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## Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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## UK Vote

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## Submission of Comments

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## Template for comments and secretariat observations

|                  |                        |
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| 1  | 2                                          | (3)                          | 4               | 5                                                                                                                                  | (6)                                                                      | 7                                                  |
|----|--------------------------------------------|------------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------|
| MB | Clause No./ Subclause No./Annex (e.g. 3.1) | Paragraph/ Figure/Table/Note | Type of comment | Comment (justification for change) by the MB                                                                                       | Proposed change by the MB                                                | Secretariat observations on each comment submitted |
|    | 3.1                                        | Definition 1                 | ed              | Definition is ambiguous and needs clarifying.                                                                                      | Amend to read '...so that the mains connector to which no connection...' |                                                    |
|    | 6.4                                        | Paragraph 2                  | te              | The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK. | Delete reference to UV photometer.                                       |                                                    |



# DRAFT International Standard

## ISO/DIS 20915

### Life cycle inventory calculation methodology for steel products

*Méthodologie de calcul de l'inventaire du cycle de vie des produits  
en acier*

ICS: 77.080.20

ISO/TC 17/SC 21

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**2026-01-12**

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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This document was prepared by Technical Committee ISO/TC 17, [name of committee], Subcommittee SC 21, .

This edition cancels and replaces the edition (ISO :), which has been technically revised.

The main changes are as follows:

A list of all parts in the ISO series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

The life cycle inventory (LCI) of steel products is an important component in the support of life cycle assessments for a wide range of products and applications that contain steel or where steel is used to support the manufacture, production or delivery of products.

The life cycle inventory analysis phase (LCI phase) is the second phase of LCA. It is an inventory of input/output data with regard to the system being studied. It involves collection of the data necessary to meet the goals of the defined study.

This document describes the methodology for the calculation of the steel life cycle inventories that should be applied to a wide range of steel products, and represents the main process routes for global steel production. This includes the extraction of raw materials from the earth through to the production of steel products at the factory gate, as well as provision for scrap recycling of steel products and the treatment of steel scrap. The methodology conforms to the principles and framework set out in ISO14040 and ISO14044 and demonstrates how these principles should be applied to steel product manufacture and steel recycling.

As illustrated in [Figure 1](#), the life cycle of steel products consists of the following stages:

- sourcing of natural resources (which includes mining, transportation and intermediate processing of raw materials) and ferrous scrap (recovered from both the manufacturing process and the end of life of final products);
- production of steel products at the steelworks;
- manufacturing of final products by downstream users, for example, by customers of the steel industry, such as automotive, construction and engineering industries;
- use of final products, where the environmental performance of the final product depends on the steel products being used; for example, the fuel (or energy) consumption of an automobile depends partly upon the weight of its steel components;
- recovery of material from the end of life of final products;
- recycling of ferrous scrap from both the manufacturing process and the end of life of final products to substitute the use of raw materials from the earth.

The schematic diagram of the full life cycle of steel is shown in [Figure 1](#). This document covers life cycle stages including sourcing of raw materials from the earth and ferrous scrap, production of steel products at the steelworks, and recycling of ferrous scrap. It does not cover the manufacturing of final products and the use of final products.

All global steel production is sourced from different ratios of ferrous scrap and primary ores. Therefore, an understanding of the value of steel recycling becomes a necessary part of the steel product LCI.

It is generally understood that the recycling of materials makes a positive contribution towards reducing resource consumption and energy requirements, and helps to avoid the potential impacts of raw materials extraction and processing. However, all recycling routes (including the processing and transport of recycled materials) carry environmental burdens and these can be quantified as part of a life cycle assessment.

A critical factor in the understanding of the benefits of materials recycling is the quality of the materials and products produced from the recycled material. Where the recycled products which are made to the same inherent properties as those sourced from primary materials, this is described as closed loop recycling.

With the existing process and scrap quality controls, steel sourced from (scrap based) steel recycling can be made to the same specification as steels sourced from the (iron ore based) primary routes. The properties of the different steel grades are achieved through different alloying concepts as well as process steps, such as heat treatment. Secondary steel metallurgy allows the control of alloying and tramp element levels to achieve closed loop recycling.

Life cycle assessment may be used to quantify the potential benefits of recycling to conform to the guidance set out in ISO 14040 and ISO 14044.

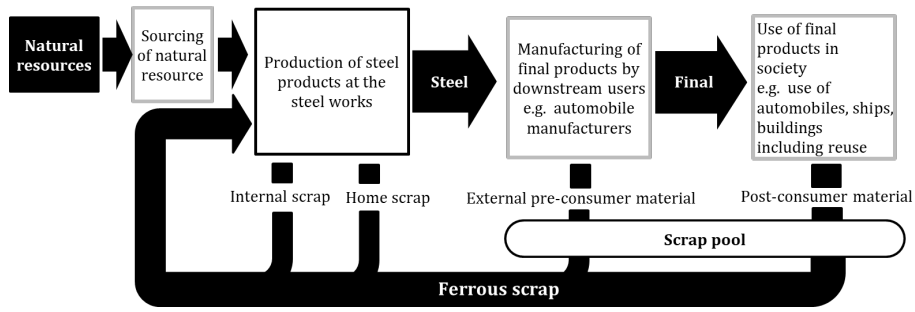


Figure 1 — Schematic diagram of the life cycle of steel



# Life cycle inventory calculation methodology for steel products

## 1 Scope

This document specifies guidelines and requirements for conducting life cycle inventory (LCI) studies of steel products reflecting steel's capacity for closed-loop recycling, including:

- a) specification of the declared unit used for LCI calculation of steel products;
- b) definition of the system boundaries used for LCI calculation of steel products;
- c) evaluation of scrap in LCI calculation of steel products;
- d) evaluation of co-products in LCI calculation of steel products;
- e) reporting of LCI calculation results of steel products.

The application of LCI results, including life cycle impact assessment (LCIA), is outside the scope of this document.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

For the purposes of this document, the terms and definition given in ISO 6929, ISO 14040 and ISO 14044 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

### 3.1

#### **life cycle inventory (LCI)**

phase of life cycle assessment involving the compilation and quantification of inputs and outputs for a product throughout its life cycle

[SOURCE: ISO 14040:2006, 3.3]

### 3.2

#### **steel product**

product produced from steel and shipped out from steelworks

**EXAMPLE** Semi-finished products (e.g. slab, billet, bloom, ingot, pig iron), hot rolled steel, pickled hot rolled steel, cold rolled steel, finished cold rolled steel, electrogalvanized steel, hot-dip galvanized steel, tin-free steel, tinplated steel, organic coated steel, section, plate, rebar, engineering steel, wire rod, seamless pipe, UO pipe, welded pipe, and forged steel.

### 3.3

#### **final product**

product that requires no additional transformation prior to its use

EXAMPLE      Automobiles, building structures, building envelopes, packaging.

Note 1 to entry: In this standard this refers to products containing steel.

[SOURCE: ISO/TS 18110:2015, 2.2, modified — The example and Note 1 to entry has been added.]

### 3.4

#### **scrap**

iron and steel material in metallic form that is recovered in multiple life cycle stages, including steel production processes, the manufacturing processes of *final products* (3.3) final products and the end of life of final products, and is recycled as a raw material for steel production

### 3.5

#### **internal scrap**

material diverted from the waste stream during a crude steel making unit process that is then recycled within the same unit process (e.g. basic oxygen furnace (BOF) or electric arc furnace (EAF))

Note 1 to entry: Internal scrap is excluded from the definition of *home scrap* (3.6).

Note 2 to entry: Material here referred to as ferrous scrap.

### 3.6

#### **home scrap**

internal pre-consumer material diverted from the waste stream during a steel manufacturing process, for examples from the rolling and processing mills

Note 1 to entry: *internal scrap* (3.5) which can be recycled within the same process (e.g. basic oxygen furnace (BOF) or electric arc furnace (EAF)) is excluded from this definition.

Note 2 to entry: Material here referred to as ferrous scrap.

### 3.7

#### **external pre-consumer material**

material diverted from the waste stream during a manufacturing process of *final products* (3.3), such as vehicles, white goods and buildings and include scrap generated outside the boundaries of the steel production sites

Note 1 to entry: Material here referred to as ferrous scrap.

[SOURCE: ISO 14021:202X (under revision), 3.4.10, modified]

### 3.8

#### **post-consumer material**

material generated by households or by commercial, industrial and institutional facilities in their role as end users of the *final product* (3.3) which can no longer be used for its intended purpose. This includes materials from any facilities which are not parts of steel making process.(e.g. any disposable material from the office)

Note 1 to entry: This includes returns of material from the distribution chain. Returns of material from the distribution chain are products that have reached end of life status before use, due to damage etc.

Note 2 to entry: Material here referred to as ferrous scrap.

[SOURCE: ISO 14021:202X (under revision), 3.4.10, modified]

### 3.9

#### **external scrap**

material provided from outside of the steelworks, including *external pre-consumer material* (3.7) and *post-consumer material* (3.8), which are outside the boundaries of the steel production site

Note 1 to entry: Material here referred to as ferrous scrap.

### 3.10 recycling rate

ratio of the mass of *external scrap* (3.9) recovered for recycling to the mass of steel products to be shipped out from the steelworks gate. The recycling rate,

$$R = (a + b) / P$$

where

- a is the mass of external pre-consumer material (3.7) recycled;
- b is the mass of post-consumer material (3.8) recycled;
- P is the mass of steel products shipped out of the gate

Note 1 to entry: Recycling rate does not refer to the % recycled content in the steel produced, referred to crude steel.

### 3.11 end of life recycling rate

ratio of the mass of *post-consumer material* (3.8) recovered for recycling to the mass of steel in *final products* (3.3). The end of life recycling rate,

$$\beta = b / F$$

where

- b is the mass of *post-consumer material* (3.8) recycled;
- F is the mass of steel products contained in the *final product* (3.3)

### 3.12 manufacturing yield

ratio of the mass of steel contained in *final products* (3.3) to the total mass of *steel products* (3.2) used for manufacturing the final product

### 3.13 ferrous raw material

raw material from the earth that becomes one of the main constituents of *steel products* (3.2), and which may have undergone intermediate processing to prepare it for ironmaking

EXAMPLE Lump ore, iron ore fine, sinter, pellet, hot briquetted iron (HBI), direct reduced iron (DRI).

### 3.14 process coal

coal used in iron and steel making processes

EXAMPLE Coking coal, injection coal, sintering coal, BOF coal, EAF coal, DRI coal.

### 3.15 non-ferrous raw material

non-ferrous ingredient material for *steel products* (3.2) other than *ferrous raw material* (3.13) or *process coal* (3.14)

EXAMPLE Zinc, tin, aluminium.

### 3.16 ferro alloy

alloy of iron with non-iron alloy metals, such as manganese, silicon or chromium used in the steelmaking process

### 3.17

#### **other input material**

material input and consumables for steel production other than *ferrous raw material* (3.13), *process coal* (3.14), *non-ferrous raw material* (3.15), *ferro alloy* (3.16) and *scrap* (3.4), which does not ultimately form part of the *steel product* (3.2)

EXAMPLE Refractory, electrode, chemical materials, limestone, dolomite.

### 3.18

#### **fuel**

energy source for generating heat, steam and power other than *process gas* (3.21)

EXAMPLE Boiler coal, fuel oils, natural gas, LPG.

### 3.19

#### **industrial gas**

gas for steel production other than *fuels* (3.18) or reducing agent

EXAMPLE Oxygen, nitrogen, argon, hydrogen, carbon dioxide, compressed air.

Note 1 to entry: Hydrogen can be used as a fuel, or is included here as an industrial gas when used as an uncombusted industrial gas, e.g. for the provision of reducing atmospheres in production processes.

### 3.20

#### **co-product**

any of two or more products coming from the same unit process or product system, or any recovered material and/or waste that can be used by some interested party

[SOURCE: ISO 14044:2006, 3.10]

### 3.21

#### **process gas**

gas that is produced as part of the processes on the steel production site

Note 1 to entry: Coke oven gas, blast furnace gas, BOF gas, DRI gas.

### 3.22

#### **waste**

resource that is no longer considered to be an asset as it, at the time, provides insufficient value to the holder

Note 1 to entry: The holder can choose to retain, discard, or transfer the waste.

Note 2 to entry: Value can be assigned to waste as a result of a need from another interested party, at which point the resource is no longer considered waste, it changes to co-product.

Note 3 to entry: The assignment of value to waste as a resource is linked, in part, to the available technology (e.g., landfill, mining).

Note 4 to entry: Some regulations require the holder to dispose of certain types of waste, while others assign value to waste.

Note 5 to entry: Because resources include the energy content or energy potential of materials, such energy, when liberated during a process and not recovered for another use, can be considered a waste.

[SOURCE: ISO 59004:2024, 3.3.6]

### 3.23

#### **primary data**

quantified value of a process or an activity obtained from a direct measurement or a calculation based on direct measurements

Note 1 to entry: Primary data need not necessarily originate from the product system under study because primary data might relate to a different but comparable product system to that being studied.

Note 2 to entry: Primary data can include emission factors and/or activity data.

[SOURCE: ISO 14067:2018, 3.1.6.1, modified]

### 3.24

#### **secondary data**

secondary data which do not fulfil the requirements for *primary data* ([3.23](#))

Note 1 to entry: Secondary data can include data from databases and published literature, default emission factors from national inventories, calculated data, estimates or other representative data, validated by competent authorities.

Note 2 to entry: Secondary data can include data obtained from proxy processes or estimates

[SOURCE: ISO 14067:2018, 3.1.6.3, modified]

### 3.25

#### **stainless steel**

steel with at least 10,5 % (mass fraction) Cr and maximum 1,2 % (mass fraction) C

[SOURCE: ISO 15510:2014, 3.1]

### 3.26

#### **declared unit**

quantity of a [product \(3.5.12\)](#) for use as a reference unit in a [Type III environmental declaration \(3.7.9\)](#) or [footprint communication \(3.7.18\)](#), based on one or more [information modules \(3.6.47\)](#)

[SOURCE: ISO 14050:2020, 3.7.11]

## **4 Basic conditions for LCI of steel products**

### **4.1 General requirements**

The requirements and guidelines set in this document shall be followed in addition to those set by ISO14040:2006 and ISO 14044:2006.

### **4.2 Function and declared unit**

The function of steel products is to form a part of final products with a certain function, such as automobiles, cans and bridges. For steel products LCI it is more appropriate to use declared unit as steel can be used for different functions which are defined for the different final products.

And also add the definition of “Declared unit” which can be found from some other ISO standard.

For an LCI of steel products, the declared unit should be set as a mass-based unit of steel products to be shipped out from the steelworks gate. Where applications are based on other declared capacities, suitable explanation and conversion guidance shall be provided.

### **4.3 System boundary**

As shown in [Figure 2](#), the system boundary used for the LCI study of steel products shall include all of the production steps from input materials (raw materials in the earth, scrap, etc.) to steel products ready to be shipped from the steelworks, including the recycling of steel products (i.e. cradle to gate). This includes production processes at the steelworks and all the upstream processes, including energy conversion, raw material mining, material preparation and transportation of materials to the steelworks site. The effect of scrap recycling, or the burdens of using scrap and the credits for the recovery of steel products, should be considered according to the procedure described in [5.5](#). The calculation of steel product LCIs should include allocation on scrap to reflect the nature of closed loop recycling. Cradle to gate LCIs without scrap allocation may be reported when this is aligned to the goals and scope of the study. Additionally, care should be taken that if no burdens are assigned to scrap inputs, then no credits should be applied to steel recycling. Also, the recovery and use of steel industry co-products outside of the steelworks shall be taken