TATA STEEL

TATA

EN 15804 verified EPD programme

Product Category Rules Part 2 Steel Lintels

V1 March 2022

Requirements for steels lintels

Scope

This document provides supplementary information on the requirements of an environmental product declaration for steels lintels. The document is relevant to products that fall into the following categories:

- Steel Lintels (including insulated steel lintels) for use in construction applications

Product specific rules

The declared unit is a specified length of lintel product.

Requirements on content and format

A recommended template for a steel lintel EPD is indicated as follows:

catnic®
A Tata Steel Enterprise

EPD
THIRD PARTY VERIFIED ISO 14025 & EN 15804

[Name of declared product]

Environmental Product Declaration

Owner of the Declaration: Tata Steel Europe
Programme Operator: Tata Steel UK Limited, 18 Grosvenor Place, London, SW1X 7HS

PICTURE OF DECLARED PRODUCT

CONTENTS

[Name of declared product]
Environmental Product Declaration
(in accordance with ISO 14025 and EN 15804)

This EPD is representative and valid for the specified (named) product

Declaration Number: EPD-TS-[Year]-[Number]
Date of Issue: [Date of issue]
Valid until: [Date of expiry]

Owner of the Declaration: [Name of owner]
Programme Operator: Tata Steel UK Limited, 18 Grosvenor Place, London, SW1X 7HS

The CEN standard EN 15804:2012+A2:2019 serves as the core Product Category Rules (PCR) supported by Tata Steel's EN 15804 verified EPD PCR documents

Independent verification of the declaration and data, according to ISO 14025

Internal ☐ External ☒

Author of the Life Cycle Assessment: Tata Steel UK
Third party verifier: [Verifier name and address]

1 General information

Owner of EPD	[Name of EPD owner]
Product & module	[Name of product & module]
psi value	[psi value]
Manufacturer	[Name of manufacturer]
Manufacturing sites	[List all sites at which product is manufactured]
Product applications	[List applications of product]
Declared unit	[Specified length of] [insulated] steel lintel
Date of issue	[Issue date]
Valid until	[Expiry date]

This Environmental Product Declaration (EPD) is for [insert brief description of product(s) included and whether environmental indicators for these products are average values]

The information in this Environmental Product Declaration is based on production data from [insert reference year(s)].

EN 15804 serves as the core PCR, supported by Tata Steel's EN 15804 verified EPD programme Product Category Rules documents, and [this] / [the LCA model (Name of model) supporting the] declaration has been independently verified according to ISO 14025.

Third party verifier

[Signature of verifier]

[Name/organisation and address of verifier]

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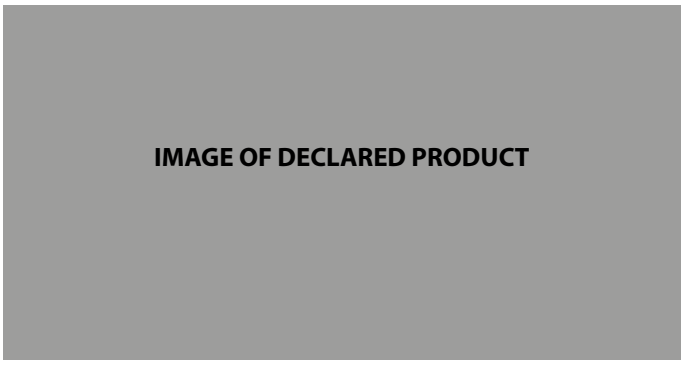
2 Product information

2.1 Product description

[A description of the product must be provided. Where an average product is used it should be clear what range of products is covered by the average. An image of the product may be inserted as Figure 1 below.]

Figure 1 [Product name]



2.2 Manufacturing

[The manufacturing sites included in the EPD should be listed as shown in Table 1, along with a description of the process of manufacture, including diagrams, such as Figure 2 below. Other diagrams of the manufacturing process can be added if required.]

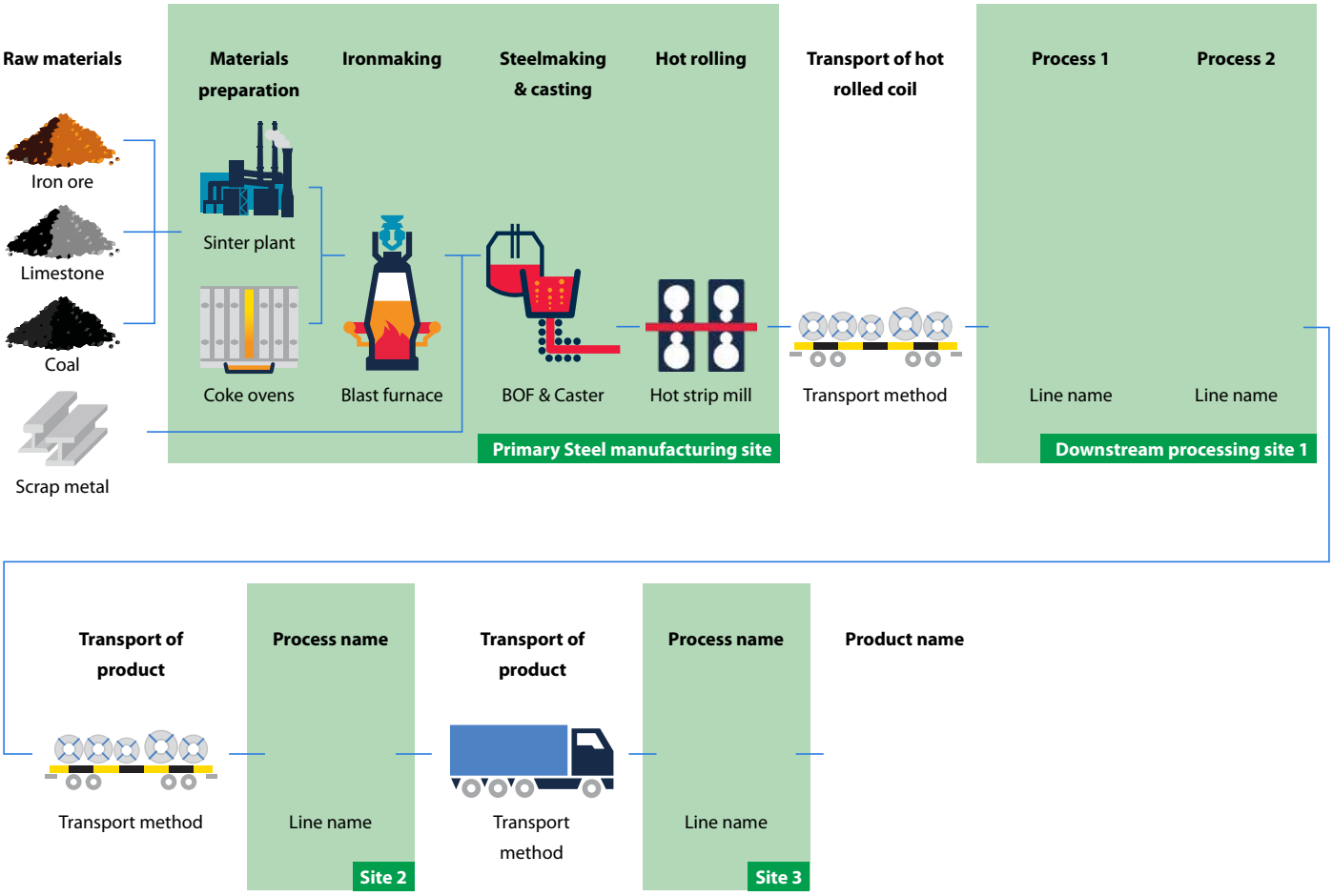
Table 1 Participating sites

Site name	Product	Manufacturer	Country

[The following text is suggested]

The process of steel coil manufacture at Tata Steel begins with sinter being produced from iron ore and limestone, and together with coke from coal, reduced in a blast furnace to produce iron. Steel scrap is added to the liquid iron and oxygen is blown through the mixture to convert it into liquid steel in the basic oxygen furnace. The liquid steel is continuously cast into discrete slabs, which are subsequently reheated and rolled in a hot strip mill to produce steel coil. The hot rolled coils are transported by rail, from etc.

Figure 2 Process overview from raw materials to [Name] product



[Describe how process data were collected and how the data were organised. Describe how resource use and emissions were attributed to product(s).]

2.3 Technical data and specifications

[The relevant technical specifications and data that relate to the product should be described, along with details of use and applications. Tables 2 and 3 need to be completed.]

Table 2 General properties of [Name of product]

	[Product name]
Lintel length (mm)	0
SWL 1:1/3:1 [kN]	0
Weight (Kg/m)	0
Nominal height 'h' (mm)	0

Table 3 Technical specification of [Name of product]

	[Product name]
Metallic Coating	0
Duplex Corrosion Protection	0
Continuous Insulation	0
Certification	[List applicable certifications]

2.4 Packaging

[Describe packaging included in the EPD. The mass of packaging should be declared here.]

2.5 Reference service life

[For Cradle-to-Grave studies where the use stage is included, a Reference Service Life should be specified. The declared RSL should be accompanied by the reference in-use condition for achieving the declared technical and functional performance.]

2.6 Biogenic Carbon content

[If required, the mass of biogenic carbon in the product and packaging can be declared here. If the mass of biogenic carbon containing materials in the product is less than 5 % of the mass of the product, the declaration of biogenic carbon content may be omitted. If the mass of biogenic carbon containing materials in the packaging is less than 5 % of the total mass of the packaging, the declaration of the biogenic carbon content of the packaging may be omitted. If necessary, refer to EN 16449, Wood and wood-based products — Calculation of the biogenic carbon content of wood and conversion to carbon dioxide.]

[The following table can be used if required.]

Table X Biogenic carbon content at the factory gate

	[Product name]
Biogenic carbon content (product) (kg)	0
Biogenic carbon content (packaging) (kg)	0

Note: 1kg biogenic carbon is equivalent to 44/12 kg of CO_2

3 LCA methodology

3.1 Declared unit

The unit being declared is a [The specified lintel length in m to be inserted here] length lintel product. [The material composition of the lintel should be detailed in Table 5]

3.2 Scope

[Specify the type of EPD and highlight the modules considered – and not considered - in the LCA from the following.]

A1-A3: Production stage (raw material supply, transport to production site, manufacturing)
A4-A5: Construction stage (transport to construction site, construction site installation)
B1-B7: Use stage (impact for duration of Reference Service Life)
C1-C4: End-of-life (demolition/deconstruction, transport, processing for recycling and disposal)
D: Reuse, recycling and recovery

The life cycle stages are explained in more detail in Figure 3, but where the text is in light grey, the impacts from this part of the life cycle are not considered for this particular product.

Table 5 Material composition of [Product name] per declared unit

	[Product name]
Declared unit (m)	0
Insulation (kg)	0
Steel (including brackets) (kg)	0
Coating (kg)	0

3.3 Cut-off criteria

[The following is an example of what should be included.]

All information from the data collection process has been considered, covering all used and registered materials, and all fuel and energy consumption. On-site emissions were measured and those emissions have been considered. Data for all relevant sites was thoroughly checked and also cross-checked with one another to identify potential data gaps. No processes, materials or emissions that are known to make a significant contribution to the environmental impact of the steel product have been omitted. On this basis, there is no evidence to suggest that input or outputs contributing more than 1% to the overall mass or energy of the system, or that are environmentally significant, have been omitted. It is estimated that the sum of any excluded flows contribute less than 5% to the impact assessment categories. The manufacturing of required machinery and other infrastructure is not considered in the LCA.

3.4 Background data

[The following is an example of what should be included.]

For life cycle modelling of the steel product, the GaBi Software System for Life Cycle Engineering is used. The GaBi database contains consistent and documented datasets which can be viewed in the online GaBi documentation.

Where possible, specific data derived from Tata Steel's own production processes were the first choice to use where available.

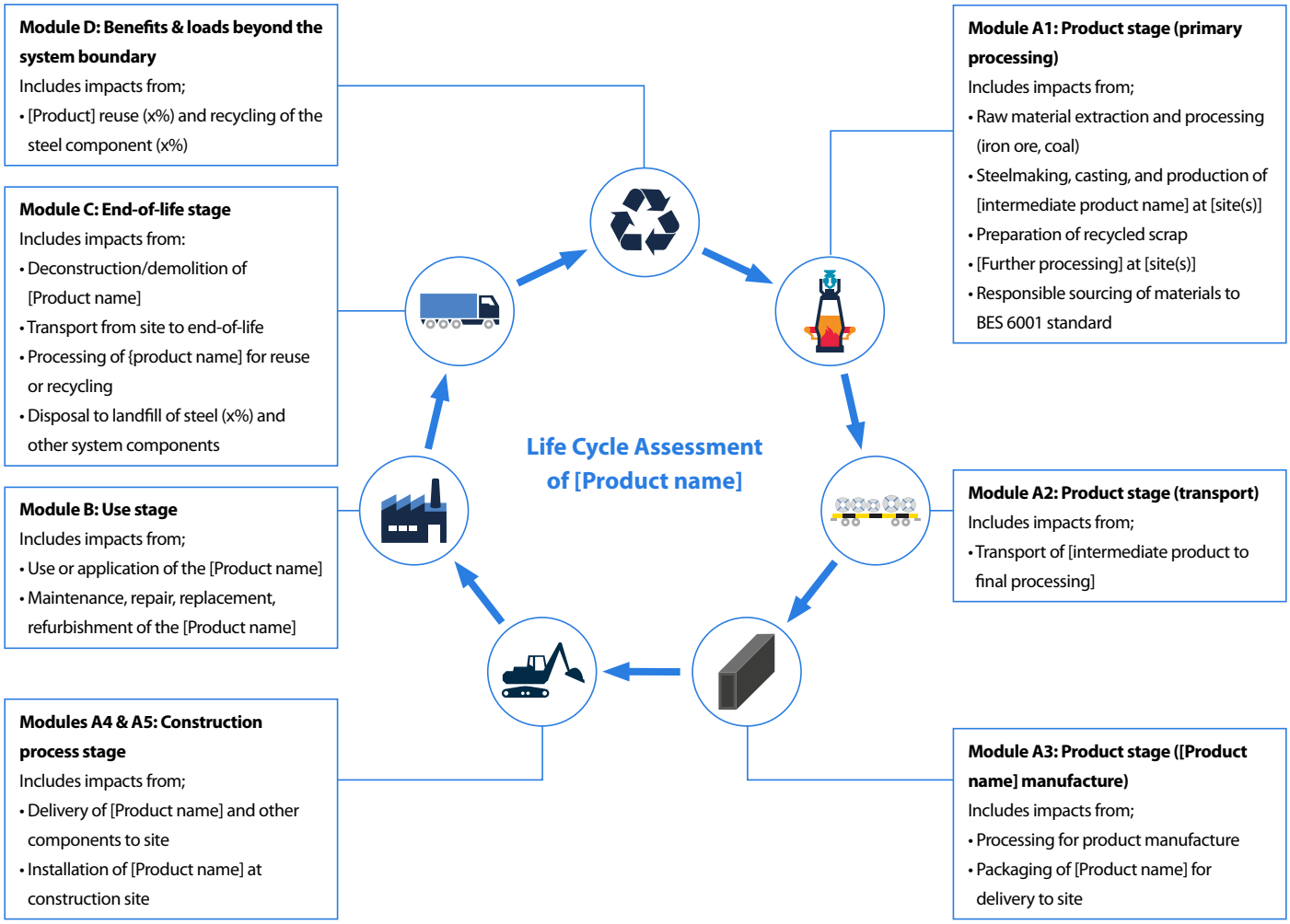
To ensure comparability of results in the LCA, the basic data of the GaBi database were used for energy, transportation and auxiliary materials.

3.5 Data quality

[The following is an example of what should be included.]

The data from Tata Steel's own production processes are from [Year(s)], and the technologies on which these processes were based during that period, are those used at the date of publication of this EPD.
All relevant background datasets are taken from the GaBi software database, and the last revision of these datasets took place less than 10 years ago. The study is considered to be based on good quality data.

Figure 3 Life Cycle Assessment of [Product name]



3.6 Allocation

[The following is an example of what should be included.]

To align with the requirements of EN 15804, a methodology is applied to assign impacts to the production of slag and hot metal from the blast furnace (co-products from steel manufacture), that was developed by the World Steel Association and EUROFER.

This methodology is based on physical and chemical partitioning of the manufacturing process, and therefore avoids the need to use allocation methods, which are based on relationships such as mass or economic value. It takes account of the manner in which changes in inputs and outputs affect the production of co-products and also takes account of material flows that carry specific inherent properties. This method is deemed to provide the most representative method to account for the production of blast furnace slag as a co-product.

Economic allocation was considered, as slag is designated as a low value co-product under EN 15804. However, as neither hot metal nor slag are tradable products upon leaving the blast furnace, economic allocation would most likely be based on estimates. Similarly BOF slag must undergo processing before being used as a clinker or cement substitute. The World Steel Association and EUROFER also highlight that companies purchasing and processing slag work on long term contracts which do not follow regular market dynamics of supply and demand.

Process gases arise from the production of the continuously cast steel slabs at [site(s)] and are accounted for using the system expansion method. This method is also referenced in the same EUROFER document and the impacts of co-product allocation, during manufacture, are accounted for in the product stage (module A1).

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

3.7 Additional technical information

The main scenario assumptions used in the LCA are detailed below in Table 4. [Reference should be made of the basis of any end of life percentages]

For all indicators the characterisation factors from the EC-JRC are applied, identified by the name EN_15804, and based upon the EF Reference Package 3.0. In GaBi, the corresponding impact assessment is used, denoted by EN 15804 +A2.

3.8 Comparability

[The EPD should contain the following statement in relation to comparability.]

Care must be taken when comparing EPDs from different sources. EPDs may not be comparable if they do not have the same functional unit or scope (for example, whether they include installation allowances in the building), or if they do not follow the same standard such as EN 15804. The use of different generic data sets for upstream or downstream processes that form part of the product system may also mean that EPDs are not comparable.

Comparisons should ideally be integrated into a whole building assessment, in order to capture any differences in other aspects of the building design that may result from specifying different products. For example, a more durable product would require less maintenance and reduce the number of replacements and associated impacts over the life of the building, or, a higher strength product may require less material for the same function.

Table 5 Main scenario assumptions

Module	Scenario assumptions
A1 to A3 – Product stage	Manufacturing data from Tata Steel's site(s) at [Name(s)] is used
A2 – Transport to the [product] manufacturing site	Specify transport mode, distance travelled, and load capacity utilisation (including empty returns) for the intermediate product to the [product] manufacturing site
A4 – Transport to construction site	If included: X km total transport distance on a Y t load capacity articulated lorry, Z% utilisation to account for any empty returns
A5 – Installation at construction site	If included: Estimation of energy consumption for power tools for fasteners and lifting equipment
B1 to B7 – Use stage	If included: state the extent of maintenance over the reference service life
C1 – Deconstruction and demolition	If included: Estimation of energy consumption
C2 – Transport for recycling, reuse, and disposal	X km total transport distance on a Y t load capacity articulated lorry. Z% utilisation to account for any empty returns
C3 – Waste processing for reuse, recovery and/or recycling	Energy associated with mechanical shredding or cutting of material collected for recycling. If applicable, no additional processing of material for reuse
C4 - Disposal	Specify disposal rate and reference
D – Reuse, recycling, and energy recovery	Specify reuse and recycling rates and reference

Please note that in the GaBi software, an empty return journey is accounted for by halving the load capacity utilisation of the outbound journey.

4 Results of the LCA

In the top section of the following tables of results, a cross should be used to indicate which modules are declared and ND inserted to show those modules not considered in the LCA study. Also, the results for all modules shall be presented separately in columns (for example, C2 and C4), but those for modules A1, A2 and A3 may be grouped together. Additionally, for any modules that are being accounted for but have a value of zero, a '0' should be used to declare this.

Description of the system boundary

Product Stage			Construction Stage		Use Stage							End of Life Stage				Benefits and Loads Beyond the System Boundary		
Raw material supply	Transport	Manufacturing	Transport	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		

X = Included in LCA; ND = module not declared

Environmental impact:

[Product name]

Parameter	Unit	A1 - A3	A4	A5	B	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq									
GWP-fossil	kg CO_2 eq									
GWP-biogenic	kg CO_2 eq									
GWP-luluc	kg CO_2 eq									
ODP	kg CFC11 eq									
AP	mol H^+ eq									
EP-freshwater	kg P eq									
EP-marine	kg N eq									
EP-terrestrial	mol N eq									
POCP	kg NMVOC eq									
ADP-minerals&metals	kg Sb eq									
ADP-fossil	MJ net calorific value									
WDP	m^3 world eq deprived									
PM	Disease incidence	ND	ND	ND	ND	ND	ND	ND	ND	ND
IRP	kBq U235 eq	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETP-fw	CTUe	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-c	CTUh	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-nc	CTUh	ND	ND	ND	ND	ND	ND	ND	ND	ND
SQP		ND	ND	ND	ND	ND	ND	ND	ND	ND

GWP-total = Global Warming Potential total
GWP-fossil = Global Warming Potential fossil fuels
GWP-biogenic = Global Warming Potential biogenic
GWP-luluc = Global Warming Potential land use and land use change
ODP = Depletion potential of stratospheric ozone layer
AP = Acidification potential, Accumulated Exceedance
EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment
EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment
EP-terrestrial = Eutrophication potential, Accumulated Exceedance
POCP = Formation potential of tropospheric ozone
ADPE = Abiotic depletion potential for non-fossil resources
ADPF = Abiotic depletion potential for fossil resources
WDP = Water (user) deprivation potential, deprivation-weighted water consumption
PM = Potential incidence of disease due to PM emissions
IRP = Potential Human exposure efficiency relative to U235
ETP-fw = Potential Comparative Toxic Unit for ecosystems
HTP-c = Potential Comparative Toxic Unit for humans
HTP-nc = Potential Comparative Toxic Unit for humans
SQP = Potential soil quality index

The following indicators should be used with care as the uncertainties on these results are high or as there is limited experience with the indicator : ADP-minerals&metals, ADP-fossil, and WDP.

Resource use:

[Product name]

Parameter	Unit	A1 - A3	A4	A5	B	C1	C2	C3	C4	D
PERE	[MJ]									
PERM	[MJ]									
PERT	[MJ]									
PENRE	[MJ]									
PENRM	[MJ]									
PENRT	[MJ]									
SM	[kg]									
RSF	[MJ]									
NRSF	[MJ]									
FW	[m^3]									

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials
PERM = Use of renewable primary energy resources used as raw materials
PERT = Total use of renewable primary energy resources
PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials
PENRM = Use of non-renewable primary energy resources used as raw materials
PENRT = Total use of non-renewable primary energy resources
SM = Use of secondary material
RSF = Use of renewable secondary fuels
NRSF = Use of non-renewable secondary fuels
FW = Use of net fresh water

Output flows and waste categories:

[Product name]

Parameter	Unit	A1 - A3	A4	A5	B	C1	C2	C3	C4	D
HWD	[kg]									
NHWD	[kg]									
RWD	[kg]									
CRU	[kg]									
MFR	[kg]									
MER	[kg]									
EEE	[MJ]									
EET	[MJ]									

HWD = Hazardous waste disposed
NHWD = Non-hazardous waste disposed
RWD = Radioactive waste disposed
CRU = Components for re-use
MFR = Materials for recycling
MER = Materials for energy recovery
EEE = Exported electrical energy
EET = Exported thermal energy

5 Interpretation of results

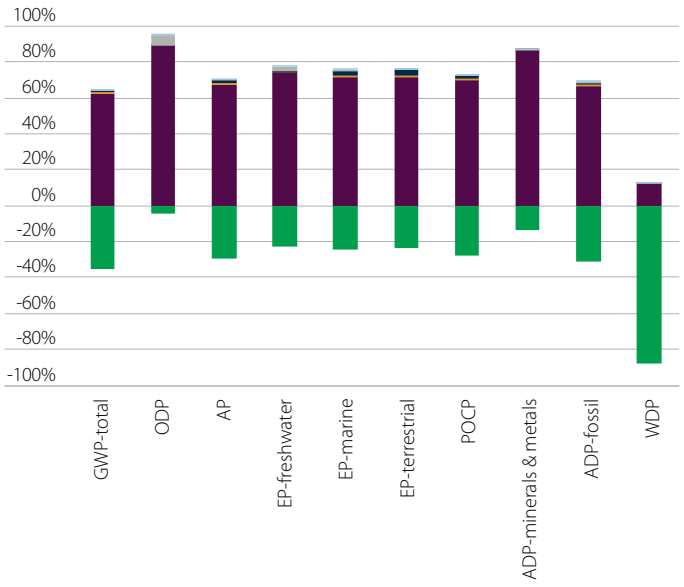
[Key parameters influencing the results should be explained using diagrams where appropriate and the main impacts highlighted. The variance of individual products within the family compared with the average should be published, and the contribution of individual inventory flows to the impact assessment categories should be explained. The following are examples of what could be included.] Figure 4 shows the relative contribution per life cycle stage for selected environmental impact categories for a [specified length] of [Name of product]. Each column represents 100% of the total impact score, which is why all the columns have been set with the same length. A burden is shown as positive (above the 0% axis) and a benefit is shown as negative (below the 0% axis). The main contributors across the impact categories are A1-A3 (burdens) and D (benefits beyond the system boundary). The manufacture of [Intermediate product] during stage A1-A3 is responsible for approximately X% of each impact in most of the categories, specifically, the conversion of iron ore into liquid steel which is the most energy intensive part of the overall [Product name] manufacturing process.

The primary site emissions come from the use of coal and coke in the blast furnace, and from the injection of oxygen into the basic oxygen furnace, as well as combustion of the process gases. These processes give rise to emissions of CO2, which contributes X% of the Global Warming Potential (GWP), and sulphur oxides, which are responsible for Y of the impact in the Acidification Potential (AP) category. In addition, oxides of nitrogen are emitted which contribute X of the A1-A3 Acidification Potential, and Y of the Eutrophication Potential (EP), and the combined emissions of carbon monoxide (X%) together with sulphur and nitrogen oxides, contribute to the Photochemical Ozone indication (POCP).

Figure 4 clearly indicates the relatively small contribution to each impact from the other life cycle stages, which are [Names of stages]. The exception to this is the contribution of [Stage name] because …

Module D values are largely derived using worldsteel's value of scrap methodology which is based upon many steel plants worldwide, including both BF/BOF and EAF steel production routes. At end-of-life, the recovered steel is modelled with a credit given as if it were re-melted in an Electric Arc Furnace and substituted by the same amount of steel produced in a Blast Furnace. This contributes a significant reduction to most of the environmental impact category results, with the specific emissions that represent the burden in A1-A3, essentially the same as those responsible for the impact reductions in Module D.

Figure 4 LCA results for [Product name]



[Describe any exceptions with regards to the end-of-life credit given to steel scrap after the use stage in Module D. This may be if a particular impact score is a positive value and does not contribute a reduction to the total results as do the other listed impact categories. It may be that any Module D burden comes from the allocation methodology used in the worldsteel model for calculating the 'value of scrap'.]

Referring to the LCA results, the impact in Module D for the Use of Renewable Primary Energy indicator (PERT) is also different to the other impact categories, being a burden or load rather than a benefit. Renewable energy consumption is strongly related to the use of electricity, during manufacture, and as the recycling (EAF) process uses significantly more electricity than primary manufacture (BF/BOS), there is a positive value for renewable energy consumption in Module D but a negative value for non-renewable energy consumption.

[Add any further comments.]

6 References and product standards

1. Tata Steel's EN 15804 verified EPD programme, General programme instructions, [Version], [Date]

2. Tata Steel's EN 15804 verified EPD programme, Product Category Rules Part 1, [Version], [Date]

3. Tata Steel's EN 15804 verified EPD programme, Product Category Rules Part 2 – Steel Lintels, [Version], [Date]

4. ISO 14044:2006, Environmental management - Life Cycle Assessment - Requirements and guidelines

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

6. ISO 14040:2006, Environmental management - Life Cycle Assessment - Principles and framework

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

8. [Product Standard 1]

9. [Product Standard 2]

10. [ISO 9001:2015, Quality management systems]

11. [ISO 14001:2015, Environmental management systems]

12. [BES 6001, Responsible sourcing of construction products]

13. [Product Standard 3]

14. [Product Standard 4]

15. [Product Standard 5]

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

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

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

19. World Steel Association: Life cycle assessment methodology report, 2017

20. Sansom M and Avery N, Reuse and recycling rates of UK steel demolition arisings, Proceedings of the Institution of Civil Engineers, Engineering Sustainability 167, June 2014, Issue ES3, (Tata Steel/ EUROFER survey of members of the National Federation of Demolition Contractors (NFDC) for 'light structural steel')

21. EC-JRC, EN 15804 Reference Package, https://eplca.jrc.ec.europa.eu/LCDN/EN15804.xhtml

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