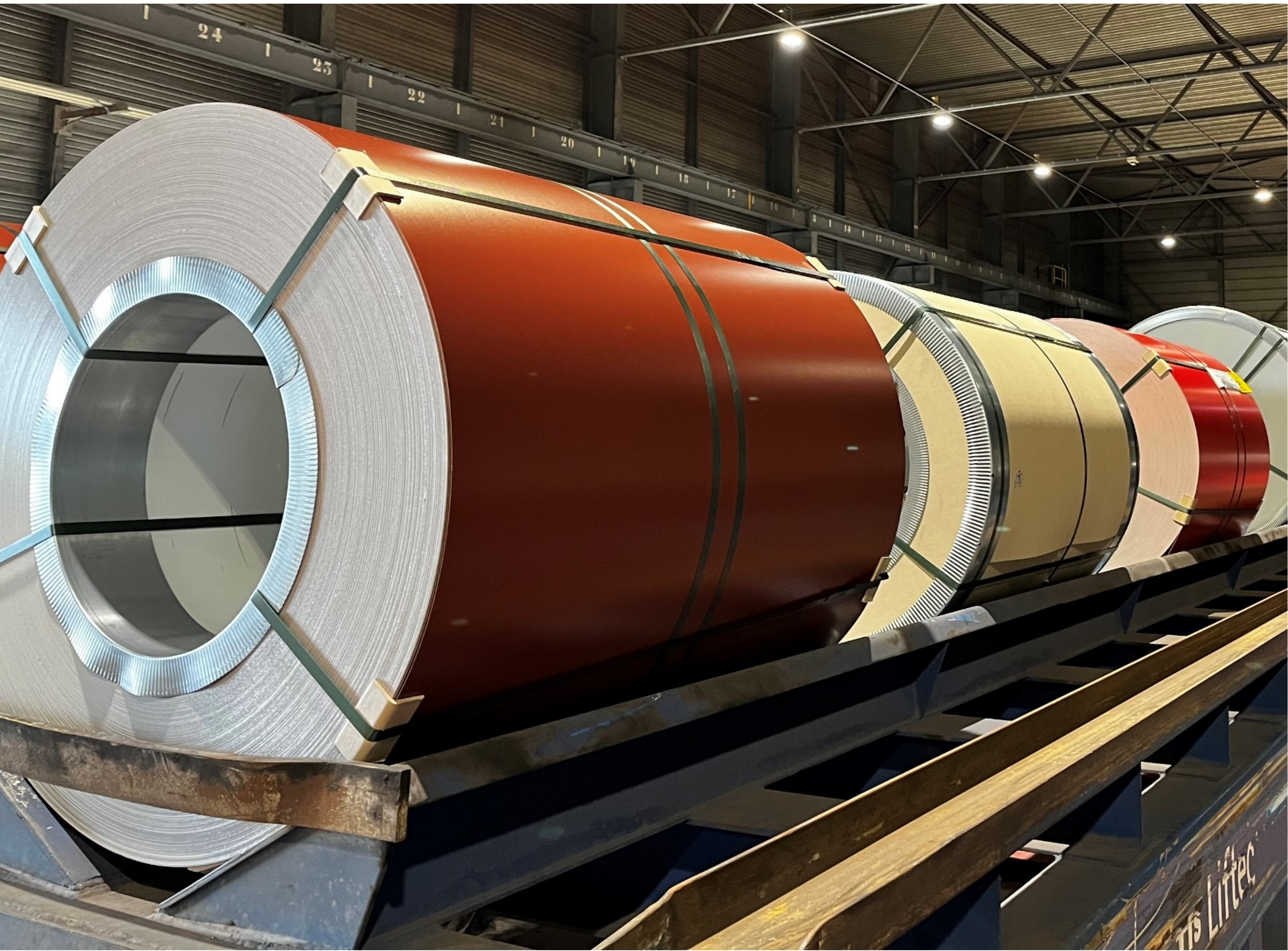
Organic Coated Steel from Maubeuge

Environmental Product Declaration



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Organic Coated Steel
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-2024-998
Date of Issue: 20th June 2024
Valid until: 19th June 2029

Owner of the Declaration: Tata Steel Netherlands
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 Netherlands
Third party verifier: Chris Foster, Eugeos Ltd.

1 General information

Owner of EPD	Tata Steel Netherlands
Product	Organic coated coil (Colorcoat® and Advantica® pre-finished steel coil)
Manufacturer	Tata Steel Netherlands
Manufacturing sites	Maubeuge
Product applications	Building Envelope (product brand name Colorcoat®) and Manufactured Goods (product brand name Advantica®)
Declared unit	1 tonne of steel product
Date of issue	20th June 2024
Valid until	19th June 2029

EPD
THIRD PARTY VERIFIED ISO 14025 & EN 15804

This Environmental Product Declaration (EPD) is for all organic coated steel manufactured by Tata Steel Netherlands. The environmental indicators are average values for organic coated steel from Maubeuge.

The information in this Environmental Product Declaration is based on production data from 2021.

EN 15804 serves as the core PCR, supported by Tata Steel's EN 15804 verified EPD programme Product Category Rules documents, and this declaration has been independently verified according to ISO 14025 [1,2,3,4,5,6,7].

Third party verifier

Chris Foster, Eugeos SRL, rue Dieudonné Lefèvre 17,
B-1020 Brussels, Belgium

2 Product information

2.1 Product description

This EPD is valid for Tata Steel Netherlands' organic coated steel products from Maubeuge, sold under the brands of Colorcoat® and Advantica®.

Colorcoat® is a range of pre-finished steel products for building envelope, roof and wall cladding systems. These are used in a wide range of industrial and commercial buildings, including warehousing, distribution and logistics, as well as schools, offices, retail, leisure and residential applications.

Advantica® is a range of pre-finished steel products specifically formulated for manufactured goods and widely used amongst others for the following applications, amongst others: controlled environments, doors and windows, lighting, ceilings, heating and ventilation, office furniture, transportation industry.

All Colorcoat® and Advantica® products are covered by this EPD, including:

- Colorcoat® SDP 50
- Colorcoat® SDP 35
- Colorcoat® PE 25
- Colorcoat® PE 15
- Colorcoat® PVDF
- Advantica® L Control

The results presented in this EPD are average values for these products manufactured at Maubeuge.

2.2 Manufacturing

The manufacturing sites included in the EPD are listed in Table 1 below. Maubeuge takes primary steel from both IJmuiden and Port Talbot, as well as a small share from external sources.

Table 1 Participating sites

Site name	Product	Manufacturer	Country
Port Talbot	Hot rolled coil	Tata Steel	UK
Llanwern	Cold rolled coil	Tata Steel	UK
IJmuiden	Hot rolled coil	Tata Steel	NL
Maubeuge	Pre-finished steel	Tata Steel	FR

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 then 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. IJmuiden has a second route for producing hot rolled steel, the direct sheet mill, in which liquid steel is formed into coils of hot rolled steel in one continuous and efficient operation. Most of the substrate for OCS is processed in the direct sheet mill.

Hot rolled coil is supplied to Maubeuge by boat and truck from IJmuiden, and these coils are pickled (to remove the oxide layer) and cold rolled (for further thickness reduction) before being processed on a combined galvanising and organic coating line. Cold rolled coil is also supplied to Maubeuge from IJmuiden, and this is processed on the combined HDG/coating line directly. A small quantity of hot and cold rolled coil is supplied from external sources and this is represented as European average hot and cold rolled coil in the calculations.

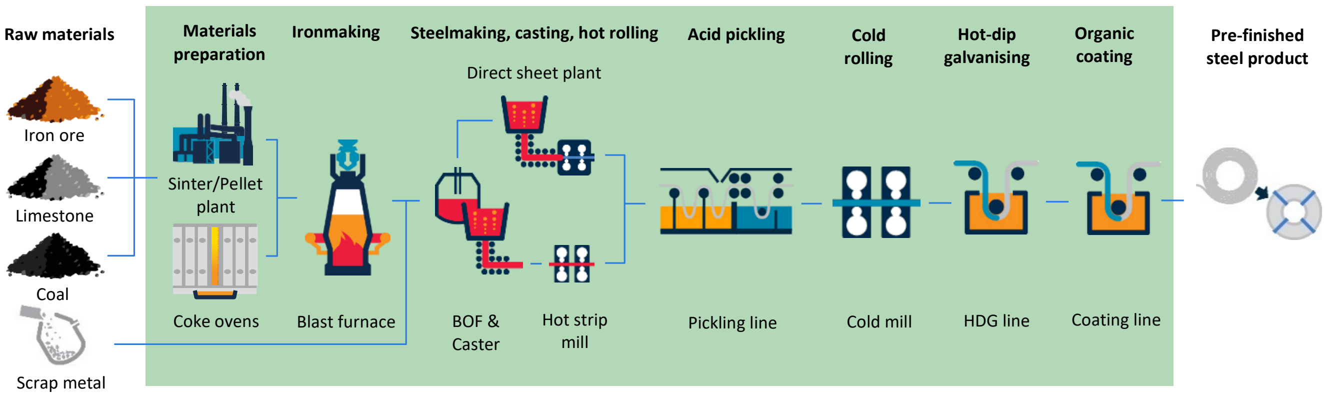
Pre-finished steel comprises a number of paint layers and treatments applied to steel in an automated and carefully controlled process with each layer of the product having a particular function. It is the combined effect of all these layers that give the product its overall performance and ensures a material that is robust and offers the specifier a choice of colour and effect.

During the organic coating process for pre-finished steel, a metallic coating is first applied to the steel coil. A pre-treatment is applied and then a primer before adding the final top coat layer in the form of liquid paint. For the vast majority of pre-finished steel products, the topcoats are applied on the front surface only, while the reverse or back side of the strip is produced with a high performing backing coat. These are cured at elevated temperatures before being recoiled ready for shipping.

An example of the process is shown in Figure 1. Transport steps are included after hot rolling and cold rolling.

Process data for the manufacture of hot and cold rolled coil at IJmuiden and Port Talbot/Llanwern was gathered as part of the latest worldsteel data collection. Organic coating data were also part of this and supplemented with additional data for the coating lines, such as paint manufacturing data.

Figure 1 Generic process flow of pre-finished steel products



2.3 Technical data and specifications

The general properties of organic coated steel are shown in Table 2.

Table 2 Technical specification of organic coated steel

	Organic coated steel
Metallic coating	All pre-finished steel is supplied with a zinc based metallic coating that conforms to EN 10346:2015 [8]
Paint coating (organic)	All pre-finished steel is fully REACH[9] compliant and chromate free
Certification	Certification applicable to Tata Steel's Maubeuge site are: ISO 9001 [17], ISO 14001 [18]

2.4 Packaging

The pre-finished coils are secured with plastic strapping, and additional steel, cardboard and plastic packaging is used to protect them during delivery to customer. The coils are transported on wooden pallets.

2.5 Reference service life

A reference service life for organic coated steel is not declared because the material can be used in a variety of different forms of construction, and the final construction application is not defined. To determine the full service life of organic coated steel, all factors would need to be included such as location and environment, corrosion protection, and fire protection. Corrosion and fire protection are usually applied during installation on site.

Pre-finished steels can be recovered and re-used or recycled repeatedly without loss of quality and they comply with the requirements of construction product class A1 (non-combustible).

2.6 Biogenic carbon content

There are no biogenic carbon containing materials in the product. The biogenic carbon content of the packaging materials is shown in Table 3.

Table 3 Biogenic carbon content at the factory gate

	kg C/t OCS
Biogenic carbon content (product)	0
Biogenic carbon content (packaging)	2,67

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

3 LCA methodology

3.1 Declared unit

The unit being declared is 1 tonne of pre-finished steel.

3.2 Scope

This EPD can be regarded as cradle-to-gate with modules C and D and the specific modules considered in the LCA are;

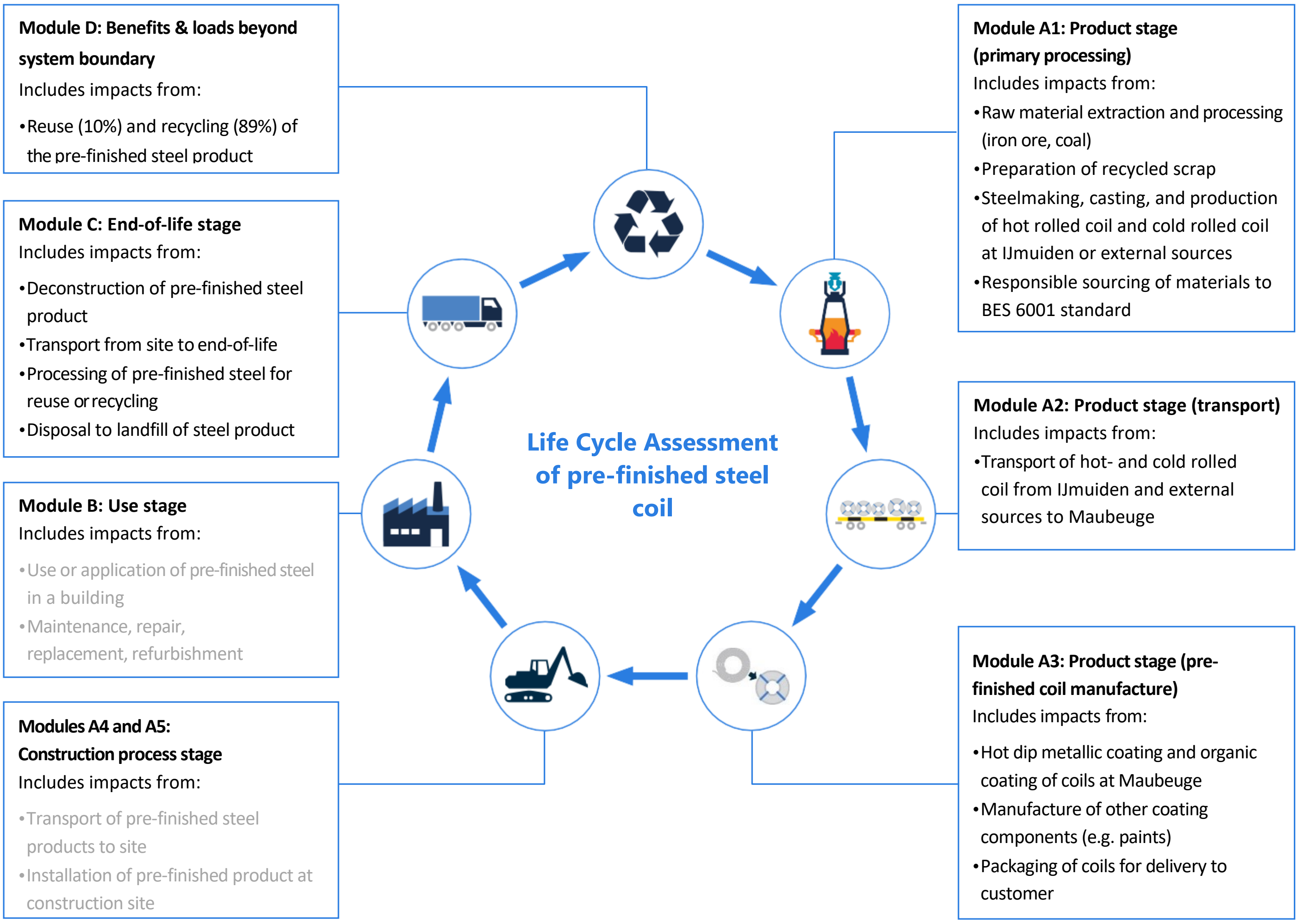
- A1-A3: Production stage (raw material supply, transport to production site, manufacturing)
- C1-C4: End-of-life (demolition/deconstruction, transport, processing for recycling and disposal)
- D: Reuse, recycling and recovery

The life cycle stages are explained in more detail in Figure 2, but where the text is in light grey, the impacts from this part of the life cycle are not considered.

3.3 Cut-off criteria

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 were 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 organic coated steel have been omitted. On this basis, there is no evidence to suggest that inputs 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.

Figure 2 Life Cycle Assessment of pre-finished steel coil



Module D: Benefits & loads beyond system boundary
Includes impacts from:
- Reuse (10%) and recycling (89%) of the pre-finished steel product

Module C: End-of-life stage
Includes impacts from:
- Deconstruction of pre-finished steel product
- Transport from site to end-of-life
- Processing of pre-finished steel for reuse or recycling
- Disposal to landfill of steel product

Module B: Use stage
Includes impacts from:
- Use or application of pre-finished steel in a building
- Maintenance, repair, replacement, refurbishment

Modules A4 and A5: Construction process stage
Includes impacts from:
- Transport of pre-finished steel products to site
- Installation of pre-finished product at construction site

Module A1: Product stage (primary processing)
Includes impacts from:
- Raw material extraction and processing (iron ore, coal)
- Preparation of recycled scrap
- Steelmaking, casting, and production of hot rolled coil and cold rolled coil at IJmuiden or external sources
- Responsible sourcing of materials to BES 6001 standard

Module A2: Product stage (transport)
Includes impacts from:
- Transport of hot- and cold rolled coil from IJmuiden and external sources to Maubeuge

Module A3: Product stage (pre-finished coil manufacture)
Includes impacts from:
- Hot dip metallic coating and organic coating of coils at Maubeuge
- Manufacture of other coating components (e.g. paints)
- Packaging of coils for delivery to customer

3.4 Background data

For life cycle modelling of organic coated steel, Sphera's LCA for Experts is used [16]. The LCAfE database contains consistent and documented datasets which can be viewed in the online documentation [17].

Specific data derived from Tata Steel's own production processes at Port Talbot, IJmuiden and Maubeuge were the first choice to use where available. Data was also obtained directly from relevant suppliers, such as for the paint which is used in the coating process.

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

3.5 Data quality

The data from Tata Steel's own production processes are from 2021, and the technologies on which these processes were based during that period, are those used at the date of publication of this EPD. Exceptions are the data from Port Talbot and Llanwern, which were from 2017, but only contributed 3,7% by mass to the substrate of Maubeuge.

All relevant background datasets are taken from the LCAfE software database, and the last revision of these datasets took place less than 10 years ago. There are some small exceptions of background data where a recent database figure was not available (EoL shredding process data and PVDF production). In addition, some modelling was performed for materials where data was not available (e.g. some pre-treatment chemicals). It is estimated that these flows account for <0,5% of environmental impacts across all categories.

An assessment of the quality of data used in this study has been made using the scheme provided in the UN Environment Global Guidance on LCA database development, referenced in EN 15804. The study is considered to be based on good quality data.

3.6 Allocation

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 [18].

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 Port Talbot and IJmuiden, 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 [19]. 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 in Table 4. The end-of-life percentages are taken from a Tata Steel/EUROFER recycling and re-use survey of UK demolition contractors carried out in 2012 [20].

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 3.1 [21]. In LCAfE, the corresponding impact assessment is used, denoted by 'EN 15804+A2'.

The values presented in the LCA results tables of section 4 are average values for organic coated steel manufactured at Maubeuge, comprising different coating types and thicknesses.

3.8 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/infrastructure assessment, in order to capture any differences in other aspects of the building or infrastructure 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 infrastructure, or, a higher strength product may require less material for the same function.

Table 4 Main scenario assumptions

Module	Scenario assumptions
A1 to A3 – Product stage	Manufacturing data from Tata Steel's sites at Port Talbot, IJmuiden, Llanwern and Maubeuge were used.
A2 – Transport to the manufacturing site	The pre-finished steel manufacturing facilities are located at Maubeuge. Hot and cold rolled coil is transported mainly from IJmuiden (350km) by ship with a utilisation factor of 50%. Part of these journeys are by road, and a 25 tonne capacity truck with 45% utilisation is assumed.
C1 – Deconstruction and demolition	Energy consumption estimated based upon published data for the dismantling of steel constructions in Germany [22].
C2 – Transport for recycling, reuse, and disposal	A transport distance of 100km to landfill or to a recycling site is assumed, while a distance of 250km is assumed for reuse. Transport is on a 25 tonne load capacity lorry with 20% utilisation to account for empty returns.
C3 – Waste processing for reuse, recovery and/or recycling	Steel that is recycled is processed in a shredder. There is no additional processing of material for reuse.
C4 - Disposal	At end-of-life, 1% of the steel is disposed in a landfill, in accordance with the findings of an NFDC survey [20].
D – Reuse, recycling, and energy recovery	At end-of-life, 89% of the steel is recycled and 10% is re-used, in accordance with the findings of an NFDC survey [20]. When reused, steel is assumed to require re-painting.

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

4 Results of the LCA

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	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

X = Included in LCA; ND = module not declared

Environmental impact:

1 tonne of organic coated steel

Parameter	Unit	A1 – A3	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	2,44E+03	4,42E+01	8,22E+00	1,06E+01	8,22E+00	-1,33E+03
GWP-fossil	kg CO_2 eq	2,45E+03	4,41E+01	8,26E+00	1,06E+01	1,48E-01	-1,34E+03
GWP-biogenic	kg CO_2 eq	-7,89E+00	5,14E-02	-1,22E-01	-1,10E-01	8,07E+00	6,95E+00
GWP-luluc	kg CO_2 eq	4,28E-01	9,32E-04	7,64E-02	5,11E-02	4,67E-04	-1,88E-01
ODP	kg CFC11 eq	8,98E-06	1,39E-11	7,22E-13	2,45E-10	3,82E-13	-3,14E-07
AP	mol H^+ eq	6,06E+00	5,74E-02	3,29E-02	3,47E-02	1,07E-03	-3,27E+00
EP-freshwater	kg P eq	1,68E-02	2,27E-05	3,01E-05	3,74E-05	3,03E-07	-9,33E-04
EP-marine	kg N eq	1,43E+00	1,91E-02	1,55E-02	6,44E-03	2,75E-04	-5,68E-01
EP-terrestrial	mol N eq	1,56E+01	2,10E-01	1,73E-01	6,89E-02	3,03E-03	-5,34E+00
POCP	kg NMVOC eq	5,01E+00	6,28E-02	2,98E-02	1,85E-02	8,31E-04	-2,24E+00
ADP-minerals&metals	kg Sb eq	1,11E-01	5,43E-07	5,36E-07	3,88E-06	6,94E-09	-1,74E-02
ADP-fossil	MJ net calorific value	2,91E+04	6,16E+02	1,12E+02	2,18E+02	2,00E+00	-1,37E+04
WDP	m^3 world eq deprived	1,59E+03	2,40E-01	9,51E-02	2,10E+00	1,65E-02	-1,29E+02
PM	Disease incidence	1,28E-04	6,77E-07	1,75E-07	2,67E-07	1,31E-08	-3,76E-05
IRP	kBq U235 eq	2,29E+02	4,14E-01	2,10E-02	4,44E+00	2,63E-03	2,89E+00
ETP-fw	CTUe	7,14E+03	4,24E+02	7,90E+01	7,51E+01	1,26E+00	-1,06E+03
HTP-c	CTUh	4,34E-07	1,37E-08	1,59E-09	1,35E-09	1,68E-10	4,18E-07
HTP-nc	CTUh	8,15E-06	2,54E-07	7,03E-08	5,21E-08	1,77E-08	1,45E-06
Land use	Pt	3,38E+03	6,69E+00	4,68E+01	8,20E+01	4,86E-01	-3,64E+02

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 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
ADP-M&M	Abiotic depletion potential for non-fossil resources (minerals & metals)
ADP-F	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

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:

1 tonne of organic coated steel

Parameter	Unit	A1 – A3	C1	C2	C3	C4	D
PERE	MJ	1,90E+03	9,78E+00	7,94E+00	6,23E+01	3,26E-01	2,83E+02
PERM	MJ	7,03E+01	0.00E+00	0,00E+00	0,00E+00	0,00E+00	-3,63E+00
PERT	MJ	1,90E+03	9,78E+00	7,94E+00	6,23E+01	3,26E-01	2,83E+02
PENRE	MJ	2,91E+04	6,17E+02	1,13E+02	2,18E+02	2,00E+00	-1,37E+04
PENRM	MJ	8,40E+02	0.00E+00	0,00E+00	0,00E+00	0,00E+00	-4,05E+01
PENRT	MJ	2,91E+04	6,17E+02	1,13E+02	2,18E+02	2,00E+00	-1,37E+04
SM	kg	8,78E-02	0.00E+00	0,00E+00	0,00E+00	0,00E+00	-6,43E-01
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	4,11E+01	1,00E-02	8,75E-03	8,96E-02	5,05E-04	-1,14E+02

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	Input 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:

1 tonne of organic coated steel

Parameter	Unit	A1 – A3	C1	C2	C3	C4	D
HWD	kg	2,93E+00	3,09E-09	4,16E-10	2,00E-06	4,36E-11	-2,58E-01
NHWD	kg	2,13E+01	1,34E-01	1,62E-02	1,20E-01	2,00E+01	1,31E+02
RWD	kg	9,82E-01	2,59E-03	1,45E-04	2,76E-02	2,28E-05	-9,44E-02
CRU	kg	0,00E+00	0,00E+00	0,00E+00	1,00E+02	0,00E+00	0,00E+00
MFR	kg	2,13E+01	0,00E+00	0,00E+00	8,90E+02	0,00E+00	-2,04E+00
MER	kg	1,05E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-7,52E-02
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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

5 Interpretation of results

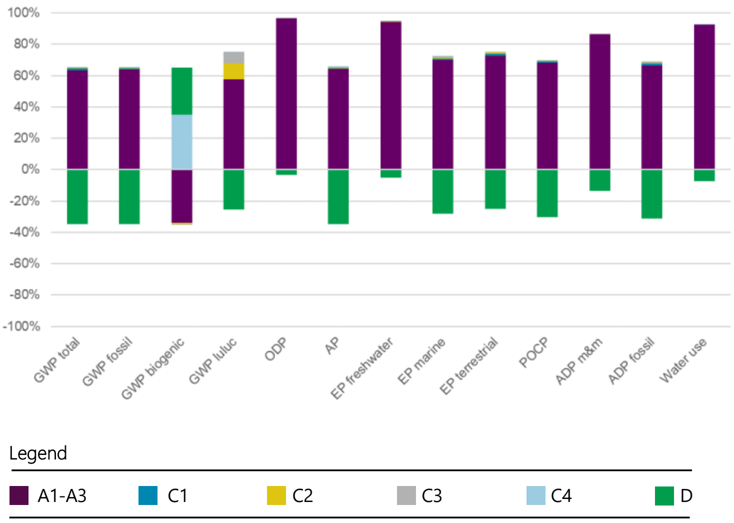
Figure 3 shows the relative contribution per life cycle stage for selected environmental impact categories for 1 tonne of Tata Steel's organic coated steel product. Each column represents 100% of the total impact score, which is why all the columns have been set with the same length. A burden is shown 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 hot dip galvanised coil during stage A1-A3 is responsible for over 90% of each impact in all of the categories, specifically, the conversion of iron ore into liquid steel which is the most energy intensive part of the overall 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 CO_2, which contributes 95% of the Global Warming Potential (GWP), and sulphur oxides, which are responsible for 36% of the impact in the Acidification Potential (AP) category. In addition, oxides of nitrogen are emitted which contribute 61% of the A1-A3 Acidification Potential, and over 98% of the Eutrophication Potentials (EP-marine and EP-terrestrial). The emissions of nitrogen oxides (83%) together with sulphur oxides, carbon monoxide and methane, contribute to the Photochemical Ozone indication (POCP).

Figure 2 clearly indicates the relatively small contribution to each impact from the other life cycle stages, which are the end-of-life stages C1 to C4. The exceptions are the contribution of C4 (in which biogenic carbon from previous stages is assumed re-emitted) and module D to the GWP-biogenic and GWP-luluc indicators.

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 [19]. The specific emissions that represent the burden in A1-A3, are essentially the same as those responsible for this Module D credit. It is important that the life cycle of the steel product is considered here, because in most cases, the Module D credit provides significant benefits in terms of reducing the whole life environmental impacts. In the case of reuse of steel at end-of-life, the steel is assumed to be re-painted.

Figure 3 LCA results for organic coated steel



The Ozone Depletion indicator (ODP) shows a marginal benefit in Module D, whereas most indicators show a slightly higher reduction. This burden comes from the recycling of the organic coated strip at end-of-life. The very different energy sources (coal versus grid electricity mix) and technologies (BF/BOS versus EAF) are the main factors why the recycling impact for ODP is larger than that of primary manufacture, and the Module D burden arises because of the allocation methodology used in the worldsteel model for calculating the 'value of scrap' process in LCAfE.

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.

The values calculated in this EPD are based on an average of coating types and thicknesses. A sensitivity analysis of the results showed that for most impact indicators, including GWP, the variation between the products based on coating type was less than 5% (A1-A3).

6 References and product standards

1. Tata Steel's EN 15804 verified EPD programme, General programme instructions, V2 January 2022
2. Tata Steel's EN 15804 verified EPD programme, Product Category Rules Part 1, V2 January 2022
3. Tata Steel's EN 15804 verified EPD programme, Product Category Rules Part 2 – metallic coated and pre-finished steel, Version 1.0, May 2019
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. EN 10346:2015, Continuously hot-dip coated steel flat products for cold forming
9. REACH, EU regulation for Registration, evaluation, authorisation and restriction of chemicals
10. ISO 9001:2015, Quality management systems
11. ISO 14001:2015, Environmental management systems
12. BS OHSAS 18001, Occupational health and safety management
13. BES 6001, Responsible sourcing of construction products
14. BBA Certification, British Board of Agrément product certification
15. EN 10169:2010+A1:2012, Continuously organic coated (coil coated) steel flat products
16. Sphera; LCA for Experts: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, Echterdingen, 1992-2024
17. Documentation of LCA for Experts. Copyright, TM. Stuttgart, Echterdingen, 1992-2024. https://lcadatabase.sphera.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 'Profiled sheet cladding'
21. EC-JRC, EN 15804 Reference Package, https://eplca.jrc.ec.europa.eu/LCDN/EN15804.xhtml
22. Siebers R. (2021), Dissertation: Development of sustainability key figures for the value chain stages – erection and dismantling – in steel construction, Bergische Universität Wuppertal

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