TATA STEEL

TATA

EN 15804 verified EPD programme

Product Category Rules Part 1

V2 January 2022

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1 Introduction

Clients and building occupiers are increasingly demanding whole life environmental assessments of buildings, which include the potential embodied impacts of the materials used within the building. As a consequence, Environmental Product Declarations (EPDs) are becoming a requirement for companies working in, and supplying to, the construction sector. In particular there is a demand for ISO Type III environmental declarations, which conform to the core Product Category Rules described in EN 15804.

With a strong focus on sustainability, Tata Steel have become the first steel manufacturer to develop and operate an EPD programme. The programme covers the development of Type III environmental declarations in accordance with the requirements of EN 15804:2012+A2:2019 (Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products), which is referred to as EN 15804 in this document. It also conforms to ISO 14025 (Environmental labels and declarations – Type III environmental declarations – Principles and procedures).

This document describes the Product Category Rules (PCR) Part 1 for Tata Steel's EPD programme. In addition to the Part 1 PCR, complementary rules are specified for product specific groupings, in separate PCR Part 2 documents.

As the relevant standards develop, both the Part 1 and Part 2 PCR will be revised and updated as necessary.

2 Scope

This is a PCR document for the assessment of the environmental performance of Tata Steel's construction products, and those of its subsidiaries and supply chain partners. It describes the methodology for the Life Cycle Assessment (LCA) of a product, which is used to create an EPD or an EPD tool for any construction product or service. EPDs may also be produced for construction products marketed by other companies operating in the steel supply chain.

The methodology follows the core PCR set out in EN 15804 (core rules for the product category of construction products).

3 Objective of the core PCR

The core PCR are used to produce EPDs and EPD tools for construction products and services, and provide verifiable and consistent data based upon an LCA that enables assessment of their environmental performance. They also enable interested parties to compare the environmental impacts of different construction products based on equivalent functionality.

4 Product Category Rules

The PCR are set out in EN 15804 and can be accessed in this standard. An outline of these PCR is given by the following relevant section headings taken from EN 15804:

1. Scope.
2. Normative references.
3. Terms and definitions.
4. Abbreviations.
5. General aspects including objective, type of EPD and comparability.
6. Product Category Rules for LCA including Life Cycle stages, calculation rules, inventory analysis and impact assessment.
7. Content of the EPD.
8. Project report.
9. Verification and validity.

5 Required documents

Each EPD or EPD tool will be accompanied by a project or background report that presents information on the LCA declared as part of an EPD. The background report comprehensively summarises the work done in generating the EPD or EPD tool, and the objective of the report is to support verification of the EPD or EPD tool.

The background report demonstrates that the LCA model and calculation of indicator results, comply with the requirements of these PCR. It will include all assumptions made, as well as showing the validity of any additional information contained in the EPD. It provides clear evidence of how the declared data and the information in the EPD have been derived from the LCA, and of the methodologies for additional information. The structure of the background report follows the guidance in this PCR document which is based on EN 15804.

The background report is made available to the verifier under condition of confidentiality (see ISO 14025) and it is not intended to be part of any public communication.

6 Specific requirements for the LCA

6.1 Declared unit

The LCA shall be calculated for a declared or functional unit of the construction product, as described in the relevant Part 2 PCR for the product specific grouping. Examples of such units are 1 tonne of steel or 1 square metre of steel wall or floor.

For further details of the differences between a declared and a functional unit, see sections 6.3.1 to 6.3.3 in EN 15804, and also see section 6.3.4 for an explanation of reference service life.

6.2 Life cycle stages and inventory analysis

Some of the following requirements and assumptions relate to the product stages defined in EN 15804 and for reference, are:

- A1 to A3 – product stage including raw material extraction and processing, transport to manufacturer, and manufacturing
- A4 to A5 – construction process stage including transport to site (A4) & installation (A5)
- B1 to B7 – use stage including maintenance, repair, replacement and refurbishment
- C1 to C4 – end of life stage including disposal (C4)
- D – benefits and loads beyond the system boundary (from re-use, recovery, recycling)

Different types of EPD are described in section 5.2 of EN 15804 and therefore some of the product stages above may not be declared. These shall be stated clearly in the EPD.

Impacts from the production of packaging materials for the product and their disposal, are included in the product stage (A1 to A3), or specifically mentioned as not being included in the EPD.

Any production losses occurring during product manufacturing (such as process scrap) are included in A1 to A3. This also includes intermediate packaging that might be used to transport a product from one manufacturing site to another.

Any impacts from transporting the product to site will be declared in A4, and impacts from the fixing of that product to the building shall be declared in A5.

With regard to co-product allocation, EN 15804 states that 'if a process can be sub-divided but respective data are not available, the inputs and outputs of the system under study should be partitioned between its different products or functions in a way which reflects the underlying physical relationships between them'. Therefore, for blast furnace slag, the partitioning of environmental burdens between products and co-products will be applied as described in the EUROFER document 'A methodology to determine the LCI of steel industry co-products', issued in February 2014 in co-operation with the World Steel Association (worldsteel). Please note that worldsteel, in their LCA methodology, use system expansion to handle co-product allocation, and EUROFER do not recommend a particular method.

Process gases will be accounted for using the system expansion method, which is also referenced in the same EUROFER document.

The impacts of co-product allocation, during manufacture, are accounted for in the product stage (A1 to A3).

End of life assumptions for recovered steel and steel recycling shall be accounted for as per the current methodology from worldsteel (2017 Life Cycle Assessment methodology report). A net scrap approach will be used, to avoid double accounting, and the net impacts shall be reported as benefits and loads beyond the system boundary (module D).

Any steel scrap leaving the system from the product manufacturing modules (A1 and A3) will be allocated as a co-product. The burden will be declared in the EPD as additional information and this burden will be applied when the scrap is used as a raw material in another life cycle.

6.3 Selection of data and data quality

Selection of data and issues relating to data quality are described in EN 15804, which outlines the requirement for the application of generic and specific data. In accordance with the standard, the steel manufacturer's average or specific data shall be used for at least the processes the manufacturer has influence over and generic data shall only be used for upstream and downstream processes.

Tata Steel's own processes are the most relevant data source for the development of an EPD or EPD tool for a Tata Steel product, and in accordance with EN 15804, these data are used where available. Resource and energy use data are collected on a monthly basis at most Tata Steel sites, and one year of emissions data are collected approximately every five years as part of the World Steel Association's regular data collection exercise. All these data are checked by Tata Steel's LCA practitioners and the data submitted to worldsteel are also checked by them, to produce robust third party validated data sets.

Where a partner of Tata Steel is involved in the manufacture of the product for which the EPD is derived, or a company formerly owned by Tata Steel, primary data from that partner or company will be used where available.

Where Tata Steel or Tata Steel partner data are not available (for raw material extraction for example), generic data will be used. This could be average industry data such as that provided by worldsteel, or data from proprietary databases which charge for access, for example from the GaBi LCA software.

6.4 Impact assessment indicators

Section 6.5 of EN 15804 specifies the indicators or impact categories that are to be used in the EPD. Annex C states that the characterisation factors that are to be applied to these indicators are taken from EC-JRC. These characterisation factors are available at the following web link which connects to the European Commission's European Platform on Life Cycle Assessment, Environmental Footprint (EF) reference package 3.0.

https://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml

The core environmental indicators are reproduced below. Guidance for calculating impacts in the climate change categories (GWP) are given in Annex C2 of EN 15804.

- Global warming potential total (GWP-total) in kg CO_2 eq.
- Global warming potential fossil fuels (GWP-fossil) in kg CO_2 eq.
- Global warming potential biogenic (GWP-total) in kg CO_2 eq.
- Global warming potential land use and land use change (GWP-luluc) in kg CO_2 eq.
- Depletion potential of the stratospheric ozone layer (ODP) in kg CFC 11 eq.
- Acidification potential, Accumulated Exceedance (AP) in mol H^+ eq.
- Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater) in kg P eq.
- Eutrophication potential, fraction of nutrients reaching marine end compartment (EP- marine) in kg N eq.
- Eutrophication potential, Accumulated Exceedance (EP-terrestrial) in mol N eq.
- Formation potential of tropospheric ozone (POCP) in kg NMVOC eq.
- Abiotic depletion potential for non-fossil resources – (ADP-minerals & metals) in kg Sb eq.
- Abiotic depletion potential for fossil resources (ADP-fossil) in MJ net calorific value
- Water (user) deprivation potential, deprivation-weighted water consumption (WDP) in m^3 world eq. deprived

The additional environmental indicators are reproduced below.

- Potential incidence of disease due to particulate matter emissions (PM) in Disease incidence
- Potential human exposure efficiency relative to U235 (IRP) in kBq U235 eq.
- Potential comparative toxic unit for ecosystems (ETP-fw) in CTUe
- Potential comparative toxic unit for humans (HTP-c) in CTUh
- Potential comparative toxic unit for humans (HTP-nc) in CTUh
- Potential soil quality index (SQP)

The background report shall reference the impact categories and characterisation factors used in the life cycle impact assessment. The additional impact categories are optional and will not be declared in the EPD except if mandatory in the country of declaration.

Disclaimer 1 in EN 15804 states that the potential human exposure efficiency relative to U235 (IRP) impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

The potential soil quality index (SQP) and the toxicity indicators (ETP-fw, HTP-c and HTP-nc) are not declared in the EPD because of a perceived lack of accuracy or representativeness of the underlying models. Disclaimer 2 in EN 15804 states that the results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicators.

The particulate matter emissions indicator is not declared in the EPD because there is doubt about the reliability of reporting of source data. The health impact of Particulate Matter is mainly based on the link between ambient air quality and human health. Ambient air quality is routinely measured based upon $PM_{2.5}$, however industrial process emissions generally do not routinely measure $PM_{2.5}$, nor are they required to do so by the authorities. This means that inventories often do not report $PM_{2.5}$, or are sometimes reported as 'unspecified' or PM_{10} (particulate matter with an aerodynamic diameter of less than 10µm). Since the fraction of $PM_{2.5}$ drives the contribution to the impact score, and the uncertainty as to whether process inventories are based on measured or default size fraction data, there will be considerable uncertainty in using the PM impact category for comparison of products.

Furthermore, a significant proportion of the particulate emissions may arise from non-stack sources such as fugitive releases from buildings, stockyards or unmade roads within the site. Such diffuse emissions cannot easily be measured and there is no standard methodology relating to how they should be included within the overall inventory. Again this leads to considerable uncertainty in using the PM impact category for comparison of products. The range of sources on a steelworks that affect air quality is shown in the following link.

https://www.worldsteel.org/publications/position-papers/air-quality.html

7 References

Tata Steel's EN 15804 verified EPD programme, General programme instructions, V2 January 2022

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

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

ISO 14025:2010, Environmental labels and declarations - Type III environmental declarations - Principles and procedures

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

ISO 15686:2011, Buildings and constructed assets – Service life planning, Parts 1, 2, 7 and 8

EUROFER in cooperation with the World Steel Association, 'A methodology to determine the LCI of steel industry co-products', February 2014

World Steel Association: Life cycle assessment methodology report, Brussels, 2017

Sphera; GaBi: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, Echterdingen, 1992-2022

GaBi: Documentation of GaBi: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, Echterdingen, 1992-2022. http://documentation.gabi-software.com

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English Language 0122