Environmental Product Declaration

Statement of Verification

CARES EPD No.: 0064

Issue 01

This is to verify that the

Environmental Product Declaration

Provided by:

ÇOLAKOĞLU METALURJİ A.Ş.

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:

Hot Rolled Flat Steel (Primary production route – Iron ore)

Company address:

Rüzgarlıbahçe Mahallesi, Çam Pınarı Sokak, No: 1 İç Kapı No: 16
34805 Beykoz
İstanbul
Türkiye

Çolakoğlu Metalurji

LadinCamci	Ladin Camci	30 April 2026
Signed for CARES	Operator	Date of this Issue
30 April 2026		29 April 2029
First Issue Date		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

EPD Number: CARES EPD 0064

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 hot rolled flat steel manufactured by the primary (iron ore-based) 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)

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

Çolakoğlu Metalurji A.Ş.
Dilovası Organize Sanayi Bölgesi, 1. Kısım Göksu Caddesi
No:16 Dilovası
Kocaeli
Türkiye

Construction Product:

Product Description

This EPD covers hot rolled flat steel products manufactured by Çolakoğlu Metalurji A.Ş. The product is manufactured using purchased steel slabs produced via the primary (BF/BOF) route. The final product is available in various grades in accordance with EN 10025 or equivalent standards listed in the References section.

Hot Rolled Flat Steel Coil is produced as a feedstock for cold rolled flat steel coil and coated steel coil, but also for direct use in a variety of industrial applications including construction, hot and cold forming, gas containers, pressure vessels, steel tubes used in transport and energy pipelines.

The declared unit is 1 tonne of hot rolled flat steel product as used in a variety of constructional and industrial applications.

Products that are covered by this EPD can be traced via CARES CPR (Construction Products Regulation) Scheme traceability systems (UKCA & UKNI Marking - CE Marking) and the CARES Cloud digital platform (https://cares.cloud/) by tracking coil tags including heat, slab and coil numbers.

Technical Information

Property	Value, Unit
Production route	BF - BOF
Density	7850 kg/m^3
Modulus of elasticity	200000 N/mm^2
Weldability (C_{eq}) EN 10025-2:2004 grades S235JR, S235J0, S235J2, S275JR, S275J0, S275J2, S355JR, S355J0, S355J2; S235JRC, S235J0C, S235J2C, S275JRC, S275J0C, S275J2C and S355JRC, S355J0C, S355J2C (for product thickness≥1mm &≤26mm) EN 10025-5-2:2004 grades S355J0WP, S355J2WP (for product thickness≥1mm & ≤12mm)	max 0.35% for S235 grade series max 0.40% for S275 grade series max 0.45% for S355 grade series max 0.52% for all grades and for all thicknesses
Yield strength EN 10025-2:2004 grades S235JR, S235J0, S235J2, S275JR, S275J0, S275J2, S355JR, S355J0, S355J2; S235JRC, S235J0C, S235J2C, S275JRC, S275J0C, S275J2C and S355JRC, S355J0C, S355J2C (for product thickness ≥1mm & ≤16mm and for thickness >16mm & ≤26mm) EN 10025-5:2004 grades S355J0WP, S355J2WP (for product thickness≥1mm & ≤12mm)	225 to 235 N/mm^2 for S235 grade series 265 to 275 N/mm^2 for S275 grade series 345 to 355 N/mm^2 for S355 grade series min 355 N/mm^2 for S355J0WP, S355J2WP
Tensile strength EN 10025-2:2004 grades S235JR, S235J0, S235J2, S275JR, S275J0, S275J2, S355JR, S355J0, S355J2; S235JRC, S235J0C, S235J2C, S275JRC, S275J0C, S275J2C and S355JRC, S355J0C, S355J2C (for product thickness ≥1mm & <3mm and for thickness ≥3mm & ≤26mm) EN 10025-5-2:2004 grades S355J0WP, S355J2WP (for product thickness<3mm and for thickness ≥3mm & ≤26mm)	360 to 510 N/mm^2 for S235 grade series 410 to 580 N/mm^2 for S275 grade series 470 to 680 N/mm^2 for S355 grade series 470-680 N/mm^2 for S355J0WP, S355J2WP
%Elongation EN 10025-2:2004 grades S235JR, S235J0, S235J2, S275JR, S275J0, S275J2, S355JR, S355J0, S355J2; S235JRC, S235J0C, S235J2C, S275JRC, S275J0C, S275J2C and S355JRC, S355J0C, S355J2C (longitudinal test piece L_0=80 mm for thickness 1mm & <3mm and longitudinal test piece $L_0=5.65\sqrt{S_0}$ mm for thickness ≥3mm & ≤26mm) EN 10025-5-2:2004 grades S355J0WP, S355J2WP (min, longitudinal test piece L_0=80 mm for thickness >1.5mm & <3mm; longitudinal test piece $L_0=5.65\sqrt{S_0}$ mm for thickness ≥3mm & ≤26mm)	min 17 to min 26% for S235 grade series min 15 to min 23% for S275 grade series min 14 to min 22% for S355 grade series min 16 to min 22 for S355J0WP, S355J2WP
Impact Strength KV longitudinal EN 10025-2:2004 grades S235JR, S235J0, S235J2, S275JR, S275J0, S275J2, S355JR, S355J0, S355J2; S235JRC, S235J0C, S235J2C, S275JRC, S275J0C, S275J2C and S355JRC, S355J0C, S355J2C EN 10025-5-2:2004 grades S355J0WP, S355J2WP	min 27J at 20˚C for all JR types min 27J at 0˚C for all J0 types min 27J at -20˚C for all J2 types min 27J at 0˚C for S355J0WP min 27J at -20˚C for S355J2WP
Recycled content (as per ISO 14021:2016/Amd:2021)	13.6[2)]

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

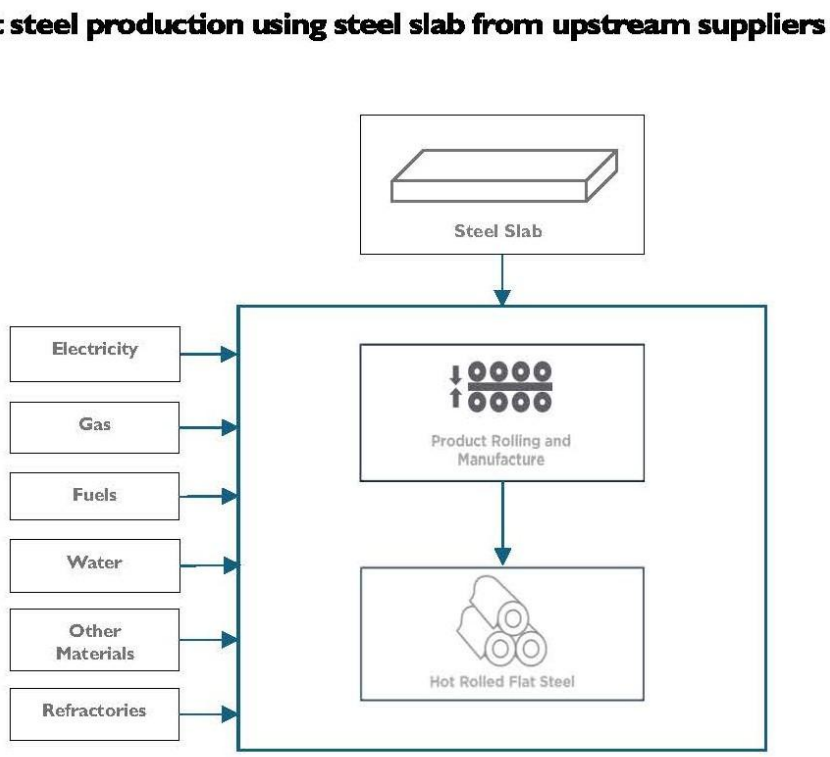
Manufacturing Process

The manufacturing process begins with the receipt of steel slabs produced via the integrated (BF/BOF) manufacturing route. These slabs are charged into a natural gas-fired reheating furnace to reach the optimal rolling temperature.

Once heated, the slabs pass through a series of roughing and finishing rolling stands, where they are progressively reduced to the target thickness and width. The steel is then cooled via controlled water laminas and wound into Hot Rolled Coils (HRC). Final steps include quality testing, dimensional inspection, and bundling with steel straps for dispatch.

Hot rolled flat steel products are packaged by binding with steel straps. Neither the products nor the packaging straps contain any biogenic materials.

Process flow diagram



Construction Installation

Processing and proper use of hot rolled flat steel products depends on the application and should be made in accordance with generally accepted practices, standards and manufacturing recommendations.

During transport and storage of reinforcing steel products the usual requirement for securing loads is to be observed.

Use Information

The composition of the hot rolled flat steel products does not change during use.

Hot rolled flat 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 hot rolled flat steel product itself.

End of Life

Hot rolled flat steel products are not reused at end of life but can be recycled to the same (or higher/lower) quality of steel depending upon the metallurgy and processing of the recycling route.

It is a high value resource, so efforts are made to recycle steel scrap rather than disposing of it at EoL. A recycling rate of 92% is typical for reinforcing steel products

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

1 tonne of hot rolled flat steel product manufactured by the primary (iron ore-based) 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.

Once steel scrap has been collected for recycling it is considered to have reached the end of waste state.

Data sources, quality and allocation

Data Sources and Quality:

The selection of data and the data quality requirements have been provided according to the requirements of BS EN 15941:2024.

Data Sources: Manufacturing data of the hot rolled flat steel products covering the period 01/01/2025 - 31/12/2025 has been provided by Çolakoğlu Metalurji A.Ş. operating on the geographical area noted in Manufacturing Site. A brief description of technology and inputs for the product is given in Manufacturing Process and in simplified Process Flow Diagram.

The primary data collection was thorough, considering all relevant flows and these data were verified by CARES, including also the verification of mass balance, to ensure that data for all the inputs and outputs for the process over the period of data collection have been collected, and that the unit process data will comply with the cut-off rules of EN 15804:2012+A2:2019/AC2021. The EPD covers transport to, and end-of-life in Türkiye.

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 Türkiye has been selected to suit specific manufacturing location, and also dismantling and demolishing location. The emission factor of carbon footprint of the applied consumption grid mix of Türkiye is 0.559 kg CO_2 eq/kWh.

Data Quality: Background data is consistently sourced from the MLC (GaBi) Databases 2025.1 (Sphera, 2025). The primary data collection was thorough, considering all relevant flows and these data have been verified during the audit conducted by CARES in March 2026.

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

Schemes applied for data quality assessment was as per EN 15804:2012+A2:2019/AC2021, 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 0.22% of total product revenue based on current market prices, therefore, economic allocation is applied at the processes where the co-product arises.

Production losses of steel during the production process are recycled in a closed loop offsetting the requirement for external scrap. Specific information on allocation within the background data is given in the 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 bundle is less than 1 % of the total mass of the product.

LCA Results

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

Core environmental impact indicators									
Life Cycle Stage	Impact Category		GWP-total kg CO_2 eq	GWP-fossil kg CO_2 eq	GWP-biogenic kg CO_2 eq	GWP-luluc kg CO_2 eq	ODP kg CFC11 eq	AP mol H^+ eq	EP-freshwater Kg P eq
Product stage	Raw material supply	A1	2.06E+03	2.05E+03	2.52	1.15	7.82E-09	4.88	1.37E-03
	Transport	A2	137	136	0.138	0.009	1.29E-11	4.50	3.60E-05
	Manufacturing	A3	142	141	0.323	0.142	4.63E-10	0.227	5.27E-05
	Total (of product stage)	A1-3	2.34E+03	2.33E+03	2.98	1.30	8.30E-09	9.61	1.46E-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	2.24	2.24	2.48E-03	8.43E-05	2.35E-13	0.005	4.05E-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	-1.37E+03	-1.37E+03	0.321	-0.670	-7.00E-10	-3.16	-4.80E-04
100% Landfill Scenario									
End of life	Deconstruction, demolition	C1	2.24	2.24	2.48E-03	8.43E-05	2.35E-13	0.005	4.05E-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	419	419	-0.098	0.204	2.14E-10	0.964	1.46E-04
100% Recycling Scenario									
End of life	Deconstruction, demolition	C1	2.24	2.24	2.48E-03	8.43E-05	2.35E-13	0.005	4.05E-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	-1.53E+03	-1.53E+03	0.357	-0.746	-7.80E-10	-3.52	-5.34E-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

LCA Results

(ND = 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	m^3 world eq deprived
Product stage	Raw material supply	A1	1.19	12.9	4.06	8.98E-05	1.75E+04	33.3
	Transport	A2	1.06	11.6	3.03	3.44E-06	1.60E+03	0.255
	Manufacturing	A3	0.055	0.71	0.154	5.72E-06	1.99E+03	33.5
	Total (of product stage)	A1-3	2.31	25.2	7.24	9.90E-05	2.11E+04	6.71E+01
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	2.03E-03	0.022	0.006	6.18E-08	28.8	0.006
	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	-0.759	-8.18	-2.55	-1.36E-05	-1.04E+04	-9.65
100% Landfill Scenario								
End of life	Deconstruction, demolition	C1	2.03E-03	0.022	0.006	6.18E-08	28.8	0.006
	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	0.23	2.5	0.778	4.15E-06	3.18E+03	2.94
100% Recycling Scenario								
End of life	Deconstruction, demolition	C1	2.03E-03	0.022	0.006	6.18E-08	28.8	0.006
	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	-0.846	-9.11	-2.84	-1.51E-05	-1.16E+04	-10.7

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.

LCA Results

(ND = 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	7.17E-05	8.19	3.35E+03	2.85E-06	7.51E-06	1.05E+03
	Transport	A2	7.86E-05	0.260	1.17E+03	1.79E-08	3.00E-07	6.74
	Manufacturing	A3	3.49E-06	0.140	1.01E+03	1.76E-08	2.95E-07	131
	Total (of product stage)	A1-3	1.54E-04	8.59	5.53E+03	2.89E-06	8.11E-06	1.19E+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	2.92E-08	4.55E-03	21.1	4.89E-10	5.4E-09	0.084
	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	-4.65E-05	18.1	-1620	-2.19E-06	1.66E-06	842
100% Landfill Scenario								
End of life	Deconstruction, demolition	C1	2.92E-08	4.55E-03	21.1	4.89E-10	5.40E-09	0.084
	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	1.42E-05	-5.5	4.96E+02	6.67E-07	-5.07E-07	-2.57E+02
100% Recycling Scenario								
End of life	Deconstruction, demolition	C1	2.92E-08	4.55E-03	21.1	4.89E-10	5.40E-09	0.084
	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	-5.18E-05	20.1	-1810	-2.43E-06	1.85E-06	938

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.

LCA Results

(ND = 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	1.14E+03	0	1.14E+03	1.75E+04	0	1.75E+04
	Transport	A2	8.30	0	8.30	1.60E+03	0	1.60E+03
	Manufacturing	A3	448	0	448	1.99E+03	0	1.99E+03
	Total (of product stage)	A1-3	1.60E+03	0	1.60E+03	2.11E+04	0	2.11E+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	0.144	0	0.144	28.8	0	28.8
	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	1.64E+03	0	1.64E+03	-1.04E+04	0	-1.04E+04
100% Landfill Scenario								
End of life	Deconstruction, demolition	C1	0.144	0	0.144	28.8	0	28.8
	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	-500	0	-500	3.18E+03	0	3.18E+03
100% Recycling Scenario								
End of life	Deconstruction, demolition	C1	0.144	0	0.144	28.8	0	28.8
	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	1.83E+03	0	1.83E+03	-1.16E+04	0	-1.16E+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

LCA Results

(ND = 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	m^3
Product stage	Raw material supply	A1	207	0	0	2.63
	Transport	A2	0	0	0	0.010
	Manufacturing	A3	0	0	0	0.845
	Total (of product stage)	A1-3	207	0	0	3.48
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	2.15E-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	920	0	0	-0.798
100% Landfill Scenario						
End of life	Deconstruction, demolition	C1	0	0	0	2.15E-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	0.243
100% Recycling Scenario						
End of life	Deconstruction, demolition	C1	0	0	0	2.15E-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	1.00E+03	0	0	-0.888

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

LCA Results

(ND = 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	1.86E-06	26.2	0.093
	Transport	A2	5.55E-08	0.129	1.90E-03
	Manufacturing	A3	5.28E-07	0.703	0.002
	Total (of product stage)	A1-3	2.44E-06	27.0	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	1.00E-09	0.006	3.35E-05
	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	3.90E-06	-21.1	0.173
100% Landfill Scenario					
End of life	Deconstruction, demolition	C1	1.00E-09	0.006	3.35E-05
	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	-1.19E-06	6.45	-0.053
100% Recycling Scenario					
End of life	Deconstruction, demolition	C1	1.00E-09	0.006	3.35E-05
	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	4.34E-06	-23.5	0.192

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

LCA Results

(ND = 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	0	0	0	0	0	0
	Construction	A5	0	0	0	0	0	0
Use stage	Use	B1	0	0	0	0	0	0
	Maintenance	B2	0	0	0	0	0	0
	Repair	B3	0	0	0	0	0	0
	Replacement	B4	0	0	0	0	0	0
	Refurbishment	B5	0	0	0	0	0	0
	Operational energy use	B6	0	0	0	0	0	0
	Operational water use	B7	0	0	0	0	0	0
%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

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 constructional 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 Türkiye. 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	%	8
	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	%	61
	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	%	53
	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 steel plant and that is collected for recycling at end of life. The balance between total scrap arisings recycled from processing, 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 primary production route (with BF/BOF) 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

Iron ore based hot rolled flat steel product of Çolakoğlu Metalurji A.Ş. is made by using feedstock slab manufactured via the Blast Furnace- BOF 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.

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