



ENVIRONMENTAL PRODUCT DECLARATION

Hot rolled coil

Industrial Estate Lot 6293 & 6294,
Kemaman, Terengganu, Malaysia

In accordance with ISO 14025 and EN 15804:2012+A2:2019

Program Operator	EPDItaly
Publisher	EPDItaly

Declaration Number	EC-EPD-31- 2026-0007
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Valid to	26/ 03/ 2031



EPD OWNER

Name of the company	Eastern Steel Sdn. Bhd. (ESSB)
Registered office	Industrial Estate Lot 6293 & 6294, Kemaman, Terengganu, Malaysia
Contacts for information on the EPD	Ziwei Lin, mandylim@ejianlong.com

PROGRAM OPERATOR

EPDItaly	Via Gaetano De Castillia n° 10 - 20124 Milano, Italy
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INFORMATION ON THE EPD

Product name (s)	Hot rolled coil
Site (s)	Industrial Estate Lot 6293 & 6294, Kemaman, Terengganu, Malaysia
Short description and technical information of the product (s)	Hot Rolled Coil is a fundamental steel product manufactured by rolling heated slabs at high temperatures. It is produced through an integrated process from ironmaking and steelmaking to continuous casting and rolling. As a versatile industrial material, hot rolled coil serves as a primary raw material for numerous downstream sectors. It is widely used in construction, automotive manufacturing, machinery, shipbuilding, and pipe production, often being further processed into steel plates, sections, or cold-rolled substrates.
Field of application of the product (s)	Construction, automotive manufacturing, machinery, shipbuilding, and pipe production
Product (s) reference standards (if any)	SAE J 403 JIS G 3131
CPC Code (number) https://unstats.un.org/unsd/classifications/Econ	UN CPC 4121

VERIFICATION INFORMATION

PCR (title, version, date of publication or update)	CEN standard EN 15804 serves as the Core Product Category Rules (PCR) PCR for Construction products: ICMQ-001/15 rev 3.2 (according to EN 15804+A2). Publication at 03/11/2025
EPDItaly Regulation (version, date of publication or update)	EPDItaly Regulations Rev 6.0 Issue date: 30/10/2023
Project Report LCA	Life cycle assessment of hot rolled products for ESSB Ver. 1.2 Release date: 13/03/2026
Independent Verification Statement	The PCR review was performed by ICMQ S.p.A. - info@epditaly.it. Independent verification of the declaration and data, carried out according to ISO 14025: 2010. Internal ☒ External Third party verification carried out by: ICMQ S.p.A., via Gaetano De Castillia n° 10 - 20124 Milan, Italy.

	Accredited by Accredia.
Comparability Statement	Environmental statements published within the same product category, but from different programs, may not be comparable. In particular, EPDs of construction products may not be comparable if they do not comply with EN 15804: 2012 + A2: 2019.
Liability Statement	The EPD Owner releases EPDIItaly from any non-compliance with environmental legislation. The holder of the declaration will be responsible for the information and supporting evidence. EPDIItaly disclaims any responsibility for the information, data and results provided by the EPD Owner for life cycle assessment.

COMPANY INFORMATION

Description of the organisation:	Eastern Steel Sdn. Bhd. is a major steel producer located in Kemaman, Terengganu, Malaysia, on the east coast of Peninsular Malaysia. It was established in 2001 as a joint venture between Hiap Teck Venture Berhad, one of Malaysia's leading steel companies, and Beijing Jianlong Heavy Industry Group from China. This integrated steel mill covers various processes such as coke production, sintering, iron and steel making, ferroalloy manufacturing, and power generation. The company operates on a large industrial land spanning over 1,200 acres and has a significant annual production capacity. Key outputs include 2.7 million metric tons of steel billets and slabs, along with ferroalloys and pig iron. Eastern Steel serves markets across Southeast Asia, including Malaysia, Thailand, Indonesia, and Vietnam, with its products widely used in industries such as construction, shipbuilding, and machinery manufacturing. In recent years, Eastern Steel has expanded its production capabilities through significant investments, reflecting growth in both revenue and profit margins
Name and location of production site:	Industrial Estate Lot 6293 & 6294, Kemaman, Terengganu, Malaysia

PRODUCT INFORMATION

Product name:	Hot rolled coil
Product identification:	Hot Rolled Coil is a fundamental steel product manufactured by rolling heated slabs at high temperatures. The main production process includes coking, sintering, blast furnace, converter, refining, continuous casting, and hot rolling.
Product features:	The hot rolled coils have a nominal thickness of 1.2 to 6.0 mm, with widths ranging from 800 to 1350 mm.
Product description:	Hot Rolled Coil is a fundamental steel product manufactured by rolling heated slabs at high temperatures. It is produced through an integrated

process from ironmaking and steelmaking to continuous casting and rolling.As a versatile industrial material, hot rolled coil serves as a primary raw material for numerous downstream sectors. It is widely used in construction, automotive manufacturing, machinery, shipbuilding, and pipe production, often being further processed into steel plates, sections, or cold-rolled substrates.

Product composition information:	
Composition	Hot rolled coil
C	≤ 0.07%
Mn	0.20%-0.35%
Si	≤ 0.03%
P	≤ 0.020%
S	≤ 0.020%
Al	0.020%-0.060%
Fe	99.45%-99.67%

GENERAL INFORMATION

LCA information

LCA report: Life cycle assessment of hot rolled products for ESSB Ver. 1.2

Software: Steel LCA Tool Ver. 1.4, August 28, 2025 - Qualified LCA Tool

LCA practitioner: Yuki, Zhao, E-c digital, zhaoyq@ecdigital.com; Yiyang Zhou, E-c digital, zhouyy@ecdigit.com

Declared unit: 1metric ton of hot rolled coil produced in Malaysia

Time representativeness: Primary data covers a period of 01.01.2025 to 31.12.2025, with all secondary data used <3 years difference to year of study.

Type of EPD: EPD of hot rolled coil, based on the average results of the product group.

Description of system boundaries: The system boundary of this LCA study covers the cradle to gate stage (A1 to A3) plus end-of-life (C1-C4) and benefits and loads beyond the system boundary (D), because other life cycle stages are dependent on scenarios and are better developed for specific building or construction works.

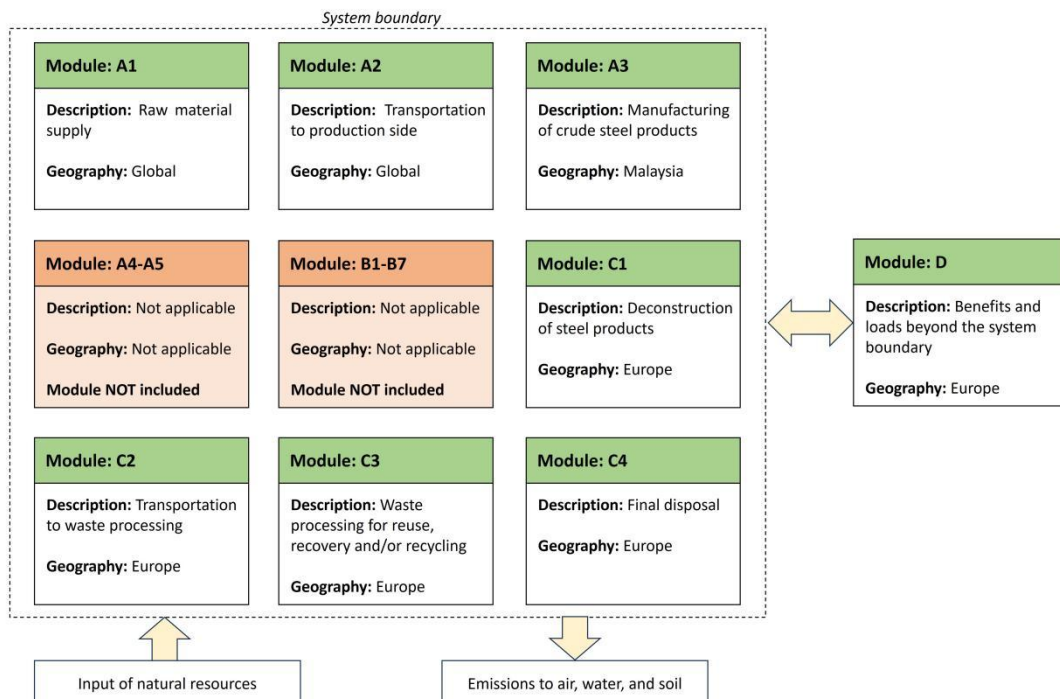


Figure 1: System boundary

Product system description:

ESSB produce hot rolled products for use in the construction industry. In this EPD, the system boundary was defined as cradle-to-gate (modules A1-A3) with options C1-C4 plus module D as described below and presented in the process flow in Figure 1 above:

- A1 raw materials supply: This stage includes the extraction or production of purchased raw materials (e.g., iron concentrate, pellet ore, iron ore), purchased energy (e.g., coal, coke), and auxiliary materials (e.g., limestone, alloys). The carbon footprint of purchased electricity (GWP100) is 0.8128 kg CO₂-eq/kWh.
- A2 transportation: All raw materials, including iron ore and limestone, are transported to the ESSB site via road and sea routes.
- A3 manufacturing: This stage encompasses the production processes within the ESSB production system, which is divided into the main production system and the energy production system. The main production system includes steel-making processes such as sintering, coking, blast furnace, converter, continuous casting and hot rolling. The energy production system covers processes like desalinated water production, self-generated power systems. The carbon footprint of mixed electricity (GWP100) is 1.53 kg CO₂-eq/kWh.
- C1-C3 end of life: At end of life, the building is deconstructed, with assumptions and scenario analysis outlined in Table 1. Scrap steel reinforcement mesh from demolition is sorted and waste processing in module C3 is modelled by background data “treatment of waste reinforcement steel, sorting plant” from Ecoinvent 3.10 database.

Table 1: Scenario and additional technical information of end-of-life stage

Scenario	Parameter	Value	Unit
C1	Energy required for deconstruction, diesel	24	MJ
C2	Transport to waste processing by Truck	50	km
C3	Background data: treatment of waste reinforcement steel, sorting plant	-	-
C4	Waste for recycling - Recovered steel from crushed concrete	92	%
	Waste for final disposal - sent to landfill	8	%

- D benefits and loads: Benefits and loads are assigned to the net scrap steel generated over the product lifecycle, calculated by the difference between end-of-life recycled scrap and scrap input in manufacturing. These are based on the recycling burdens and the benefits of avoided primary production.

Goal of study:

The goal of this study was to create an environmental profile for reporting in an EPD of the hot rolled products, aimed at better understanding its life-cycle environmental impacts.

Intended use:

This LCA study enables ESSB to assess the relative environmental impact contributions of all processes within the product lifecycle. Consequently, it provides insights into the environmental impact distribution across the product system under investigation, helping to pinpoint critical areas where targeted mitigation measures can be implemented.

Allocation:

Allocation, as defined in EN 15804, involves dividing input or output flows between multiple product systems. In this study, allocation is minimized by subdividing processes and collecting specific data for each sub-process. Where process division is possible but data are unavailable, inputs and outputs are distributed to reflect the physical relationships between products, based on how inputs and outputs change with product quantity.

For joint co-production processes that cannot be subdivided, allocation reflects the primary purpose of the process. When co-products differ by $\leq 25\%$ in revenue, allocation is based on physical properties (e.g., mass, volume); otherwise, economic value is used. Flows with inherent properties, such as energy content, are allocated according to physical flows regardless of economic considerations.

For ESSB's hot rolled coil, co-products like blast furnace slag, liquid argon, and nitrogen, considered end-of-waste, are allocated using economic value from the Ecoinvent database and ESSB.

Cut-off criteria:

The exclusion of inputs and outputs followed these guidelines:

All available data for a unit process are included; any data gaps are conservatively estimated with average or generic data, with assumptions fully documented.

For incomplete data, per EN 15804, cut-off criteria allow for excluding up to 1% of renewable/non-renewable primary energy use and 1% of total mass per unit process. Neglected input flows per module (e.g., A1-A3, C1-C4, D) are limited to 5% of energy use and mass.

Particular care is taken to include materials or processes with potential significant emissions across declared LCIA categories.

Data Quality:

Data quality has been assessed and validated during data collection process.

Data quality requirements followed those of ISO 14040/44, EN 15804:2012+A2:2019 and PCR for Construction products: ICMQ-001/15 rev 3.2 (according to EN 15804+A2). To ensure the quality of data was sufficient data quality checks were completed on key data parameters by data quality indicators using a data quality matrix and assigning scores between 1 (best) and 5 (worst). The range of scores for primary and secondary data used in this study can be summarized as:

- Temporal representativeness: Excellent
- Technological representativeness: Very good
- Geographical representativeness: Very good
- Precision: Very good

Database(s) and LCA software used:

Secondary data are from the Ecoinvent v3.10, cut-off by classification. The LCA model was developed with "Steel LCA Tool" version 1.4 of 28.08.2025, developed by EC Digital and verified by ICMQ.

Life cycle impact assessment method (LCIA):

This study applies the EF 3.1 impact assessment methods. EF 3.1 characterization factors are considered to be the most robust and up-to-date available for the European context, are widely used and respected within the

LCA community, and are required for Product Environmental Footprint studies and Environmental Product Declarations under EN 15804+A2.

Table 2 Modules declared in the LCA research of hot rolled products

Included modules in the life cycle assessment	Product Stage	X	A1	Raw material supply
		X	A2	Transport
		X	A3	Manufacturing
	Construction Stage	MND	A4	Transport from the gate to the site
		MND	A5	Assembly
	Use Stage	MND	B1	Use
		MND	B2	Maintenance
		MND	B3	Repair
		MND	B4	Replacement
		MND	B5	Refurbishment
		MND	B6	Operational energy use
		MND	B7	Operational water use
	End of Life Stage	X	C1	De-construction demolition
		X	C2	Transport
		X	C3	Waste processing
		X	C4	Disposal
	Benefits and loads beyond the product system boundary	X	D	Reuse-Recovery-Recycling potential
Note: X=Declared Module, MND=Module not Declared in this LCA study				

Environmental performance:

Table 3 Results of environmental impacts by stage (1 metric ton of hot rolle products)

Imp act indic ators	Unit	Product stage				De- constructi on demolitio n	Transport	Waste process	Disposal	Reuse- Recovery- Recycling potential
		A1	A2	A3	A1:A3	C1	C2	C3	C4	D
<i>GWP</i>	kg CO2 eq	3.22E+02	1.87E+02	2.08E+03	2.59E+03	2.41E+00	9.51E+00	6.56E+01	5.01E-01	-1.13E+03
<i>GWP , b</i>	kg CO2 eq	-9.27E+00	-5.15E-02	1.76E-01	-9.15E+00	2.40E-04	6.25E-03	9.38E-03	5.18E-05	3.38E+00
<i>GWP , f</i>	kg CO2 eq	3.31E+02	1.87E+02	2.08E+03	2.60E+03	2.40E+00	9.50E+00	6.56E+01	5.00E-01	-1.13E+03
<i>GWP , ghg</i>	kg CO2 eq	3.32E+02	1.87E+02	2.08E+03	2.60E+03	2.41E+00	9.50E+00	6.56E+01	5.01E-01	-1.13E+03
<i>GWP , luluc</i>	kg CO2 eq	3.61E-01	9.46E-02	2.38E-02	4.79E-01	2.09E-04	3.16E-03	9.19E-03	2.60E-04	-7.58E-02
<i>ODP</i>	kg CFC- 11 eq	2.44E-06	2.70E-06	9.18E-07	6.06E-06	3.66E-08	1.87E-07	9.70E-07	1.44E-08	-4.16E-06
<i>AP</i>	mol H+ eq	2.05E+00	4.67E+00	6.72E-01	7.39E+00	2.17E-02	1.98E-02	5.81E-01	3.54E-03	-4.56E+00
<i>EP, f</i>	kg P eq	8.26E-01	7.43E-03	9.09E-03	8.43E-01	7.00E-05	6.43E-04	3.09E-03	4.15E-05	-4.84E-01
<i>EP, m</i>	kg N eq	6.11E-01	1.17E+00	4.18E-02	1.82E+00	1.01E-02	4.75E-03	2.66E-01	1.35E-03	-1.02E+00
<i>EP, t</i>	mol N eq	5.44E+00	1.29E+01	4.62E-01	1.88E+01	1.10E-01	5.13E-02	2.91E+00	1.47E-02	-1.12E+01
<i>POC P</i>	kg NMVO C eq	1.49E+00	3.56E+00	2.67E-01	5.32E+00	3.29E-02	3.29E-02	8.66E-01	5.28E-03	-3.79E+00
<i>ADP E*</i>	kg Sb eq	4.99E-04	2.41E-04	9.27E-05	8.32E-04	8.62E-07	3.16E-05	3.84E-05	7.94E-07	-1.09E-02
<i>ADP F*</i>	MJ, net calorific value	1.77E+04	2.37E+03	5.02E+02	2.06E+04	3.15E+01	1.34E+02	8.57E+02	1.23E+01	-1.04E+04
<i>WDP *</i>	m3 world eq. deprived	5.89E+01	7.42E+00	2.73E+02	3.39E+02	7.70E-02	6.53E-01	2.63E+00	3.43E-02	-2.69E+02
<i>PM</i>	Disease incidenc e	6.09E-05	7.69E-06	8.75E-05	1.56E-04	6.16E-07	6.99E-07	1.62E-05	8.06E-08	-7.83E-05
<i>IRP</i>	kBq U235 eq	6.87E+00	1.27E+00	1.90E+00	1.00E+01	1.41E-02	1.73E-01	7.42E-01	7.82E-03	4.04E+01
<i>ETP- fw</i>	CTUe	6.08E+04	4.37E+02	3.70E+02	6.16E+04	4.46E+00	3.64E+01	1.25E+02	1.68E+00	-8.67E+04
<i>HTP- c</i>	CTUh	2.21E-04	8.13E-07	1.52E-07	2.22E-04	9.39E-09	6.75E-08	2.51E-07	2.25E-09	-3.27E-04
<i>HTP- nc</i>	CTUh	5.35E-06	7.92E-07	1.63E-06	7.77E-06	4.27E-09	8.65E-08	1.38E-07	2.20E-09	-1.67E-05
<i>SQP</i>	dimensi onless	3.59E+03	6.10E+02	1.13E+02	4.31E+03	2.20E+00	8.07E+01	7.88E+01	2.41E+01	-3.33E+03

Acronyms

<i>GWP</i>	Climate change: global warming potential, total (GWP100)	<i>POCP</i>	Formation potential of tropospheric ozone
<i>GWP, f</i>	Climate change: global warming potential, fossil (GWP100)	<i>ADPE</i>	Abiotic depletion potential for non-fossil resources: minerals & metals

GWP, b	Climate change: global warming potential, biogenic (GWP100)	$ADPF$	Abiotic depletion potential for fossil resources
$GWP, luluc$	Climate change: land use and land use change-global warming potential (GWP100)	WDP	Water (user) deprivation potential, deprivation-weighted water consumption
GWP, ghg	Climate change: global warming potential, excluding biogenic uptake, emission and storage (GWP100)	PM	Potential incidence of disease due to PM emissions
ODP	Ozone depletion potential	IRP	Ionizing radiation, potential human exposure efficiency relative to U235
AP	Acidification potential, Accumulate Exceedance	ETP_{fw}	Potential comparative toxic unit for ecosystems: fresh water
EP, f	Eutrophication potential, fraction of nutrients reaching freshwater end compartment	$HTP-c$	Potential comparative toxic unit for humans: cancer effects
EP, m	Eutrophication potential, fraction of nutrients reaching marine end compartment	$HTP-nc$	Potential comparative toxic unit for humans: non-cancer effects
EP, t	Eutrophication potential, Accumulate Exceedance	SQP	Land use related impacts: potential soil quality index

*The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Table 4 Results of resource use by stage (1 metric ton hot rolled products)

Impact indicators	Unit	Product stage				De-constructi on demolition	Transport	Waste process	Disposal	Reuse-Recovery-Recycling potential
		A1	A2	A3	A1:A3	C1	C2	C3	C4	D
$PERE$	MJ	3.36E+02	2.02E+01	4.14E+01	3.98E+02	1.92E-01	2.29E+00	1.00E+01	1.14E-01	-6.85E+02
$PERM$	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$PERT$	MJ	3.36E+02	2.02E+01	4.14E+01	3.98E+02	1.92E-01	2.29E+00	1.00E+01	1.14E-01	-6.85E+02
$PENRE$	MJ	1.77E+04	2.37E+03	5.05E+02	2.06E+04	3.15E+01	1.34E+02	8.57E+02	1.23E+01	-1.04E+04
$PENRM$	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$PENRT$	MJ	1.77E+04	2.37E+03	5.05E+02	2.06E+04	3.15E+01	1.34E+02	8.57E+02	1.23E+01	-1.04E+04
SM	kg	0.00E+00	0.00E+00	2.46E+02	2.46E+02	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	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	0.00E+00	0.00E+00	0.00E+00
FW	m ³	0.00E+00	0.00E+00	2.43E+03	2.43E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Acronyms

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

Table 5 Results of output flows and waste categories by stage (1 metric ton hot rolled products)

Impact indicators	Unit	Product stage				De-constructi on demolition	Transport	Waste processin g	Disposal	Reuse-Recovery-Recycling potential
		A1	A2	A3	A1:A3	C1	C2	C3	C4	D
<i>HWD</i>	kg	1.44E+02	3.32E+00	2.24E+00	1.49E+02	3.51E-02	1.95E-01	1.16E+00	1.36E-02	-3.72E+02
<i>NHWD</i>	kg	4.04E+03	4.88E+01	9.37E+01	4.19E+03	4.80E-01	4.12E+00	9.86E+01	8.03E+01	-2.90E+03
<i>RWD</i>	kg	1.68E-03	3.11E-04	4.60E-04	2.45E-03	3.45E-06	4.31E-05	1.82E-04	1.91E-06	1.05E-02
<i>CRU</i>	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>MFR</i>	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.20E+02	0.00E+00	0.00E+00
<i>MER</i>	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>EEE</i>	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>EEH</i>	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Acronyms

<i>HWD</i>	Hazardous waste disposed	<i>MFR</i>	Materials for recycling
<i>NHWD</i>	Non-hazardous waste disposed	<i>MER</i>	Materials for energy recovery
<i>RWD</i>	Radioactive waste disposed	<i>EEE</i>	Exported energy, electricity
<i>CRU</i>	Components for re-use	<i>EEH</i>	Exported energy, heat

Reference:

1. EN 15804:2012+A2:2019

Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

2. EPDIItaly Regulations Rev 6.0

3. ISO 14020:2022

Environmental statements and programmes for products – Principles and general requirements.

4. ISO 14025:2006

Environmental labels and declarations – Type III environmental declarations – Principles and procedures.

5. ISO 14040:2021

Environmental management – Life cycle assessment – Principles and framework.

6. ISO 14044:2021

Environmental management – Life cycle assessment – Requirements and guidelines.

7. ISO 14046:2014

Environmental management – Water footprint – Principles, requirements and guidelines.

8. ISO 14067:2018

Greenhouse gases – Carbon footprint of products – Requirements and guidelines for quantification and communication.

9. PCR ICMQ-001/15 rev 3.2

Product Category Rules for Construction Products.

10. Steel Construction Institute. (2000). The recycling and reuse survey.

Retrieved from https://www.steelconstruction.info/The_recycling_and_reuse_survey

11. Life cycle assessment of hot rolled products for ESSB Ver. 1.2