TATA STEEL

TATA

Colorcoat® pre-finished steel coil

Environmental Product Declaration

CONTENTS

Colorcoat® pre-finished steel coil
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-2024-997
Date of Issue: 16th September 2024
Valid until: 15th September 2029

Owner of the Declaration: Tata Steel UK
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: Chris Foster, Eugeos Ltd.

1 General information

Owner of EPD	Tata Steel UK
Product	Colorcoat® pre-finished steel coil
Manufacturer	Tata Steel UK
Manufacturing sites	Port Talbot, Llanwern and Shotton
Product applications	Building Envelope (construction)
Declared unit	1 tonne of pre-finished steel coil
Date of issue	16th September 2024
Valid until	15th September 2029

This Environmental Product Declaration (EPD) is for Colorcoat® pre-finished steel manufactured by Tata Steel in the UK. The environmental indicators are for products manufactured at Shotton with feedstock supplied from Port Talbot and Llanwern.

The information in the Environmental Product Declaration is based on production data from 2021 and 2022.

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 Ltd, Suite 11, The Old Fuel Depot, Twemlow Lane, Twemlow, CW4 8GJ, UK

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2 Product information

2.1 Product description

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 and leisure. An example is shown in Figure 1. The products covered by this EPD are;

- Colorcoat® PE 15
- Colorcoat® PE 25
- Colorcoat® High Reflect
- Colorfarm®
- Colorcoat® SDP 50
- Colorcoat® LG

The results presented in this EPD are average values for the above products manufactured in the UK at Shotton, weighted by the tonnage produced. EPDs are also available for Colorcoat® branded products – Colorcoat HPS200 Ultra® and Colorcoat Prisma®.

Figure 1 Application of Colorcoat®

2.2 Manufacturing

The manufacturing sites included in the EPD are listed in Table 1 below.

Table 1 Participating sites

Site name	Product	Manufacturer	Country
Port Talbot	Hot rolled coil	Tata Steel	UK
Llanwern	Cold rolled coil	Tata Steel	UK
Shotton	Hot dip galvanised coil	Tata Steel	UK
Shotton	Pre-finished steel	Tata Steel	UK

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. The hot rolled coils are transported by rail, from Port Talbot to Llanwern where they are pickled and cold rolled. Following cold rolling the coil is then transported by train to Shotton where the strip is hot dip metallic coated and painted.

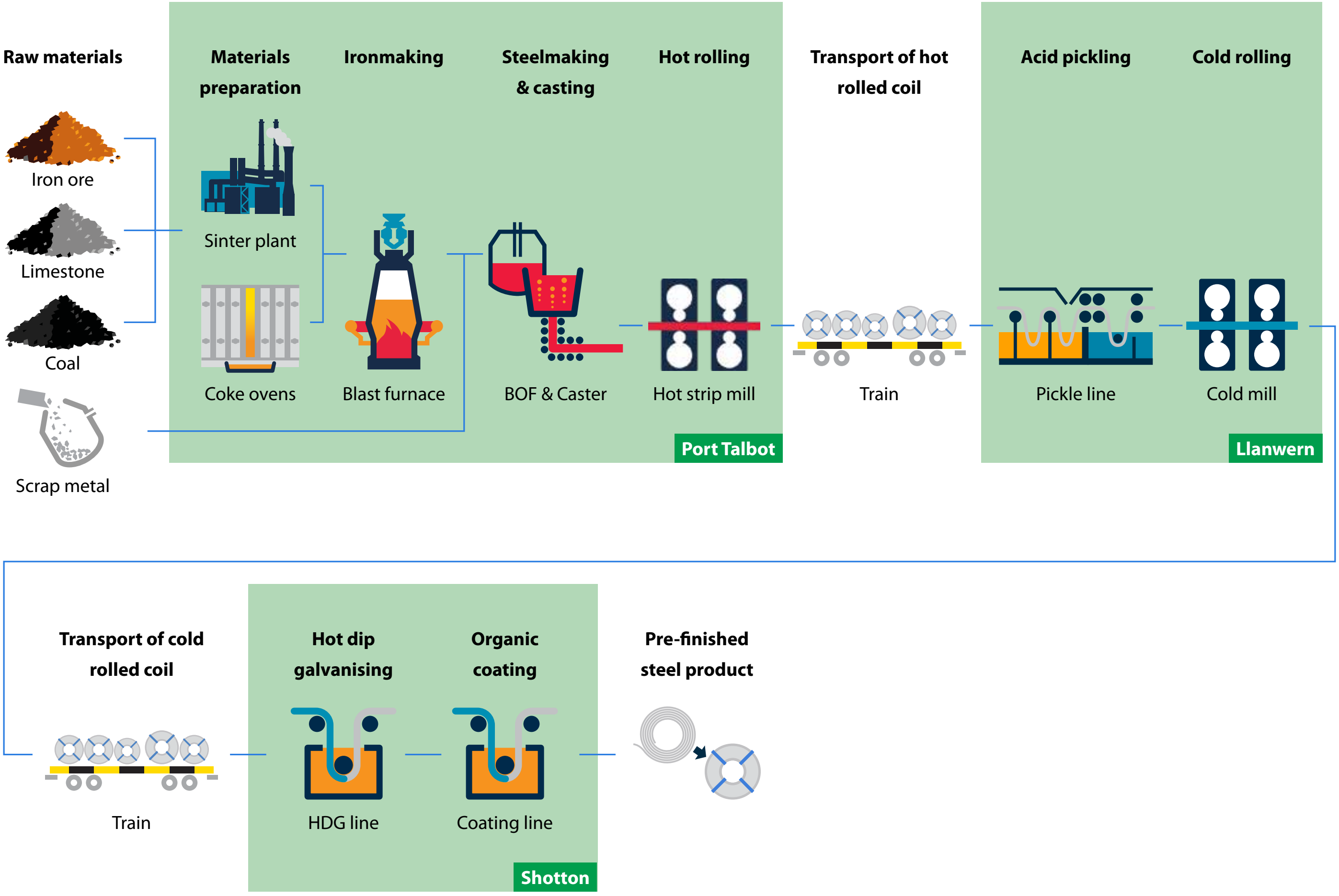
Pre-finished steel comprises a number of paint layers and treatments which are applied to the steel in an automated and carefully controlled process with each layer of the product having a particular function. It is the combined effect of all these layers that give the product its overall performance and ensures a material that is robust and offers the specifier a choice of colour and effect. During the coating process for Colorcoat® pre-finished steel, a zinc based 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 above topcoat is applied on the top 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 prior to use in the manufacture of building envelope products. The process is shown in Figure 2.

Tata Steel's Shotton plant in North Wales has been producing market leading products for over 125 years. The site launched a sustainability commitment in 2022, with four key themes of sustainable development, namely, reducing the site's carbon footprint, developing and producing products and services that support sustainable construction, protecting and expanding the biodiversity that co-exists on site, and maximising material efficiency and achieving zero onsite waste.

As part of its decarbonisation journey, the Shotton site purchases electricity from 100% renewable sources (including solar, wind, biomass and hydro) for its entire operation, in the form of Guarantees of Origin, reducing the site annual CO_2 emissions by 16%. However, to avoid the risk of double counting the benefits of renewable electricity, Tata Steel's EPD Programme does not currently permit the use of REGOs in EPDs, and so this emission reduction is not reflected in the A1-A3 environmental indicators of this EPD.

Additionally, over 70 onsite vehicles run fully on Hydrotreated Vegetable Oil (HVO) as an alternative to conventional diesel, and some onsite vehicles have been switched to fully electric. For more information on the efforts the site has made towards achieving its' sustainability commitment, see www.colorcoat-online.com

Figure 2 Process overview from raw materials to pre-finished steel



Process data for the manufacture of hot and cold rolled coil at Port Talbot and Llanwern was gathered as part of the latest worldsteel data collection. For Port Talbot and Llanwern, and Colorcoat® manufacture at Shotton, the data collection was not only organised by site, but also by each process line within the site. In this way it was possible to attribute resource use and emissions to each process line, and using processed tonnage data for that line, also attribute resources and emissions to specific products.

2.3 Technical data and specifications

The technical specifications of the product are presented in Table 2.

Table 2 Technical specification of the pre-finished steel

	Colorcoat® pre-finished steel
Metallic coating	Colorcoat® pre-finished steel is supplied with a zinc based metallic coating that conforms to EN 10346 [8]
Paint coating (organic)	All Colorcoat® pre-finished steel products are fully REACH [9] compliant and chromate free
Certification	Volatile organic compounds (VOC) against ISO 16000-9 A+ rating (Colorcoat® High Reflect and Colorcoat® SDP 50) [10] CPI5 certificates in accordance with EN 10169 [11] Certifications applicable to Tata Steel's Shotton site are; ISO 9001 [12], ISO 14001 [13], ISO 45001 [14], ISO 50001 [15] BES 6001 certification [16], BBA certification [17]

2.4 Packaging

The coils are secured with plastic strapping and loaded on timber pallets prior to despatch. Additional steel, plastic and cardboard packaging is used to protect them during delivery to the customer. The mass of this packaging is 0.25 kg of plastic banding and protection, 0.32 kg of cardboard, 1.24 kg of steel, and 0.05 kg of timber per tonne of product.

2.5 Reference service life

A reference service life for pre-finished steel is not declared because the construction application is not part of the LCA study. To determine the full service life of pre-finished steel, all factors would need to be included, such as details of the final product, and its location and environment.

2.6 Biogenic Carbon content

There are no materials containing biogenic carbon in Colorcoat® pre-finished steel products. Timber and cardboard are used to package the pre-finished coils and comprise a measurable mass of the total packaging as shown in Table 3 below.

Table 3 Biogenic carbon content at the factory gate

	Colorcoat® pre-finished steel
Biogenic carbon content (product) (kg)	0
Biogenic carbon content (packaging) (kg)	0.187

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 1 tonne of pre-finished steel.

3.2 Scope

This EPD can be regarded as Cradle-to-Gate with modules C1-C4 and module D, and the modules considered in the LCA are;

A1-A3: Production stage (Raw material supply, transport to production site, manufacturing)
C1-C4: End-of-life (Deconstruction, transport, processing for recycling & reuse and disposal)
D: Reuse, recycling and recovery

The life cycle stages are explained in more detail in Figure 3.

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 the pre-finished steel 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 contributes less than 5% to the impact assessment categories. The manufacturing of required machinery and other infrastructure is not considered in the LCA.

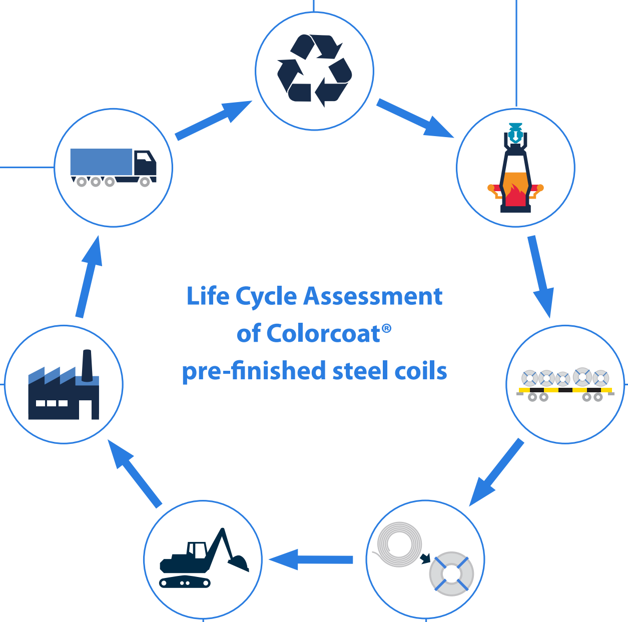
Figure 3 Life Cycle Assessment of pre-finished steel

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

Module C: End-of-life stage
Includes impacts from:
- Deconstruction of pre-finished steel products
- Transport from site to end-of-life
- Processing of pre-finished steel for reuse or recycling
- Disposal to landfill of steel (1%)

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

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



Module A1: Product stage (primary processing)
Includes impacts from;
- Raw material extraction and processing (iron ore, coal)
- Steelmaking, casting, and production of cold rolled coil at Port Talbot & Llanwern
- Preparation of recycled scrap
- Production of paints for coatings
- Responsible sourcing of materials to BES 6001 standard

Module A2: Product stage (transport)
Includes impacts from;
- Transport of cold rolled steel coils from Llanwern to Shotton

Module A3: Product stage (pre-finished coil manufacture)
Includes impacts from;
- Hot dip metallic coating at Shotton
- Organic coating of HDG coils
- Packaging of coils for delivery to customers

3.4 Background data

For life cycle modelling of the coated steel, the Sphera LCA for Experts Software System for Life Cycle Engineering (formerly GaBi) is used [18]. The LCAfE database contains consistent and documented datasets which can be viewed in the online Managed LCA Content (MLC) documentation [19].

Where possible, specific data derived from Tata Steel's own production processes were the first choice to use where available. Data were also obtained directly from the relevant suppliers, such as the paint which is used in the coating process.

To ensure comparability of results in the LCA, the basic data of the Sphera MLC 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 2022, 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 Sphera MLC, and the last revision of all but three of these data sets took place less than 10 years ago. However, the contribution to impacts of these three datasets is small and relatively insignificant, and therefore, 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 [20]. 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 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 [21]. 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).

In order to avoid allocation between different coatings produced from the same line, specific data for the manufacture of each paint type were obtained, and the mass of paint applied was considered, based upon the thickness of the coating.

3.7 Additional technical information

The main scenario assumptions used in the LCA are detailed below in Table 4. The end-of-life percentages are taken from a Tata Steel/ EUROFER recycling and reuse survey of UK demolition contractors carried out in 2012/2013 [22].

For the environmental impact indicators, the characterisation factors from the EC-JRC are applied, identified by 'EN_15804', and based upon the EF Reference Package 3.1 [23]. In LCAfE, the corresponding impact assessment is used, denoted by EN15804+A2.

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, 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.

Table 4 Main scenario assumptions

Module	Scenario assumptions
A1 to A3 – Product stage	Manufacturing data from Tata Steel's sites at Port Talbot, Llanwern and Shotton are used.
A2 – Transport to the pre-finished steel manufacturing site	The Colorcoat® manufacturing facilities are located on the Shotton site. The cold rolled steel coils are transported to Shotton by rail from Llanwern, a distance of 336km. A utilisation factor of 45% was assumed to account for empty returns.
C1 – Deconstruction & demolition	Energy consumption estimated based upon published data for the dismantling of steel constructions in Germany [24]
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.
D – Reuse, recycling, and energy recovery	At end-of-life, 89% of the steel is recycled and 10% is reused, in accordance with the findings of an NFDC survey

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 Colorcoat® pre-finished steel

Parameter	Unit	A1 – A3	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	2.71E+03	4.57E+01	3.76E+01	1.06E+01	1.49E-01	-1.66E+03
GWP-fossil	kg CO_2 eq	2.71E+03	4.79E+01	3.73E+01	1.06E+01	1.50E-01	-1.67E+03
GWP-biogenic	kg CO_2 eq	6.85E-01	-2.86E+00	-3.43E-01	-1.09E-01	-1.03E-03	8.17E+00
GWP-luluc	kg CO_2 eq	4.23E-01	7.03E-01	6.18E-01	5.11E-02	8.98E-04	-2.25E-01
ODP	kg CFC11 eq	1.37E-05	2.20E-11	5.42E-12	2.45E-10	4.04E-13	1.52E-09
AP	mol H^+ eq	7.41E+00	1.13E-01	6.28E-02	3.47E-02	1.06E-03	-4.15E+00
EP-freshwater	kg P eq	2.49E-02	1.82E-04	1.57E-04	3.73E-05	3.40E-07	-4.35E-04
EP-marine	kg N eq	1.65E+00	5.03E-02	2.46E-02	6.44E-03	2.73E-04	-7.07E-01
EP-terrestrial	mol N eq	1.70E+01	5.65E-01	2.88E-01	6.88E-02	3.01E-03	-6.53E+00
POCP	kg NMVOC eq	5.57E+00	1.63E-01	6.22E-02	1.85E-02	8.37E-04	-2.75E+00
ADP-minerals&metals	kg Sb eq	7.41E-02	3.80E-06	3.21E-06	3.87E-06	9.69E-09	-1.57E-02
ADP-fossil	MJ net calorific value	3.19E+04	5.86E+02	4.85E+02	2.18E+02	1.97E+00	-1.68E+04
WDP	m^3 world eq deprived	3.25E+03	8.54E-01	5.69E-01	2.10E+00	1.71E-02	-1.11E+02
PM	Disease incidence	ND	ND	ND	ND	ND	ND
IRP	kBq U235 eq	ND	ND	ND	ND	ND	ND
ETP-fw	CTUe	ND	ND	ND	ND	ND	ND
HTP-c	CTUh	ND	ND	ND	ND	ND	ND
HTP-nc	CTUh	ND	ND	ND	ND	ND	ND
SQP		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:

1 tonne of Colorcoat® pre-finished steel

Parameter	Unit	A1 – A3	C1	C2	C3	C4	D
PERE	MJ	4.05E+03	5.80E+01	4.17E+01	6.22E+01	3.44E-01	2.03E+02
PERM	MJ	4.86E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	4.05E+03	5.80E+01	4.17E+01	6.22E+01	3.44E-01	2.03E+02
PENRE	MJ	3.10E+04	5.86E+02	4.85E+02	2.18E+02	1.97E+00	-1.68E+04
PENRM	MJ	9.67E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	3.19E+04	5.86E+02	4.85E+02	2.18E+02	1.97E+00	-1.68E+04
SM	kg	8.08E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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	8.01E+01	6.13E-02	4.65E-02	8.96E-02	5.23E-04	-1.44E+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 = 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:

1 tonne of Colorcoat® pre-finished steel

Parameter	Unit	A1 – A3	C1	C2	C3	C4	D
HWD	kg	1.18E-01	4.28E-08	1.86E-08	2.00E-06	4.91E-10	-4.60E-03
NHWD	kg	1.02E+02	1.07E-01	7.92E-02	1.19E-01	2.00E+01	1.61E+02
RWD	kg	6.21E-01	3.35E-03	8.83E-04	2.77E-02	2.07E-05	-5.57E-02
CRU	kg	0.00E+00	0.00E+00	0.00E+00	9.99E+01	0.00E+00	0.00E+00
MFR	kg	2.37E+00	0.00E+00	0.00E+00	8.89E+02	0.00E+00	-2.43E-01
MER	kg	3.70E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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 4 shows the relative contribution per life cycle stage for each of the main environmental impact categories for 1 tonne of Tata Steel's Colorcoat® pre-finished steel. 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 all impact categories are A1-A3 (burdens) and D (benefits beyond the system boundary).

The manufacture of the cold rolled coil during stage A1-A3 is responsible for between 70% and 80% 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 manufacturing process.

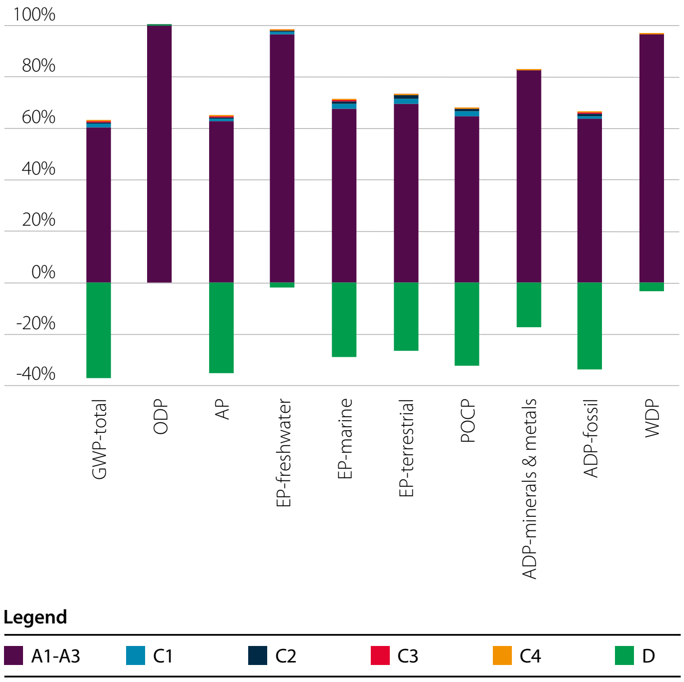
The primary site emissions come from use of coal and coke in the blast and basic oxygen furnaces, as well as combustion of the process gases. These processes give rise to emissions of CO_2, which contributes over 90% of the Global Warming Potential (GWP), and sulphur oxides, which are responsible for more than half of the impact in the Acidification Potential (AP) category. In addition, oxides of nitrogen are emitted which contribute more than a third of the A1-A3 Acidification Potential, and almost all of the Eutrophication Potential (EP) marine and terrestrial indicators, and the combined emissions of nitrogen oxides, together with those of carbon monoxide and NMVOCs, all contribute to the Photochemical Ozone indication (POCP).

Two of the indicators are almost exclusively influenced by the manufacture of the paint used in the organic coating process, namely Ozone Depletion (ODP) and the Eutrophication Potential (EP) freshwater. Emissions of halogenated organic compounds drive the ODP indication, while phosphate emissions contribute almost all of the EP-freshwater category.

Figure 4 clearly indicates the relatively small contribution to each impact from the other life cycle stages, C1, C2, C3 and C4. Of these stages, the most significant contributions are from stages C1 (deconstruction) and C2 (transport to end-of-life) in the Acidification (AP) and Eutrophication (EP) Potential indicators, mainly from emissions of nitrogen oxides (and sulphur dioxide) from the production and combustion of the diesel fuel used to power mobile plant and road transport.

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 [21]. 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 overall environmental impacts across successive uses.

Figure 4 LCA results for the pre-finished steel



Referring to the LCA results, the impact in Module D for the Use of Renewable Primary Energy indicator (PERT) is different to 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.

In addition, for the 'use of net fresh water' indicator, Module D is a benefit, but the magnitude of this benefit is greater than the impact from Modules A1-A3. This can be explained by the Module D benefit for net use of fresh water being based upon a worldsteel calculation for many steel plants worldwide. Port Talbot, the biggest water user in this study, is a relatively modest user of fresh water as reported in A1-A3. The worldwide average calculation for Module D includes many sites with considerably greater fresh water use in A1-A3 than Port Talbot.

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, V2 January 2023

4. ISO 14044:2006+A2:2020, Environmental management - Life Cycle Assessment – Requirements and guidelines

5. ISO 14025:2006, Environmental labels and declarations - Type III environmental declarations - Principles and procedures

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Tata Steel
Shotton Works
Deeside
Flintshire
CH5 2NH
United Kingdom
Colorcoat Connection® helpline
T: +44 (0) 1244 892434
E: colorcoat.connection@tatasteeleurope.com

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