



Environmental Product Declaration

Statement of Verification

CARES EPD No.: 0086

Issue 00

This is to verify that the

Environmental Product Declaration

Provided by:

Southern Steel Berhad

Is in accordance with the requirements of:

EN ISO 14025:2010 and EN 15804:2012 + A2:2019/AC2021

and CARES PCR for Type III EPD of Semi-Finished and Finished Steel Products, February 2025

This declaration is for:

Carbon Steel Wire Rod (Primary production route – Iron ore)



Company address:

2723, Lorong Perusahaan 12
Kawasan Perusahaan Bebas
Perai, 13600 Perai
Pulau Pinang
Malaysia

南達



Southern Steel



LadinCamci

Signed for CARES

30 June 2026

First Issue Date

Ladin Camci

Operator

30 June 2026

Date of this Issue

29 June 2029

Expiry Date

The validity of this Environmental Product Declaration can be verified by contacting CARES on +44 (0)1732 450 000 or visiting CARES website <https://www.carescertification.com/certification-schemes/environmental-product-declarations>.

CARES, Pembroke House, 21 Pembroke Road, Sevenoaks, Kent TN13 1XR



Environmental Product Declaration

Environmental Product Declaration

EPD Number: CARES EPD 0086

General Information

EPD Programme Operator	CARES Pembroke House, 21 Pembroke Road, Sevenoaks, Kent, TN13 1XR UK www.carescertification.com
Applicable Product Category Rules	CARES Product Category Rules (PCR) for Type III Environmental Product Declaration (EPD) of Semi-Finished and Finished Steel Products, February 2025
Commissioner of LCA study	CARES Pembroke House, 21 Pembroke Road, Sevenoaks, Kent, TN13 1XR UK www.carescertification.com
LCA consultant/Tool	CARES EPD Tool version 3.0 SPHERA SOLUTIONS UK LIMITED The Innovation Centre Warwick Technology Park, Gallows Hill, Warwick, Warwickshire CV34 6UW UK www.sphera.com
Declared/Functional Unit	1 tonne of carbon steel wire rod manufactured by the Blast Furnace/Basic Oxygen Furnace (BF/BOF) production route
Applicability/Coverage	Manufacturer-specific product produced at a single plant of one manufacturer
EPD Type	Cradle to Gate with Modules C1-C4 and Module D
Background database	MLC (GaBi) Databases 2025.1 (Sphera, 2025)

Demonstration of Verification

CEN standard EN 15804 serves as the core PCR ^a

Independent verification of the declaration and data according to EN ISO 14025:2010

☐ Internal

☒ External

(Where appropriate ^b) Third party verifier:
Dr Jane Anderson

a: Product category rules

b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)



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Comparability

Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A2:2019/AC2021. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A2:2019/AC2021 for further guidance

Information modules covered

Product Stage			Construction Stage		Use Stage							End-of-life Stage				Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse, Recovery and/or Recycling potential
✓	✓	✓	ND	ND	ND	ND	ND	ND	ND	ND	ND	✓	✓	✓	✓	✓

Note: Checks indicate the Information Modules declared.

Manufacturing site

Southern Steel Berhad
2723, Lorong Perusahaan 12 Kawasan Perusahaan, Bebas Perai
13600 Perai
Pulau Pinang
Malaysia

Construction Product:

Product Description

The product consists of hot-rolled carbon steel wire rod supplied in coil form, manufactured in accordance with the standards listed in the References section. Wire rod is a long product produced in a range of diameters and serves as feedstock for downstream cold-forming and wire-based applications such as drawn wire, welded mesh, cold-ribbed reinforcing wire, fasteners and nails. Its mechanical properties and microstructure are controlled during hot rolling and cooling to provide the ductility and consistency required for subsequent processing.

In accordance with the requirements of EN 15804+A2, it is declared that the steel wire rod and its associated packaging materials (steel wires or straps) are composed entirely of inorganic metallic substances and do not contain any biogenic carbon.

The declared unit is 1 tonne of carbon steel wire rod manufactured by Southern Steel Berhad from externally purchased billet produced via the Primary (iron-ore based, BF/BOF) route.

This EPD covers carbon steel wire rod manufactured by Southern Steel Berhad from externally purchased billet produced via the primary (iron-ore, BF/BOF) route. Southern Steel Berhad supplies wire rod derived from both primary-route billet (externally purchased BF/BOF) and secondary-route billet (in-house scrap-based, EAF); these two route combinations are declared in two separate EPDs.

The product type and production route of each item are identifiable from Southern Steel Berhad's product marking and batch-numbering system, in accordance with the product standards listed in the References section and the



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manufacturer's documented internal traceability procedure. The product type is shown on the product tag. For wire rod, the production route is identified from the 4th character (and, where applicable, the 5th) of the Wire Rod Batch Number: a numeral in the 4th position, or "J" immediately followed by a numeral in the 5th position, indicates the secondary (scrap-based) route, while any other letter in the 4th position indicates the primary (iron-ore) route.

This EPD is valid only for wire rod whose Wire Rod Batch Number has a letter in the 4th position other than "J" immediately followed by a numeral (e.g. Batch No. HQ6C182441-3, 4th character "C"). Wire rod produced via the secondary route is covered by its respective separate EPD.

Technical Information

Property	Value, Unit
Production route	EAF
Weldability (C _{eq})	As per the requirements of the wire rod product standards listed in References section of this EPD report
Yield strength	
Tensile strength	
Elongation	
Bend and/or Re-bend test	
Recycled content (as per ISO 14021:2016/Amd:2021) ²⁾	13.6

1) Technical Information details are as per relevant product standards listed in References section.

2) Recycled content is based on the weighted average of the recycled content reported in the CARES EPDs of products produced via the primary production route (iron ore) and includes internal and external scrap consumption.

Main Product Contents

Material/Chemical Input	%
Fe	97
C, Mn, Si, V, Ni, Cu, Cr, Mo and others	3

Manufacturing Process

The metallic feedstock for these products is square steel billet produced via the primary (iron-ore, BF/BOF) route and purchased by Southern Steel Berhad on the open market. In this upstream route, iron ore (as sinter and/or pellets) is reduced with metallurgical coke and fluxes in a Blast Furnace (BF) to produce hot metal, which is converted to crude steel in a Basic Oxygen Furnace (BOF), refined in a Ladle Furnace (LF), and continuously cast into billets. These steelmaking and casting operations are carried out by external billet suppliers; Southern Steel Berhad does not operate a primary (BF/BOF) steelmaking route and enters this billet into its process as a purchased product.

At Southern Steel Berhad, the purchased billets are charged into a billet reheating furnace and brought to the required rolling temperature. The heated billets are processed through the hot rolling mill, a sequence of roughing and intermediate stands followed by a high-speed wire rod finishing block, where they are progressively reduced in cross-section to the specified wire rod diameter and surface finish. On exit from the finishing block, the rod passes through a laying head that forms it into rings, which are deposited onto a controlled-cooling conveyor, where regulated air cooling develops the required microstructure and mechanical properties. The rings are gathered at the reforming station into coils.

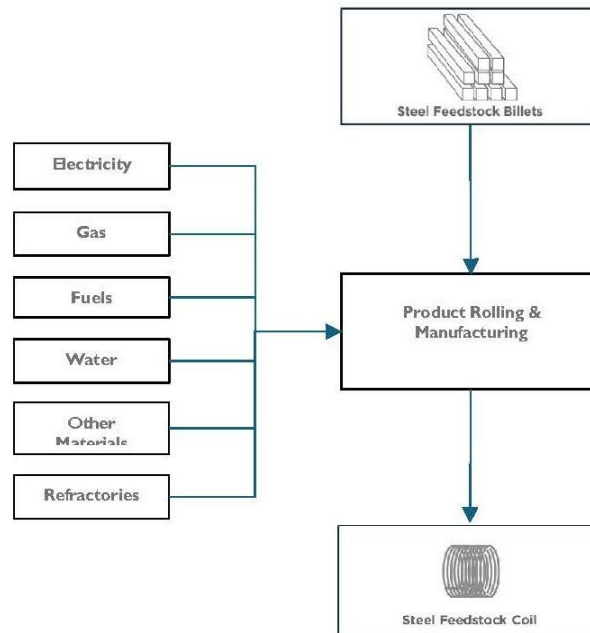
The coils are compacted and secured with steel wire or steel strap binding. Neither the wire rod products nor the binding materials contain any biogenic content.



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Process flow diagram

Steel wire rod production using steel billets from upstream suppliers



Construction Installation

Processing and proper use of reinforcing steel and other structural steel products manufactured from carbon steel wire rods depends on the application and should be made in accordance with generally accepted practices, standards and manufacturing recommendations.

During transport and storage of carbon steel wire rods and reinforcing steel and structural steel products manufactured from them the usual requirement for securing loads is to be observed.

Use Information

The composition of the reinforcing steel and other structural steel products manufactured from carbon steel wire rods does not change during use.

Carbon steel reinforcing bars and other structural steel products do not cause adverse health effects under normal conditions of use.

No risks to the environment and living organisms are known to result from the mechanical destruction of the reinforcing steel product itself.

End of Life

Reinforcing steel bars and other structural steel products manufactured from carbon steel wire rods are not reused at end of life but can be recycled to the same comparable quality of steel depending upon the metallurgy and processing of the recycling route.

A recycling rate of 92% is adopted for the primary end-of-life scenario in this EPD, with 100% landfill and 100% recycling declared as alternative scenarios per CARES PCR requirements.



Life Cycle Assessment Calculation Rules

This EPD uses the "Cut-off by Classification" method, also known as the recycled content method. It assigns the environmental impacts of primary material production to the initial user. Recyclable materials enter the recycling process without burdens, and secondary materials only bear the impacts of recycling.

This method promotes recycling by making producers responsible for waste management. It supports a circular economy by reducing the environmental impacts of primary material production.

This approach follows ISO 14040 and ISO 14044 standards for Life Cycle Assessments.

The Life Cycle Impact Assessment (LCIA) has been carried out using the characterisation method described in EN 15804+A2. For all indicators the characterisation factors from the Environmental Footprint v3.1 (EF 3.1) was applied.

Declared unit description

The declared unit is 1 tonne of carbon steel wire rod manufactured by the Blast Furnace/Basic Oxygen Furnace (BF/BOF) production route.

System boundary

The system boundary of the EPD follows the modular design defined by EN 15804+A2. Type of this EPD is Cradle to Gate with Modules C1-C4 and Module D.

Impacts and aspects related to losses/wastage (i.e. production, transport and waste processing and end-of-life stage of lost waste products and materials) are considered in the modules in which the losses/wastage occur.

Scrap is considered to reach end-of-waste after collection and processing to a defined scrap quality suitable for recycling, consistent with the applied modelling approach.

Data sources, quality and allocation

Data Sources and Quality:

Data selection and data quality evaluation were performed in accordance with BS EN 15941:2024, considering temporal, geographical and technological representativeness and prioritising specific data over generic data where available.

Data Sources:

Foreground manufacturing data for carbon steel wire rod production were provided by Southern Steel Berhad for the reference period 01/07/2024 – 30/06/2025 and are representative of the manufacturing site stated in this EPD.

Foreground data collection was carried out to meet the cut-off rules of EN 15804:2012+A2:2019/AC:2021. Foreground data were checked for completeness and plausibility, including mass balance verification, and were verified by CARES during the audit conducted in April 2026.

The manufacturing technology and key inputs are described in the Manufacturing Process section and the simplified Process Flow Diagram.

Background datasets are consistently sourced from MLC (GaBi) Databases 2025.1 (Sphera, 2025), selecting country/region-specific datasets where available and appropriate. The selection of the background data for electricity generation is in line with the CARES PCR 2025. Country or region-specific power grid mixes are selected from MLC (GaBi) Databases 2025.1 (Sphera, 2025); thus, consumption grid mix of Malaysia has been selected to suit specific manufacturing location, and also for fabrication, installation and demolishing location. The applied emission factor of carbon footprint of the applied consumption grid mix of Malaysia is 0.778 kg CO₂ eq/kWh.

Data Quality:

Data quality was assessed and reported with respect to geographical, technological and time representativeness and prioritising specific over generic data. Foreground data were site-specific and based on a continuous 12-month period (2025) and were verified during the CARES audit in April 2026. Background data are consistently sourced from MLC (GaBi) Databases 2025.1 (Sphera, 2025).

There isn't any data from different LCI/LCA databases are used considering that the overall consistency of the study is not adversely affected.



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Schemes applied for data quality assessment was as per EN 15804:2012+A2:2019, Annex E, Table E.1 — Data quality level and criteria of the UN Environment Global Guidance on LCA database development. No poor or very poor data was found during the assessment of relevant data.

Data quality level and criteria of the UN Environment Global Guidance on LCA database development:

Geographical Representativeness	: Good
Technical Representativeness	: Very good
Time Representativeness	: Good

Allocation:

Mill scale is produced as co-product from the rolling process and is traded. Environmental burdens are allocated between steel product and mill scale using economic allocation, based on market values. Mill scale revenue represents approximately 0.11% of total product revenue based on current market prices, therefore, economic allocation is applied at the processes where the co-product arises.

Steel production losses generated during manufacturing are recycled in a closed loop, offsetting the requirement for external scrap. Specific allocation approaches within background datasets follow the documentation of MLC (GaBi) Databases 2025.1 (Sphera, 2025).

Cut-off criteria

On the input side all flows entering the system and comprising more than 1% in total mass or contributing more than 1% to primary energy consumption are considered. All inputs used as well as all process-specific waste and process emissions were assessed. For this reason, material streams which were below 1% (by mass) were captured as well. In this manner the cut-off criteria according to the PCR requirements are fulfilled).

The mass of steel wire or strap used for binding the product coil is less than 1 % of the total mass of the product.



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LCA Results

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Core environmental impact indicators									
Life Cycle Stage	Impact Category		GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO ₂ eq	kg CO ₂ eq	kg CO ₂ eq	kg CO ₂ eq	kg CFC11 eq	mol H ⁺ eq	kg P eq
Product stage	Raw material supply	A1	2.09E+03	2.09E+03	2.06	1.14	7.89E-09	4.95	1.40E-03
	Transport	A2	50.6	50.4	0.060	0.107	5.04E-12	1.35	3.82E-05
	Manufacturing	A3	244	242	1.70	0.217	2.01E-10	0.733	4.64E-05
	Total (of product stage)	A1-3	2.38E+03	2.38E+03	3.82	1.46	8.10E-09	7.03	1.48E-03
Construction process stage	Transport	A4	ND	ND	ND	ND	ND	ND	ND
	Construction	A5	ND	ND	ND	ND	ND	ND	ND
Use stage	Use	B1	ND	ND	ND	ND	ND	ND	ND
	Maintenance	B2	ND	ND	ND	ND	ND	ND	ND
	Repair	B3	ND	ND	ND	ND	ND	ND	ND
	Replacement	B4	ND	ND	ND	ND	ND	ND	ND
	Refurbishment	B5	ND	ND	ND	ND	ND	ND	ND
	Operational energy use	B6	ND	ND	ND	ND	ND	ND	ND
	Operational water use	B7	ND	ND	ND	ND	ND	ND	ND
%92 Recycling / %8 Landfill Scenario									
End of life	Deconstruction, demolition	C1	2.09	2.09	8.33E-04	6.83E-05	1.62E-13	0.012	2.52E-07
	Transport	C2	48.4	47.8	0.090	0.477	5.75E-12	0.120	1.26E-04
	Waste processing	C3	0	0	0	0	0	0	0
	Disposal	C4	1.23	1.22	3.96E-05	0.005	3.40E-12	0.009	1.82E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.58E+03	-1.58E+03	0.370	-0.773	-8.08E-10	-3.64	-5.54E-04
100% Landfill Scenario									
End of life	Deconstruction, demolition	C1	2.09	2.09	8.33E-04	6.83E-05	1.62E-13	0.012	2.52E-07
	Transport	C2	2.23	2.20	0.004	0.023	2.67E-13	0.003	6.11E-06
	Waste processing	C3	0	0	0	0	0	0	0
	Disposal	C4	15.3	15.3	4.95E-04	0.063	4.25E-11	0.108	2.27E-05
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	423	422	-0.099	0.206	2.16E-10	0.971	1.48E-04
100% Recycling Scenario									
End of life	Deconstruction, demolition	C1	2.09	2.09	8.33E-04	6.83E-05	1.62E-13	0.012	2.52E-07
	Transport	C2	52.4	51.8	0.097	0.516	6.22E-12	0.131	1.36E-04
	Waste processing	C3	0	0	0	0	0	0	0
	Disposal	C4	0	0	0	0	0	0	0
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.76E+03	-1.76E+03	0.411	-0.858	-8.98E-10	-4.04	-6.15E-04

GWP-total = Global warming potential, total;
 GWP-fossil = Global warming potential, fossil;
 GWP-biogenic = Global warming potential, biogenic;
 GWP-luluc = Global warming potential, land use and land use change;

ODP = Depletion potential of the stratospheric ozone layer;
 AP = Acidification potential, accumulated exceedance; and
 EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment



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LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Core environmental impact indicators

Life Cycle Stage	Impact Category		EP-marine	EP-terrestrial	POCP	ADP-mineral & metals	ADP-fossil	WDP
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m³ world eq deprived
Product stage	Raw material supply	A1	1.21	13.1	4.14	9.10E-05	1.77E+04	24.7
	Transport	A2	0.321	3.51	0.914	1.70E-06	605	0.117
	Manufacturing	A3	0.241	2.64	0.666	8.77E-06	3.15E+03	2.29
	Total (of product stage)	A1-3	1.77	19.3	5.72	1.01E-04	2.15E+04	27.1
Construction process stage	Transport	A4	ND	ND	ND	ND	ND	ND
	Construction	A5	ND	ND	ND	ND	ND	ND
Use stage	Use	B1	ND	ND	ND	ND	ND	ND
	Maintenance	B2	ND	ND	ND	ND	ND	ND
	Repair	B3	ND	ND	ND	ND	ND	ND
	Replacement	B4	ND	ND	ND	ND	ND	ND
	Refurbishment	B5	ND	ND	ND	ND	ND	ND
	Operational energy use	B6	ND	ND	ND	ND	ND	ND
	Operational water use	B7	ND	ND	ND	ND	ND	ND
%92 Recycling / %8 Landfill Scenario								
End of life	Deconstruction, demolition	C1	4.08E-03	0.045	0.011	2.94E-08	27.7	0.016
	Transport	C2	0.054	0.580	0.129	3.15E-06	626	0.191
	Waste processing	C3	0	0	0	0	0	0
	Disposal	C4	0.002	0.025	0.007	7.57E-08	16.0	0.132
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-0.876	-9.44	-2.94	-1.57E-05	-1.20E+04	-11.1
100% Landfill Scenario								
End of life	Deconstruction, demolition	C1	4.08E-03	0.045	0.011	2.94E-08	27.7	0.016
	Transport	C2	1.40E-03	0.015	0.003	1.50E-07	28.8	0.009
	Waste processing	C3	0	0	0	0	0	0
	Disposal	C4	0.028	0.308	0.085	9.46E-07	200	1.65
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.234	2.52	0.784	4.18E-06	3.20E+03	2.97
100% Recycling Scenario								
End of life	Deconstruction, demolition	C1	4.08E-03	0.045	0.011	2.94E-08	27.7	0.016
	Transport	C2	0.058	0.630	0.140	3.41E-06	678	0.207
	Waste processing	C3	0	0	0	0	0	0
	Disposal	C4	0	0	0	0	0	0
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-0.973	-10.5	-3.27	-1.74E-05	-1.33E+04	-12.4

ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;
 ADP-fossil = Depletion potential of the stratospheric ozone layer;
 WDP = Water (user) deprivation potential, deprivation-weighted water consumption.
 The results of the three environmental impact indicators above shall be used with care as the uncertainties on these results are high or as there is limited experienced with these indicators.

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;
 EP-terrestrial = Eutrophication potential, accumulated exceedance;
 POCP = Formation potential of tropospheric ozone;
 PM = Particulate matter.



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LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts

Life Cycle Stage	Impact Category		PM	IRP	ETP-fw	HTP-c	HTP-nc	SQP
			disease incidence	kBq U ²³⁵ eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	7.20E-05	8.37	3.17E+03	2.90E-06	7.64E-06	1.06E+03
	Transport	A2	2.35E-05	0.101	516	7.58E-09	2.17E-07	59.6
	Manufacturing	A3	6.33E-06	0.062	324	6.41E-08	3.66E-06	103
	Total (of product stage)	A1-3	1.02E-04	8.53	4.01E+03	2.97E-06	1.15E-05	1.22E+03
Construction process stage	Transport	A4	ND	ND	ND	ND	ND	ND
	Construction	A5	ND	ND	ND	ND	ND	ND
Use stage	Use	B1	ND	ND	ND	ND	ND	ND
	Maintenance	B2	ND	ND	ND	ND	ND	ND
	Repair	B3	ND	ND	ND	ND	ND	ND
	Replacement	B4	ND	ND	ND	ND	ND	ND
	Refurbishment	B5	ND	ND	ND	ND	ND	ND
	Operational energy use	B6	ND	ND	ND	ND	ND	ND
	Operational water use	B7	ND	ND	ND	ND	ND	ND
%92 Recycling / %8 Landfill Scenario								
End of life	Deconstruction, demolition	C1	7.82E-08	5.77E-04	32.9	5.92E-10	7.53E-09	0.036
	Transport	C2	1.45E-06	0.113	792	1.07E-08	5.87E-07	262
	Waste processing	C3	0	0	0	0	0	0
	Disposal	C4	1.08E-07	0.019	13.8	2.13E-10	7.98E-09	3.96
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-5.37E-05	20.8	-1.87E+03	-2.52E-06	1.92E-06	972
100% Lanfill Scenario								
End of life	Deconstruction, demolition	C1	7.82E-08	5.77E-04	32.9	5.92E-10	7.53E-09	0.036
	Transport	C2	3.23E-08	0.005	37.4	5.03E-10	2.84E-08	12.8
	Waste processing	C3	0	0	0	0	0	0
	Disposal	C4	1.35E-06	0.235	173	2.67E-09	9.98E-08	49.5
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	1.43E-05	-5.56	500	6.72E-07	-5.11E-07	-259
100% Recycling Scenario								
End of life	Deconstruction, demolition	C1	7.82E-08	5.77E-04	32.9	5.92E-10	7.53E-09	0.036
	Transport	C2	1.57E-06	0.123	858	1.16E-08	6.36E-07	284
	Waste processing	C3	0	0	0	0	0	0
	Disposal	C4	0	0	0	0	0	0
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-5.96E-05	23.1	-2.08E+03	-2.80E-06	2.13E-06	1.08E+03

IRP = Potential human exposure efficiency relative to U235; This 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.

HTP-nc = Potential comparative toxic unit for humans; and
ETP-fw = Potential comparative toxic unit for ecosystems;
HTP-c = Potential comparative toxic unit for humans;
SQP = Potential soil quality index.

The results of the four environmental impact indicators above shall be used with care as the uncertainties on these results are high or as there is limited experienced with these indicators.



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LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing resource use

Life Cycle Stage	Impact Category		PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	1.05E+03	0	1.05E+03	1.77E+04	0	1.77E+04
	Transport	A2	12.0	0	12.0	605	0	605
	Manufacturing	A3	201	0	201	3.15E+03	0	3.15E+03
	Total (of product stage)	A1-3	1.26E+03	0	1.26E+03	2.15E+04	0	2.15E+04
Construction process stage	Transport	A4	ND	ND	ND	ND	ND	ND
	Construction	A5	ND	ND	ND	ND	ND	ND
Use stage	Use	B1	ND	ND	ND	ND	ND	ND
	Maintenance	B2	ND	ND	ND	ND	ND	ND
	Repair	B3	ND	ND	ND	ND	ND	ND
	Replacement	B4	ND	ND	ND	ND	ND	ND
	Refurbishment	B5	ND	ND	ND	ND	ND	ND
	Operational energy use	B6	ND	ND	ND	ND	ND	ND
	Operational water use	B7	ND	ND	ND	ND	ND	ND
%92 Recycling / %8 Landfill Scenario								
End of life	Deconstruction, demolition	C1	0.056	0	0.056	27.7	0	27.7
	Transport	C2	43.6	0	43.6	626	0	626
	Waste processing	C3	0	0	0	0	0	0
	Disposal	C4	3.09	0	3.09	16.0	0	16.0
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	1890	0	1890	-1.20E+04	0	-1.20E+04
100% Landfill Scenario								
End of life	Deconstruction, demolition	C1	0.056	0	0.056	27.7	0	27.7
	Transport	C2	2.12	0	2.12	28.8	0	28.8
	Waste processing	C3	0	0	0	0	0	0
	Disposal	C4	38.7	0	38.7	200	0	200
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-504	0	-504	3.20E+03	0	3.20E+03
100% Recycling Scenario								
End of life	Deconstruction, demolition	C1	0.056	0	0.056	27.7	0	27.7
	Transport	C2	47.2	0	47.2	678	0	678
	Waste processing	C3	0	0	0	0	0	0
	Disposal	C4	0	0	0	0	0	0
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	2.10E+03	0	2.10E+03	-1.33E+04	0	-1.33E+04

PERE = Use of renewable primary energy excluding renewable primary energy 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 resource



Environmental Product Declaration

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing resource use						
Life Cycle Stage	Impact Category		SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m³
Product stage	Raw material supply	A1	212	0	0	2.52
	Transport	A2	0	0	0	0.008
	Manufacturing	A3	0	0	0	1.06
	Total (of product stage)	A1-3	212	0	0	3.59
Construction process stage	Transport	A4	ND	ND	ND	ND
	Construction	A5	ND	ND	ND	ND
Use stage	Use	B1	ND	ND	ND	ND
	Maintenance	B2	ND	ND	ND	ND
	Repair	B3	ND	ND	ND	ND
	Replacement	B4	ND	ND	ND	ND
	Refurbishment	B5	ND	ND	ND	ND
	Operational energy use	B6	ND	ND	ND	ND
	Operational water use	B7	ND	ND	ND	ND
%92 Recycling / %8 Landfill Scenario						
End of life	Deconstruction, demolition	C1	0	0	0	4.04E-04
	Transport	C2	0	0	0	0.021
	Waste processing	C3	0	0	0	0
	Disposal	C4	0	0	0	0.004
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	1.03E+03	0	0	-0.921
100% Landfill Scenario						
End of life	Deconstruction, demolition	C1	0	0	0	4.04E-04
	Transport	C2	0	0	0	1.02E-03
	Waste processing	C3	0	0	0	0
	Disposal	C4	0	0	0	0.048
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0	0	0	0.245
100% Recycling Scenario						
End of life	Deconstruction, demolition	C1	0	0	0	4.04E-04
	Transport	C2	0	0	0	0.023
	Waste processing	C3	0	0	0	0
	Disposal	C4	0	0	0	0
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	1.12E+03	0	0	-1.02

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;

NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water



Environmental Product Declaration

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Other environmental information describing waste categories

Life Cycle Stage	Impact Category		HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	1.76E-06	26.7	0.095
	Transport	A2	2.12E-08	0.056	7.34E-04
	Manufacturing	A3	9.75E-08	1.29	0.001
	Total (of product stage)	A1-3	1.88E-06	28.0	0.096
Construction process stage	Transport	A4	ND	ND	ND
	Construction	A5	ND	ND	ND
Use stage	Use	B1	ND	ND	ND
	Maintenance	B2	ND	ND	ND
	Repair	B3	ND	ND	ND
	Replacement	B4	ND	ND	ND
	Refurbishment	B5	ND	ND	ND
	Operational energy use	B6	ND	ND	ND
	Operational water use	B7	ND	ND	ND
%92 Recycling / %8 Landfill Scenario					
End of life	Deconstruction, demolition	C1	4.71E-10	0.004	7.85E-06
	Transport	C2	2.26E-08	0.081	8.18E-04
	Waste processing	C3	0	0	0
	Disposal	C4	3.51E-09	80.1	1.70E-04
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	4.50E-06	-24.4	0.200
100% Landfill Scenario					
End of life	Deconstruction, demolition	C1	4.71E-10	0.004	7.85E-06
	Transport	C2	1.04E-09	0.004	3.80E-05
	Waste processing	C3	0	0	0
	Disposal	C4	4.38E-08	1.00E+03	0.002
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.20E-06	6.50	-0.053
100% Recycling Scenario					
End of life	Deconstruction, demolition	C1	4.71E-10	0.004	7.85E-06
	Transport	C2	2.45E-08	0.087	8.86E-04
	Waste processing	C3	0	0	0
	Disposal	C4	0	0	0
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	4.99E-06	-27.1	0.221

HWD = Hazardous waste disposed;
NHWD = Non-hazardous waste disposed;
RWD = Radioactive waste disposed



Environmental Product Declaration

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Other environmental information describing output flows – at end of life

Life Cycle Stage	Impact Category		CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	0	0	0	0	0	0
	Transport	A2	0	0	0	0	0	0
	Manufacturing	A3	0	0	0	0	0	0
	Total (of product stage)	A1-3	0	0	0	0	0	0
Construction process stage	Transport	A4	ND	ND	ND	ND	ND	ND
	Construction	A5	ND	ND	ND	ND	ND	ND
Use stage	Use	B1	ND	ND	ND	ND	ND	ND
	Maintenance	B2	ND	ND	ND	ND	ND	ND
	Repair	B3	ND	ND	ND	ND	ND	ND
	Replacement	B4	ND	ND	ND	ND	ND	ND
	Refurbishment	B5	ND	ND	ND	ND	ND	ND
	Operational energy use	B6	ND	ND	ND	ND	ND	ND
	Operational water use	B7	ND	ND	ND	ND	ND	ND
%92 Recycling / %8 Landfill Scenario								
End of life	Deconstruction, demolition	C1	0	920	0	0	0	0
	Transport	C2	0	0	0	0	0	0
	Waste processing	C3	0	0	0	0	0	0
	Disposal	C4	0	0	0	0	0	0
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0	0	0	0	0	0
100% Landfill Scenario								
End of life	Deconstruction, demolition	C1	0	0	0	0	0	0
	Transport	C2	0	0	0	0	0	0
	Waste processing	C3	0	0	0	0	0	0
	Disposal	C4	0	0	0	0	0	0
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0	0	0	0	0	0
100% Recycling Scenario								
End of life	Deconstruction, demolition	C1	0	1.00E+03	0	0	0	0
	Transport	C2	0	0	0	0	0	0
	Waste processing	C3	0	0	0	0	0	0
	Disposal	C4	0	0	0	0	0	0
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0	0	0	0	0	0

CRU = Components for reuse;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy



Environmental Product Declaration

Scenarios and additional technical information

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
Modules C1 to C4 End of life	The end-of-life stage starts when the construction product is replaced, dismantled or deconstructed from the building or construction works and does not provide any further function. The recovered steel is transported for recycling while a small portion is assumed to be unrecoverable and remains in the rubble which is sent to landfill. 92% of the reinforcing steel is assumed to be recycled and 8% is sent to landfill [STEELCONSTRUCTION.INFO 2012]. The EPD covers transport to, and end-of-life in Malaysia. Once steel scrap is generated through the deconstruction activities on the demolition site it is considered to have reached the "end of waste" state. No further processing is required so there are no impacts associated with this module. Hence no impacts are reported in module C3.		
	Waste for recycling - Recovered steel from crushed concrete	%	92
	Waste for energy recovery - Energy recovery is not considered for this study as most end-of-life steel scrap is recycled, while the remainder is landfilled	-	-
	Waste for final disposal - Unrecoverable steel lost in crushed concrete and sent to landfill	%	2
	Portion of energy assigned to rebar from energy required to demolish building, per tonne	MJ	24
	Transport to waste processing by Truck - Fuel consumption	litre/km	1.56
	Transport to waste processing by Truck – Distance	km	463
	Transport to waste processing by Truck – Capacity utilisation	%	85
	Transport to waste processing by Truck – Density of Product	kg/m ³	7850
	Transport to waste processing by Container ship - Fuel consumption	litre/km	0.0041
	Transport to waste processing by Container ship - Distance	km	158
	Transport to waste processing by Container ship – Capacity utilisation	%	50
	Transport to waste processing by Container ship – Density of Product	kg/m ³	7850
Module D	It is assumed that 92% of the steel used in the structure is recovered for recycling, while the remainder is landfilled. "Benefits and loads beyond the system boundary" (module D) accounts for the environmental benefits and loads resulting from net steel scrap that is used as raw material in the EAF or in IF and that is collected for recycling at end of life. The balance between total scrap arisings recycled from fabrication, installation and end of life and scrap consumed by the manufacturing process (internally sourced scrap is not included in this calculation). These benefits and loads are calculated by including the burdens of recycling and the benefit of avoided primary production. A large amount of net scrap is generated over the life cycle as the BF/BOF production route is primarily from virgin sources and there is a very high end of life recycling rate for this product. Benefits and loads associated with this scrap are calculated by including the burdens of recycling process and accounting for the avoided primary production. As a result, module D reports the credits associated with the scrap output. The resulting scrap credit/burden is calculated based on the global "value of scrap" approach (/worldsteel 2011).		
	Recycled Content	kg	136
	Re-used Content	kg	0
	Recovered for recycling	kg	920
	Recovered for re-use	kg	0
	Recovered for energy	kg	0



Summary, comments and additional information

Interpretation

Scrap based carbon steel wire rod product of Southern Steel Berhad is made via the Electric Arc Furnace production route. The bulk of the environmental impacts and primary energy demand is attributed to the manufacturing phase, covered by information modules A1-A3 of EN 15804:2012+A2:2019/AC2021.

The interpretation of the results has been carried out considering the methodology- and data-related assumptions and limitations declared in the EPD. This interpretation section focuses on the environmental impact categories as well as the primary energy demand indicators only.

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