification groups. There is in particular no requirement for simultaneity between production of a particular classification group and availability of a particular (potentially sustainably produced) version of an input material. All the materials required for production must however continue to be allocated to each classification group. All materials used must continue to be taken into account in the correct quantity over the period under consideration (calendar or accounting year). The weight assessment must tally. The weight assessment approach must in particular not result in multiple counting of lower-emission input materials.

Example:

A plant operator is able to use certified biogenic coal rather than anthracite in its production process. It obtains a certain quantity from its supplier every month and uses biogenic coal mixed with anthracite in its ongoing production process. The operator differentiates between two classification groups. It may allocate its complete use of biogenic coal to Group I when allocating to classification groups. This would also apply even if Group I were only physically produced within a specified time period. Should the available amount of biogenic coal not be sufficient to meet the Group I demand, however, the appropriate amount of anthracite would also need to be allocated. Exclusively anthracite would in this case then need to be used to calculate the Group II emissions to exclude multiple attribution of low-emission biogenic coal.

Example of weight assessment in the event of partial transformation

Both a traditional blast furnace and a direct reduction unit with submerged arc furnace/ open slag bath furnace (SAF-OSBF) are operated at one site. Steel is subsequently produced from the molten pig iron in the converter. The plant operator wants to divide its production into two classification groups. It may on an accounting-related basis allocate the entire molten pig iron from the SAF-OSBF (low emission) to Group I and the pig iron from the blast furnace (more emission intensive) to Group II. The product quantity must in each case correspond to the utilisation quantity. More pig iron of the one type may not be offset on an accounting-related basis than was actually produced and used. Multiple allocations relating to low-emission pig iron production in particular are to be excluded. A temporal production correlation is not required.

Accounting-related attributions relating to energy sources

An accounting-related procedure is also permitted when allocating energy sources, provided that they are comparable energy sources. These include:

- Natural gas, biogas and synthetic methane, provided that the latter two have been fed into or purchased directly from the public natural gas network. A distinction can as necessary also be made within the stated fuels if they are obtained from different sources and thus have different emission factors or are self-produced.
- Solid fuels with similar combustion properties from different sources, and thus with different emission factors (including coals).
- Electricity from different sources and thus with different emission factors.
- Hydrogen from different sources and thus with different emission factors.
- Heat/cold from different sources and thus with different emission factors.

Accounting-related allocations are only possible within these five groups. Accounting-related allocations are voluntary.

This in practice enables the accounting-related allocation of comparable energy sources from different origins and thus with varying emission intensity. Accounting is also independent of the temporal relationships between procurement and production. All energy sources used must continue to be taken into account in the correct quantity over the period under consideration (usually the calendar year). The account must be calculated for the location under consideration. The accounting approach must in particular not result in multiple counting of lower-emission energy sources. The quantities of energy actually needed for production must be allocated across all classification groups.

Example of accounting-related distribution of green electricity

A plant operator wants to divide its production into two classification groups. Group I accounts for 25% of its production and Group II for the remaining 75%. The specific electricity consumption is identical. The plant operator acquires guarantees of origin for green electricity relating to 25% of its electricity consumption. It may fully allocate the low-emission electricity to Group I. In the case of Group II, it must reckon with its supplier’s actual mix. It could alternatively waive any division into groups and reduce the emission intensity of its average electricity consumption based on the guarantees of origin and then transfer the impact across its entire production.

Example of accounting-related attribution of energy sources that are technically not directly renewable

A plant operator has already converted its hot rolling mill to use hydrogen. Albeit its direct reduction unit will continue to be operated using natural gas. The plant operator would like to divide its production into two classification groups and earmark Group I to be as low-emission as possible. It is considering whether it can allocate part of its hydrogen use to the direct reduction unit and thus make this production step for Group I less emission intense. Natural gas for the DR unit would accordingly be allocated to the rolling mill and ultimately to Group II. This procedure is not permitted because the DR unit is not powered by hydrogen.

The accounting-related acquisition of biogas would conversely be a way to reduce Group I emissions from the DR plant.

Accounting-related handling of issued CS warranties

CS warranties are essentially independent of real production but result in the issuance of certain quantities of warranties. Only temporal independence from production and the use of warranties enables producers who want to issue such warranties on an annual basis to also use them.

CS warranties may at the time of sale be allocated to any of the producer's products that are covered by the warranty classification group and were produced at the same production site as the warranty. The sum of allocated warranties may never exceed the total number of warranties per classification group. Each warranty may only be issued once. CS warranties may also be used regardless of the actual time of issuance, provided that corresponding warranties are available.

Example of production independence and CS warranty within a site

A plant operator does not subdivide its production at the site according to product specifics, but rather differentiates between two classification groups with different emission intensity (such as due to partial transformations and energy sources with varying emission intensity). The same products are manufactured in both groups. The operator is able to allocate 40,000 t to its production class C and to provide appropriate substantiation based on its validated determination model. It allocates 160,000 t to class D pursuant to its determination model. The two classification groups each represent the site's entire production range, so the plant operator is free to choose which 40,000 t of production it sells as class C. Double accounting is also to be excluded here.

Example of time independence relating to issuing and use of warranties

A plant operator produces 10,000 t of class C steel and provides corresponding warranties. It sells the product without CS warranties, since there is no demand for this product as class C steel. It can use the CS warranties for this type of product from the site once there is a demand. The warranties may only be used for production that is subject to classification in the system and belongs to the same classification group. Double accounting issues are excluded, since the quantity of warranties is precisely limited and is tracked in the register.

This opens up the option for producers who operate a continuous production in small quantities of higher-classified steel or who can produce smaller quantities of higher-class steel in certain situations to service larger orders with corresponding requirements without having to build up additional independent stocks.

Note: this does not mean that products from previous years can be retrospectively classified. Only warranties that have already been prepared can be used in subsequent years.

Accounting for the defined accounting range is always to be performed at the level of a single asset, or of a location for several assets. **It cannot be accounted for across locations.**

4. Classification of the production within the classification system

Classification of a production run with emissions correctly determined according to the stipulations in this set of rules depends on the scrap share in the respective product.

4.1. Determination of the scrap share

The scrap share in terms of this classification system relates to the ratio of scrap used to the total quantity of scrap, pig iron, DRI and HBI.

The scrap share is thus determined as the ratio of the amount of scrap used to the total quantity of these materials.

$$scrap\ share = \frac{Amount_{Scrap}}{Total\_Amount}$$

The total quantity is in turn the sum of the quantities of scrap, pig iron, DRI and HBI used.

$$Total\ Amount = Amount_{Scrap} + Amount_{pig\ iron} + Amount_{DRI} + Amount_{HBI}$$

It is irrelevant whether the materials mentioned are supplied solid or molten.

Alloying agents, including those containing FE, are not to be used in determining the scrap share. The scrap share is used to differentiate between primary and secondary production.

Threshold values are negatively correlated with the scrap share: the higher the proportion of scrap input, the lower the threshold value.

The scrap share in terms of this classification system is used solely to determine the relevant individual threshold values for a particular production run to enable classification within the classification system. This scrap share is not equivalent to information on the proportion or use of recycled material in the product.

The scrap share contains of pre-consumer, post-consumer and internal scrap. Scope 3 emissions from scrap are to be considered, as explained in chapter 1 (p. 21).

4.2. Calculation of the threshold values depending on the scrap share

The individual classification thresholds reduce depending on the scrap share. As shown in previous figures, the thresholds are mapped in a diagram. The vertical axis shows the emission in kg of CO_2e per ton of hot rolled steel; the horizontal axis shows the scrap share on a scale from zero to one hundred per cent.

The classification thresholds are straight lines. The following straight-line equation is derived from the reference plants and serves as the basis for calculation.

$$E = m * (100 - x) + s,$$

where E represents the threshold value in kg CO_2e per ton of hot rolled steel, m the gradient, x the scrap share and s the calculated emission reference value relating to the secondary route at 100% scrap share in kg CO_2e/ t of hot rolled steel. Gradient m of the straight line is determined by the reference values for the virtual reference plants relating to the primary route p (assumption 20% scrap share) and the secondary route s (assumption 100% scrap share).

$$m = \frac{(p-s)}{80}.$$

The calculation applies to all four threshold progressions. In terms of thresholds C/D and B/C, the respective *p* and *s* are derived from the reference values for D/E and A/B (see Section 2).

The individual threshold values can thus be precisely determined for each real scrap share.

The calculations for determining the threshold values are shown in Annex 7.3 for greater transparency. This tool in its currently valid version is to be used to determine the threshold values for a genuine production run, or the logic that is stored there is to be implemented in a separate calculation. The threshold values are to be rounded to the nearest kilogram prior to use.

Threshold values are to be determined for each classification group, or subgroup where applicable. A separate determination is not required if individual groups do not differ in terms of their scrap share.

4.3. Determination of the classification level

The emission values per ton of hot rolled steel are also to be rounded to the nearest kilogram. This value for each classification group or subgroup is then to be compared with the threshold values calculated in line with Section 2. It is important to pay attention to corresponding scrap share when doing so. A classification level is reached when the emission value is less than or equal to the specified threshold value. The produced quantity relating to the classification group or considered subgroup is to be allocated to the specific level.

5. Adjustment rules

Adjustment rules are necessary to an appropriate extent given the variety of steel grades whose production differs considerably in terms of energy use and, above all, in relation to the use of raw materials. These are defined in the following subsections. The design permits the inclusion of variable steel grades without creating incentives for unnecessary material or energy use.

The system thus also focusses on the required process transformation, which is independent of the different products. Transformation of the entire industry can only be advanced by the comprehensive involvement of production.

5.1. Adjustment rule for alloying agents

Steel grades differ in their composition according to the elements they contain and their proportion. In addition to iron and carbon, there are a variety of metallic elements such as chromium or nickel as well as non-metallic elements such as sulfur that can be used to give the steel certain properties. It may also be necessary to use certain substances to achieve desired material properties without these substances remaining completely in the steel (such as deoxidisers). Many of these materials are currently contributing relevant upstream emissions to the process. Creating a comparable system irrespective of the steel grade requires adjustments to be made based on the alloying agents used.

5.1.1. Design of the adjustment rule for alloying agents

Scope 3.1 emissions from the alloying agents used in the production of different steel grades have the greatest impact on emissions. Any Scope 3.1 emissions from alloying agents that exceed the emissions from alloying agents relating to the reference products are to be completely excluded to form an equivalence value. A materials list is therefore included as an Annex to these rules, which should be followed when considering the adjustment rule. The adjustment is always to be made based on the standard emission factors outlined in the Annex, even if the plant operator can rely on individual emission factors that could be used to determine the actual emissions.

Scope 3.1 emissions relating to alloying agents for carburisation may only be excluded if weight assessment is used to substantiate the proportion of the material that actually contributes to this carburisation. This prevents this rule from being used to introduce additional energy use.

Some alloying agents (ferrochrome, for example) have an unignorable carbon content that results in relevant additional Scope 1 emissions, especially in grades involving high use of these agents. Here too an adjustment is made to avoid penalising these grades. This is performed based on a weight assessment. Although this involves a deduction being made, since the additional carbon content also causes an energy input.

5.1.2. Application of the alloying agents adjustment rule

The adjustments made to determine the equivalence value are always to occur at the cast crude steel level. In other words, before the steel is rolled.

Scope 3.1 adjustments excluding special cases

Consistent use over the entire range of alloying agents is defined in relation to the reference value. This results in 93.7 kg of CO_2e of Scope 3.1 emissions per ton of crude steel for QST in the underlying virtual reference plant. The value for BST is 43.8 kg CO_2e per ton of crude steel.

The procedure for determining the equivalence value is as follows.

Selection of the correct reference alloying emissions.

Reference Scope 3.1 alloying emissions[36]:

Em_Leg_{Ref} = 93.7 kg CO_2e / t crude steel (QST) or 43.8 kg CO_2e / t crude steel (BST)

Determination of the amount of alloying agents used per alloying agent.

Real use of alloying agents: $Input_{Leg}$

Determination of Scope 3.1 emissions for each alloying agent based on standard factors and summation of the results.

Scope 3.1 alloying emissions based on standard factors: Em_Leg_{Std}

$$Em\_Leg_{Std} = \sum_{i}^{n} Input_{Leg,i} * Standard\_Emission\_Factor_i$$

The standard emission factors are set out in the Annex.

Determination of Scope 3.1 emissions for each alloying agent based on individual factors and summation of results.

Scope 3.1 alloying emissions based on individual factors: $EM\_Leg_{Ind.}$

$$Em\_Leg_{Ind} = \sum_{i}^{n} Input_{Leg,i} * Individual\_Emission\_Factor_i$$

The individual emission factors are to comply with the requirements in Section 3.1. Should individual emission factors only be available for some of the alloying agents used, this value may also include a combination of alloying agents with individual emission factors and alloying agents with standard factors.

In the case of

$$Em\_Leg_{Std} \leq Em\_Leg_{Ref}$$

an equivalent value is not to be determined. The calculation of emissions for inclusion in the classification system is performed when using standard factors with Em_Leg_{Std}, when using individual factors (or a combination of both) with Em_Leg_{Ind}.

[36] Em_Leg: the abbreviation “Leg” was chosen based on the German term “Legierungselement” (engl.: alloying agents).

In the case of

$$Em\_Leg_{Std} > Em\_Leg_{Ref}$$

an equivalent value may be determined. This first requires a correction value to be calculated.

$$Correction\_Value_{Leg} = \frac{Em\_Leg_{Ind}}{Em\_Leg_{Std}}$$

Subsequently, the correction factor is multiplied by the reference alloying agent emissions Scope 3.1. This value gives the alloying agent emissions Scope 3.1 for determining the equivalent value, Em_Leg_{Eqv}.

$$Em\_Leg_{Eqv} = Em\_Leg_{Ref} * Correction\_Value_{Leg}$$

The exclusive application of standard factors for alloy emissions Scope 3.1 results in:

$$Em\_Leg_{Std} = Em\_Leg_{Ind}$$

And thus:

$$Correction\_Value_{Leg} = 1$$

Accordingly, if only standard factors are applied for alloy emissions Scope 3.1:

$$Em\_Leg_{Eqv} = Em\_Leg_{Ref} * 1 = Em\_Leg_{Ref}$$

The difference between the individual value Em_Leg_{Ind} and the equivalent value Em_Leg_{Eqv} multiplied by the corresponding production quantity can also be applied directly in the mass balance, i.e. subtracted.

Example application of the adjustment rule in relation to Scope 3.1 alloying emissions:

A plant operator produces quality steel. It determines the Scope 3.1 alloying emissions based on the alloying agents used and standard factors from Annex and determines

$$Em\_Leg_{Std} = 250.0\ kg \frac{CO_2e}{t\ crude\ steel}.$$

If the operator cannot use individual emission factors to determine scope 3 emissions for alloying agents, the value to determine the equivalent value is calculated as

$$Em\_Leg_{Äqv} = Em\_Leg_{Ref} * 1 = Em_{Leg}{}_{Ref} = 93.7kg\ \frac{CO_2e}{t\ crude\ steel}$$

However, the operator can prove that alloying agents are obtained from ‘sustainable sources’ (see chapter 3.1). The calculation of individual emissions of the operator results in

$$Em_{Leg}{}_{Ind} = 200kg\ \frac{CO_2e}{t\ crude\ steel}$$

This leads to a correction value of

$$Correction\_Value_{Leg} = \frac{200{,}0\ kg \frac{CO_2e}{t\ crude\ steel}}{250{,}0\ kg \frac{CO_2e}{t\ crude\ steel}} = 0{,}80$$

The value for determining the equivalent value is thus calculated as

$$Em\_Leg_{Eqv} = 93{,}7\ kg\frac{CO_2e}{t\ crude\ steel} * 0{,}80 = 75{,}0\ kg\frac{CO_2e}{t\ crude\ steel}$$

Generally, the operator will apply the equivalent value directly to the mass balance. In this example, 100 tons of this intermediate product are manufactured.

When using standard factors, the mass balance for Scope 3.1 emissions from alloying agents thus includes

$$250{,}0\ kg\frac{CO_2e}{t\ crude\ steel} * 100\ t\ crude\ steel = 25{,}00\ t\ CO_2e.$$

By applying the correction, the equivalent value is calculated as follows

$$93{,}7\ kg\frac{CO_2e}{t\ crude\ steel} * 1{,}0 * 100\ t\ crude\ steel = 9{,}37\ t\ CO_2e$$

The correction can also be applied directly to the overall emissions.

When individual factors are applied, the mass balance for Scope 3.1 emissions from alloying agents in this example includes

$$200{,}0\ kg\frac{CO_2e}{t\ crude\ steel} * 100\ t\ crude\ steel = 20{,}00\ t\ CO_2e$$

By applying the correction, the calculation is carried out with

$$20{,}00\ t\ CO_2e - \left(200{,}0\ kg\frac{CO_2e}{t\ crude\ steel} - 75{,}0\ kg\frac{CO_2e}{t\ crude\ steel}\right) * 100\ t\ crudesteel = 7{,}50\ t\ CO_2e.$$

Here again, the correction can be applied directly to the total emissions.

5.1.3. Special cases for adjustments to alloying agents

Special case 1: Scope 3.1 adjustments to alloying agents and/or additives containing calcium

Both the steel quality and the production route are decisive in terms of the input quantity of calcium-containing materials (in particular quicklime and limestone as reducing agents or slag formers). The different reference systems therefore take into account different quantities and accordingly different Scope 3.1 emissions. These emissions are set out in Annex 7.2.

The plant operator is to determine the proportion of its relevant production from the blast furnace converter, DRI EAF, DRI SAF and scrap EAF routes. The most suitable reference system is to be selected if an exact allocation is impossible. The most suitable reference system in this case is the plant equipment whose theoretical configuration comes closest to the plant equipment under consideration. It then multiplies the proportions by the corresponding emissions as set out in Annex 7.2 and adds them together. The result provides the limit value used to calculate the Scope 3.1 emissions from additives containing calcium according to the standard case for determining an equivalence value.

The plant operator is to take into account the emissions of these substances from blast furnaces, DR units and steel mills with corresponding standard values. The analysis is based on crude steel.

Table 4: Limit values for adjustments to alloying agents and/or additives containing calcium

Data in kg CO_2e/t rolled steel	Integrated steelworks	DRI EAF	DRI SAF	Scrap EAF QST	Scrap EAF BST
Limit value Scope 3.1 emissions from calcium-containing input materials	62.7	49.1	133.8	61.4	42.9

Example Scope 3.1 adjustment in special case 1:

Within a classification group, a rolling mill processes 50% crude steel from the blast furnace converter route and 50% crude steel from the EAF route. The reference plant emissions relevant to the adjustment rule are 62.7 kg CO_2e/t of crude steel (blast furnace converter) and 61.4 kg CO_2e/t of crude steel (EAF). The stated breakdown results in:

$$0.5 * 62.7\,kg\,\frac{CO_2e}{t\ crude\ steel} + 0.5 * 61.4\,kg\,\frac{CO_2e}{t\ crude\ steel} = 62.1\,kg\,\frac{CO_2e}{t\ crude\ steel}$$

Emissions from additives containing calcium in excess of 62.1 kg of CO_2e/t of crude steel may be excluded in determining the equivalence value.

Standard factors result in emissions of 82.1 kg of CO_2e/t of crude steel for this producer. It may thus reduce its result by 20 kg of CO_2e/t of crude steel when determining the reference value.

Special case 2: Scope 3 adjustments relating to carburising agents

Carburising agents are coals or other materials mainly containing carbon as defined in the Carbon section of the alloying agents in the Annex.

The Scope 3 emissions relating to these carburising agents may be excluded when determining an equivalence value if a steel mill weight assessment substantiates that the additional carburising agents have been introduced without increasing direct emissions. Should it only be possible to provide substantiation for one subset, the adjustment may then also only be made to that subset. Such substantiation is to be based on the most suitable reference system. In this case, the most suitable reference system is the plant equipment whose theoretical configuration comes closest to the plant equipment under consideration. The use of biogenic carbon is to be treated as fossil carbon in terms of substantiation. The calculation is to be based on crude steel and relates exclusively to the steel mill. Any off-gases generated are not to be taken into account. The logic applied in Annex 7.2 is to be taken into account in the event of doubt.

The following limit and baseline values apply to calculation of the permitted adjustments.

Table 5: Limit and baseline values for adjustments to carburising agents.

Data in kg C/ t crude steel	Integrated steelworks	DRI EAF	DRI SAF	Scrap EAF QST	Scrap EAF BST
Excess carbon limit value from weight assessment	43.8	50.8	43.4	24.0	15.6
Carbon input baseline value for primary carbon carriers	0	9.5	0	19.4	11.4

For the purposes of applying the rule, the plant operator determines the real carbon input through primary carbon carriers (all coals and carburising agents as defined in Annex 7.5). From this, it then subtracts the baseline value according to Table 5. This rule cannot be applied in the event of a value less than zero. The next step is to determine the excess carbon in the weight assessment and to deduct the limit value according to Table 5. The total differential quantity of carbon input can be calculated if this value is less than zero. The differential quantity of carbon input is reduced by the differential quantity of excess carbon if the value is greater than zero. The result is the amount of carbon that can be adjusted. The plant operator uses this to determine the corresponding amount of carburising agent. The Scope 3.1 emissions for this amount of carburising agent are calculated to determine the equivalence value.

Example Scope 3.1 adjustment in special case 2:

An EAF QST producer has a real carbon input of 22.4 kg C/ t of crude steel and excess carbon in the weight assessment of 25.0 kg C/ t of crude steel. The differential quantity of carbon input results in:

$$22.4\ kg\ \frac{C}{t\ crude\ steel} - 19.4\ kg\ \frac{C}{t\ crude\ steel} = 3.0\ kg\ \frac{C}{t\ crude\ steel}.$$

The value is positive, so the rule can be applied. The differential quantity of excess carbon results in:

$$25.0\ kg\ \frac{C}{t\ crude\ steel} - 24.0\ kg\ \frac{C}{t\ crude\ steel} = 1.0\ kg\ \frac{C}{t\ crude\ steel}.$$

This results in the amount of carbon relevant to an adjustment as:

$$3.0\ kg\ \frac{C}{t\ crude\ steel} - 1.0\ kg\ \frac{C}{t\ crude\ steel} = 2.0\ kg\ \frac{C}{t\ crude\ steel}.$$

This value must be divided by the carbon content of the carburising agent used and multiplied by the corresponding emission factor. The result is deducted from the total emissions to determine the equivalence value.

Special case 3: Scope 1 adjustments for alloying agents with a direct carbon input

Additional direct emissions from the carbon content of alloying agents may be excluded when determining an equivalence value if the weight assessment can substantiate that these additional direct emissions are generated in the steel mill. Only those alloying agents that cannot be covered by special cases 1 & 2 are to be considered. Should it only be possible to provide substantiation for one subset, the adjustment may then also only be made to that subset. Such substantiation is to be based on the most suitable reference system. The most suitable reference system in this case is the plant equipment whose theoretical configuration comes closest to the plant equipment under consideration. The use of biogenic carbon is to be treated in the same way as fossil carbon in terms of substantiation. The calculation is to be based on crude steel and relates exclusively to the steel mill. Any off-gases generated are not to be taken into account. The logic applied in Annex 7.2 is to be considered in the event of doubt.

Oxidation of the additionally introduced carbon releases usable energy. A compensation mechanism has been established to take this effect into account. This is based on the following highly simplified relationship:

Enthalpy change due to the oxidation of carbon: ΔH= -394 kJ/mol

$$C + O_2 = CO_2$$

394 kJ/mol / 12.011 g/mol = 32.8 kJ/g of carbon = 9.112 Wh/g of carbon

A simplified energy input of 9.112 kWh is thus assumed for each kilogram of carbon that is taken into account under this compensation rule. The default basis for the compensation mechanism is electricity. The calculated energy input is to be multiplied by the Scope 2 and 3 emission factors for the electricity mix in use at the plant to determine the equivalence value. The actual electricity mix is to be used. Guarantees of origin that are explicitly to be taken into account regarding this theoretical amount of electricity must be separately obtained and must not already be taken into account elsewhere in this classification system.

The following limit and baseline values apply to calculation of the permitted adjustment.

Table 6: Limit and baseline values for adjustments to alloying agents with a direct carbon input

Data in kg C/ t crude steel	Integrated steelworks	DRI EAF	DRI SAF	Scrap EAF QST	Scrap EAF BST
Excess carbon limit value from weight assessment	43.8	50.8	43.4	24.0	15.6
Baseline value of carbon input relating to alloying agents	0.76	0.76	0.76	0.76	0.85

In applying the rule, the plant operator determines the real carbon input due to the relevant alloying agents. From this, it then subtracts the baseline value according to Table 6. This rule cannot be applied in the event of a value less than zero. The next step is to determine the excess carbon in the weight assessment and to deduct the limit value according to Table 6. This rule cannot be applied in the event of a value less than zero. The smaller value defines the amount of carbon that can be adjusted if both differential quantities are greater than zero. The emissions that may be deducted to determine the equivalence value are to be determined from the quantity by multiplying it by a factor of 44/12. These are to be reduced by the amount of compensation for the usable energy.

Example Scope 3.1 adjustment in special case 3:

An EAF QST producer has a real carbon input from alloying agents of 3.8 kg C/ t of crude steel and excess carbon in the weight assessment of 28.0 kg C/ t of crude steel. The differential quantity of carbon input results in:

$$3.8\,kg\,\frac{C}{t\ Crude\ steel} - 0.8\,kg\,\frac{C}{t\ Crude\ steel} = 3.0\,kg\,\frac{C}{t\ Crude\ steel}.$$

The value is positive, so the rule can be applied. The difference in the amount of excess carbon results in:

$$28.0\ kg\ \frac{C}{t\ Crude\ steel} - 24.0\ kg\ \frac{C}{t\ Crude\ steel} = 4.0\ kg\ \frac{C}{t\ Crude\ steel}.$$

This value is also positive, so both application requirements are met. The lesser of the two differential quantities in this case determines the relevant amount of carbon for an adjustment of 3.0 kg C/t of crude steel.

The simultaneous application of special cases 2 and 3 with respect to a product or product group is excluded.

5.2. Adjustment rule for excess rolling mill input

The reference plant calculations are based on an assumed excess input to a rolling mill of 5%. Albeit real excess input is highly dependent on the formats being rolled. In principle, the higher the product's weight per meter, the greater the waste and the lower the possible output. This results in higher excess input. Output is generally influenced by two factors: scaling and head and foot scrap. Head and foot scrap increase significantly at higher cross-sections.

In the case of certain special formats, it is also essential to cut the sides as well as the head and foot. Output is therefore significantly reduced compared to the usual case and there is no correlation between the output and the weight per meter. However, this is not due to a lack of efficiency in the production process, but rather to physical relationships, a high degree of individual production, quality requirements and product standards. Producers of lower output formats should not be disadvantaged by the system, which is why it is appropriate to introduce an adjustment rule. It should also be noted that the costs associated with excess input give an incentive to keep this excess input as low as possible.

5.2.1. Design of the adjustment rule for excess input

The following procedure is to be used when applying the adjustment rule.

- Products weighing up to 1,600 kg/m are to be treated according to the attached output model. The corresponding weight per metre is always the lower limit for the excess input of the row in question. A plant operator may decide to combine several dimensions to minimise the effort required for inclusion within the classification system. If this is the case, the group's lowest weight per metre defines the excess input to be applied in the adjustment.
- In the case of products weighing more than 1,600 kg/m per meter or products that need to be cut on the sides during production, the actual excess input from production is to be used for the adjustment, irrespective of the weight per meter. This is to be substantiated to the verifier, if necessary, differentiated by the selected classification groups.

The adjustment rule covers both the actual excess input, i.e. the crude steel input into the rolling mill, and the amount of fuel required to heat the crude steel in the rolling mill. This is necessary because the additional crude steel must also be heated in the rolling mill's heating furnaces. The factors are also to be used to adjust the fuel use to the excess input to ensure comparability.

Plant operators who decide to waive application of the adjustment rule thereby waive an adjustment of the values. The plant operator is free to only apply the adjustment rule to selected classification groups.

Output optimization is a high priority in the operational practice of rolling mills. The highest output possible is desirable for economic reasons alone. The adjustment rule does not therefore create incentives to thwart emission reductions.

5.2.2. Application of the excess input adjustment rule

The plant operator is to determine the actual crude steel and fuel use for each classification group according to the requirements in this document. It is also to determine for each group the applicable excess input according to Section 0. The equivalence value is then to be calculated by multiplying both crude steel and fuel use by the factor of reference excess input (1.05) divided by the applicable excess input.

Reference excess input: $Excess\_input_{Ref}$ = 1.05

Applicable excess input: $Excess\_input_{An}$; determination according to Section 5.2.1

Actual crude steel use in the rolling mill: $Input_{RS, WW}$

Actual fuel use in the rolling mill: $Input_{BS, WW}$

Rolling mill crude steel input for equivalence value: $Eqv\_Input_{RS, WW}$

Fuel use for equivalence value in the rolling mill: $Eqv\_Input_{BS, WW}$

Determination of the crude steel input for calculation of the equivalence value:

$$Äqv\_Input_{RS,WW} = Input_{RS,WW} * \frac{Excess\_input_{Ref}}{Excess\_input_{An}}$$

Determination of fuel use for calculation of the equivalence value:

$$Äqv\_Input_{BS,WW} = Input_{BS,WW} * \frac{Excess\_input_{Ref}}{Excess\_input_{An}}$$

Emissions are to be calculated based on the specified values for each classification group to establish the equivalence value.

The adjustment must be performed separately if different crude steels (with varying emission intensities) or different fuels are used within a classification group.

Example:

A rolling mill produces 100 t of hot-rolled steel from 110 t of crude steel as a final product in terms of this classification system. The product weighs 135 kg/m per meter. The excess input to be applied thus amounts to 1.070. Calculation of the equivalence value for the crude steel input therefore results in:

$$Eqv\_Input_{RS,WW} = 110.00\ t * \frac{1.05}{1.07} = 107.94\ t$$

There is moreover 150 GJ of natural gas used in the rolling mill for production of the 100 t of product. The fuel used to determine the equivalence value is then:

$$Eqv\_Input_{BS,WW} = 150.00\ GJ * \frac{1.05}{1.07} = 147.20\ GJ$$

These calculated values are applied to calculation of the equivalence value for inclusion in the classification system. The actual emission value must nevertheless also be declared without applying adjustment rules. This involves calculation using 110 t of crude steel and 150 GJ.

5.3. Adjustment rule for hot input relating to BST

An adjustment can be used in compensation for BST products where hot input is impossible.

Hot input is impossible if at least one of the following conditions is met:

- Quality reasons exclude hot input
- Rolling mill batch sizes are smaller than steel mill production batches due to large product segmentation

The adjustment is to be made based on the energy use in the reheating furnace. The reference value to be used is 0.47 GJ/t. Should hot input be impossible, the maximum difference to the reference value for cold input of 1.5 GJ/t, i.e. 1.03 GJ/t may be factored out. Should the actual fuel quantity for the reheating furnace be less than 1.5 GJ/t, only the difference between this utilisation quantity and the reference value for cold input may be factored out. The emissions to be deducted in determining the equivalence value are to be obtained by multiplying the difference in fuel use by the standard emission factors applicable to that fuel. Should more than one fuel be used, the proportion of each fuel in the differential quantity has to be equal to the proportion of that fuel in the total quantity.

In the event of fuel use having been calculated to determine the equivalence value according to Section 5.2.1 as a result of the excess input adjustment rule, then this value is to be used instead of the actual use in the reheating furnace.

Examples of the hot input adjustment rule

Case 1 – Higher fuel use than in the cold input reference value

It is impossible for a BST producer's products to be produced using hot input. Its reheating furnace is heated using natural gas and requires 1.6 GJ/t. It may factor out 1.03 GJ/t when determining the equivalence value. It accordingly multiplies this quantity by the standard emission factors for natural gas and subtracts the result from the specific emissions. The natural gas emissions of 0.1 GJ/t, which exceed the reference value for cold input, remain unaffected by the result.

Case 2 – Lower fuel use than in the cold input reference value

It is impossible for a BST producer's products to be produced using hot input. It's reheating furnace is heated using natural gas and requires 1.0 GJ/t. It may factor out 0.53 GJ/t when determining the equivalence value. It accordingly multiplies this quantity by the standard emission factors for natural gas and subtracts the result from the specific emissions. Variation: were hydrogen to be used rather than natural gas, the standard factors for hydrogen would need to be applied.

Case 3 – Use of multiple fuels:

It is impossible for a BST producer's products to be produced using hot input. In its reheating furnace it uses 60% natural gas and 40% hydrogen. It is allowed to factor out a total of 0.5 GJ/t. The 60% factor for natural gas results in 0.3 GJ/t and the 40% factor for hydrogen results 0.2 GJ/t.

6. Dealing with deviating plant configurations

It is in principle possible that plant components within the CS system boundaries are not located at a single location or that intermediate products are purchased from external producers. Examples include the purchase of coke or sinter, or the sale of crude steel to another plant operator's hot rolling mill. The entire production chain covered by the system must be included in the determination of emissions to ensure comparability of products within the system. Producers who only represent part of the production chain must, nevertheless, also be able to participate in the system. It is therefore possible to have plant equipment certified under the CS that only represents part of the production chain.

Nevertheless, the plant operator is always to proceed in the same way as in the standard case. Here too, classification groups in particular are also be created if production is to be divided according to different emission intensities. The indication of classification levels is omitted unless rolled steel is produced as a product. Rolled steel is always the first inclusion in the classification system.

Substantiation of calculation may be issued relating to the production of intermediate products. This must be performed on a validated identification model and must be reviewed as part of regular verification in the same way as the CS warranties. The rules for CS warranties apply accordingly, excluding those relating to the aspect of register management.

The resulting substantiation of CS calculation can be passed on to the downstream steel mill or rolling mill, for instance, and is to be used by the latter for classification. Both the actual and the equivalence values are to be declared if adjustment rules are used. The scrap share must also be declared insofar as it is relevant to the intermediate product.

The standard values defined here in the rulebook are to be used if operators are unable to provide the verifier with appropriate substantiation of calculation for the utilisation quantities of intermediate products in the sense of the CS. Alternatively, if at least 95% of an intermediate product's utilisation quantity is classified, the highest emission value from these warranties may be used for the remaining utilisation quantity. Intermediate products from the plant operator's own or affiliated companies are to be determined and certified according to the CS.

Hot-rolled steel as a product within the meaning of the CS only qualifies for classification within this system if at least 95% of the crude steel quantities used for the classified product are subject to the CS. Intermediate products are only CS compliant if at least 95% of the total input quantity of pig iron, DRI, HBI and scrap is evaluated according to the CS or if an evaluation is not required with respect to scrap. Should the proportion of intermediate products used that are not subject to CS be greater than 5%, the production is to be apportioned accordingly and only part of the production can be evaluated under CS. The threshold of 95% always refers to the quantities used in relation to a classified production quantity. This does not in particular mean that plant equipment must use a total of 95% of CS-rated intermediate products or classify 95% of its production according to CS to be able to participate in the system.

7. Annex

7.1. Detailed definition of quality steel

Rulebook Annex I. Steel is considered to be QST if at least one of the following criteria is met:

- A maximum hydrogen content of 0.0003 per cent
- A maximum sulphur content of 0.003 per cent
- A maximum phosphorus content of 0.01 per cent
- Micro-unit:
  a. K3 (oxide) < 40; K4 < 50 according to DIN 50602 (or any equivalent international standard)
  b. Sulphide: A/thin 2.0; A/thick 1.5 according to ISO 4967
  c. Oxide: B/thin 1.5; B/thick 0.5 according to ISO 4967
  d. ASTM E45: Procedure B, C, D maximum 2
  e. SEP 1920: ultrasonic testing: core test – KSR maximum 2 mm

- Macro-unit: blue brittleness break test: maximum 2.5 mm/dm^2

It can also be assumed that QST has a high surface quality and processing capability if

- One of the following non-destructive technological tests is required for more than 10 per cent of the outgoing product stream:
    a. Ultrasonic testing according to ASTM E213 or EN 10246-6, 7.14
    b. Magnetic particle testing according to ASTM E709 or EN 10246-12
    c. Dye penetrant inspection according to ASTM E165
    d. Electromagnetic testing
        i. Eddy current, ASTM E309:
        ii. Flux leakage, ASTM E570:

Structural and reinforcing steel is to be assumed if neither the alloy constituents criterion nor any of the six criteria listed above are met.

7.2. Reference plant calculations

See rulebook Annex II, Reference plant calculations plus application example.

7.3. Threshold value calculation aid

See rulebook Annex III, Threshold value calculation aid.

7.4. Standard factors for excess rolling mill input

See rulebook Annex IV, Rolling mill excess input.

7.5. Adjustment rule materials list

See rulebook Annex V, List of alloying agents.

7.6. Standard factors for determining Scope 3 emissions

See rulebook Annex VI, Standard emission factors.

Additional and more differentiated standard factors may need to be provided in the context of reviews.

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