



Environmental Product Declaration

In accordance with the standards UNE-EN ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 and PCR 2019:14 Construction products version 1.3.4

STEEL REBAR

Riva-Industries



1 Programme information

Program:	The International EPD® System
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Website	www.environdec.com
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Product category rules (PCR):	PCR 2019 :14 Construction products version 1.3.4 (EN 15804+A2)
<u>The PCR review was performed by:</u> The Technical Committee of the International EPD® System. Members of the Committee were requested on www.environdec.com (Members of the Committee were requested to state any potential conflict of interest with the PCR moderator or PCR committee and if so, were excused from the review) Contact via info@environdec.com	
Independent third-party verification of the DAP and data, according to ISO 14025:2006: ☐ EPD process certification ☐ EPD verification	
Third Party Verifier: Verifier accredited by the International EPD® System. Approved by: The International EPD® System	
The procedure for tracking data during the validity of the EPD involves a third-party verifier: ☐ Yes ☐ No	
EPDs within the same product category but registered in different EPD programs, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterization factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.	
Manufacturer information: Owner of the EPD: RIVA INDUSTRIES Address: 5ème étage, résidence Marina center 1, angle bd Zerkouni et, Boulevard de la Corniche, Casablanca Contact : aelyahyaoui@rivaindustries.ma Website : www.rivaindustries.ma	
Development of the EPD: SGS MAROC S. A	



The owner of the EPD presents the exclusive ownership and responsibility of the EPD. EPDs within the same product category, but from different programs may not be comparable. For more information on comparability, see ISO 14025.

2 RIVA INDUSTRIES

Riva Industries, a subsidiary of the Meski Invest Group, is a key player in the steel and metallurgy sector in Morocco. The company specializes in the production, marketing, and distribution of long steel products used across various sectors of the national economy.

Located on over 100 hectares in the Med-Z industrial zone in Jorf Lasfar, Riva Industries operates a modern steel and metallurgy complex. This facility is equipped with advanced technologies and automated systems that meet both current and future industry standards. The site has a production capacity of over one million tons, along with significant storage capabilities.

With this industrial strength, Riva Industries continues to expand its expertise and contribute to the growth of Morocco's steel industry. The company aims to become a leading and trusted partner, diversified in its operations, socially responsible, and a creator of value within its ecosystem. In line with the group's values and strategic direction, human capital, environmental protection, and industrial excellence are core priorities for Riva Industries.

Sustainability Strategy

Riva Industries conducts its activities within a sustainable development framework aimed at reducing the environmental impact of its operations. Through its investments and dedicated programs, the company is committed to fostering a culture of prevention to manage all risks related to Health, Safety, and the Environment.

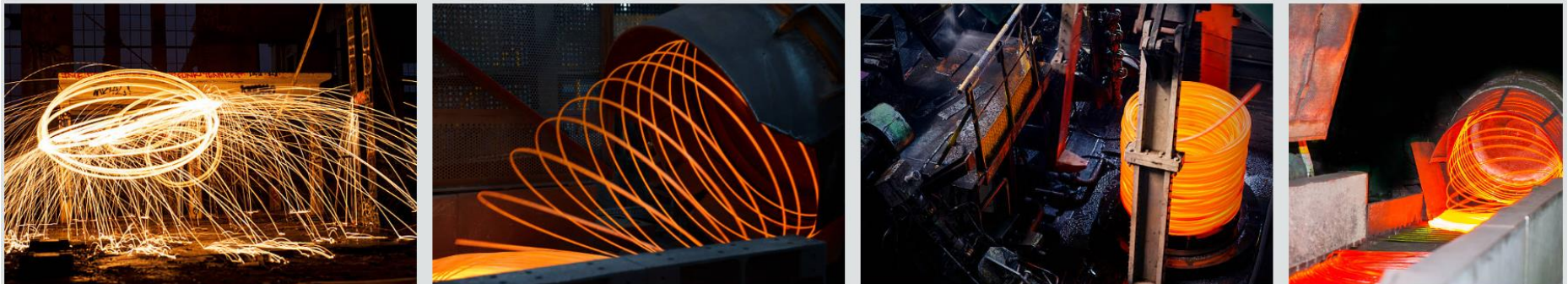
In this spirit, Riva Industries is dedicated to maintaining and continuously improving its leadership in Quality, Safety, and Environmental management. The company holds certifications in the following standards: ISO 9001, ISO 14001, ISO 45001, ISO 50001, and OHSAS 18001.

Although steel is infinitely recyclable, RIVA INDUSTRIES remains attentive to technological and economic developments, such as hydrogen-based technologies, to remain among the world leaders in carbon-free steel production.

Manufacturer

Riva Industries : Med-Z industrial zone in Jorf Lasfar Eljadida

More information: www.rivaindustries.ma





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3 Product description

Name of the product or product family

This EPD describes the production of **one ton of STEEL REBAR** manufactured at Jorf Lasfar site of Riva industries located in El jadida (Morocco)

Description of the product and its use:

Riva Industries produces its steel using 93% recycled scrap, demonstrating its commitment to sustainability. The production process begins with melting raw materials—primarily steel scrap—alongside coal, lime, dolomite, and alloying elements in an electric arc furnace (EAF) at temperatures reaching 1,800°C. The molten steel is then refined to remove impurities and adjust its composition to meet international standards such as ISO 4957 (alloy steels) and ASTM A36/A36M (carbon steels).

Once refined, the steel is cast into semi-finished forms and processed in a rolling mill to produce square steel billets. These billets meet rigorous mechanical and dimensional standards, including EN 10025 for structural steels, and are subjected to strict quality controls throughout the production chain.

The finished billets are supplied to local clients and also used internally by Riva Industries for the production of wire rod and steel rebar, reinforcing the company's integrated and value-driven industrial approach.

Steel rebar is produced from steel billets heated to approximately 1200 °C in a reheat furnace. The hot billet is then rolled through a series of stands that gradually reduce its cross-section and elongate the material. In the final passes, specially grooved rolls form the ribs directly on the surface of the bar to enhance its bonding with concrete

After shaping, the ribbed bar undergoes controlled quenching and is then cut to the desired length. Depending on project requirements, the production line can deliver rebars in various diameters.

We have a hot charging production process that helps reduce fuel consumption in the reheating furnace, with **21%** of our production done through hot charging.

3.1 Applicability

Steel rebar is a steel product widely used in the construction sector. It serves to reinforce concrete, improving its tensile strength and durability. Due to its high strength and ribbed surface, rebar ensures better bonding with concrete and is essential for building stable and long-lasting structures.

3.2 Specifications

Riva Industries' square steel billets are produced primarily from recycled materials, with 93.8% post-consumer steel scrap, underscoring the company's commitment to circular economy practices. Each metric ton of billet (1,249 kg total input) is composed of steel scrap, along with carefully measured quantities of lime, dolomite, ferrous alloys, coal, and other additives. These billets contain no biogenic material, and no packaging materials are used during final delivery, reflecting an efficient and low-waste production process.

Steel rebar is made from steel billets. The billets are heated and passed through rolling mills to form ribbed bars. These ribs improve grip when embedded in concrete. The rebar is then cut to standard lengths and bundled. This process produces strong, durable bars that reinforce concrete structures in construction projects.

Table 1: Characteristics of product.

Parameters	Specifications
Thickness	
Width	
Grades	

3.3 Description of system components

Table 2: Product content.

Product content	Weight, Kg	material, weight-%	Renewable material, weight-%
Imported billets	64,6	6,3%	0%
Local billets	953,7	93,7%	0%
Sum	1 018,3		
Packaging material	Weight, kg / ton product	Weight-% (versus the product)	
Steel strapping	0,985	< 1%	
Paper Label	0,002	< 1%	

Table 3: Amount of biogenic carbon in the product.

Content per declared unit		
Content of biogenic carbon	Unit	Amount
Biogenic carbon in the product	kg C	0
Biogenic carbon in the packaging	kg C	0

During the life cycle of the product, no hazardous substances included in the "Candidate List for Authorization (SVHC)" have been used in a percentage greater than 0.1% of the weight of the product. All quantities specified in the steel component description table together, unifying all stages of the life cycle.

4 LCA information

4.1 Declared Unit

The declared unit is 1 ton (1000 kg) of **Steel Rebar** at the gate of the Riva Industries factory

NAME	VALUE	UNIT
Declared Unit	1	ton

4.2 Reference Service life

Sheets and coils are used in the main structure of the project, so the reference service life will be equal to the useful life of the project being, from:

- 50 years for buildings and infrastructures.

4.3 Representativity

The specific data referring to the year **2024** has been used for the calculation of the LCA which is considered a representative year.

4.4 Geographical scope

Morocco

4.5 Database and LCA: software used

Ecoinvent 3.10 (allocation, cut-off by classification) with Simapro 9.6.0.1 database used for LCA calculations.

The LCA methods used are in accordance with the Standard ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021

4.6 System limits

This environmental product declaration is from “**Cradle to gate with module C1-C4 and module D**”

4.7 Data quality

The data collected regarding components and energy corresponds to the year 2024 and includes data on raw materials consumed and energy consumption. The plausibility and consistency of the data collected has been verified. Good data quality can therefore be considered. In the calculation of the LCA of the system, flows related to the construction of production plants, application machines and the staff transportation.

4.8 Cutt-off rules

According to EN 15804 a minimum of 95% of total inflows (mass and energy) per module are included and more than 99% of the inflows are accounted for.

The following processes have been excluded:

- Manufacture of equipment used in the production, buildings or any other capital goods.
- Transportation of staff to the plant.
- Transportation of staff to other work centers.
- Transportation of staff within the plant.
- Research and development activities including production and manufacture of laboratory equipment.
- Long-term emissions.

4.9 Allocation

Wherever possible, allocations have been avoided. For cases where this has not been possible, a mass-based physical allocation is made. The data referring to the composition of the system have been obtained directly and have been analyzed following the principles of *modularity* and *polluter pays*.

4.10 Other information

This LCA has been carried out by **SGS MAROC S.A.**

4.11 Lifecycle and compliance

This EPD includes the steps shown in Figure 1. This statement is from Cradle to gate with module C1-C4 and module D.

This statement may not be comparable with those developed in other programs or according to different reference documents; in particular it may not be comparable with Declarations not prepared in accordance with the ISO 14025:2010 Standard. Similarly, environmental claims may not be comparable if the source of the data is different, the same information modules are not included or are not based on the same data scenarios.

Figure 4: System limits. X: Declared module; MA: Morocco, GLO: Global.

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5 Life cycle stages

Product Stage A1 - A3

A1 - Extraction and production of raw materials.

This module covers the extraction and pre-processing of raw materials and energy sources used in the product's manufacturing. The main component is scrap steel, supplied to RIVA INDUSTRIES, made entirely from post-consumer recycled steel. This material is not classified as hazardous under REACH Regulation 1907/2006. The scrap used consists of 100% recycled content.

A2 - Transport of raw materials

All raw and secondary materials are transported by road in trucks with an average load of 16-32 with EURO 4 standard and freight.

A3 - Manufacturing of WIRE ROD STEEL

Steel billet production using Electric Arc Furnace (EAF) and Ladle Furnace (LF) technology begins with melting scrap steel and other raw materials such as coal, lime, dolomite, and ferroalloys. The EAF generates high temperatures to liquefy the materials, followed by slag removal to eliminate impurities. The molten steel is then refined in the LF, where additional elements are added to adjust the chemical composition and enhance mechanical properties. The steel is then cast into billets using a continuous casting machine, cooled, cut to length, and subjected to strict quality control procedures.

Manufacture of WIRE ROD STEEL

Steel rebar is produced from steel billets heated to approximately 1200 °C in a reheat furnace. The hot billet is then rolled through a series of stands that gradually reduce its cross-section and elongate the material. In the final passes, specially grooved rolls form the ribs directly on the surface of the bar to enhance its bonding with concrete. After shaping, the ribbed bar undergoes controlled quenching and is then cut to the desired length. Depending on project requirements, the production line can deliver rebars in various diameters.

The production process also requires the use of **water** and **fuel**.

"Preheating of the input metal using a lime-charged feed at 600°C (21% of the total mass) allows a reduction in the furnace's energy demand. Based on specific heat capacity calculations, the estimated reduction is approximately 37%, lowering fuel consumption from 32 to 20.2 kg per tonne of wire rod."

packaging

At this stage, the finished product is packaged using steel strapping and a paper label. Waste from raw material packaging is considered insignificant.

Electricity mix

RIVA INDUSTRIES has one supplier of electricity:

- 100% COUNTRY MIX (Morocco) 0,856 KgCO₂ eq/kWh

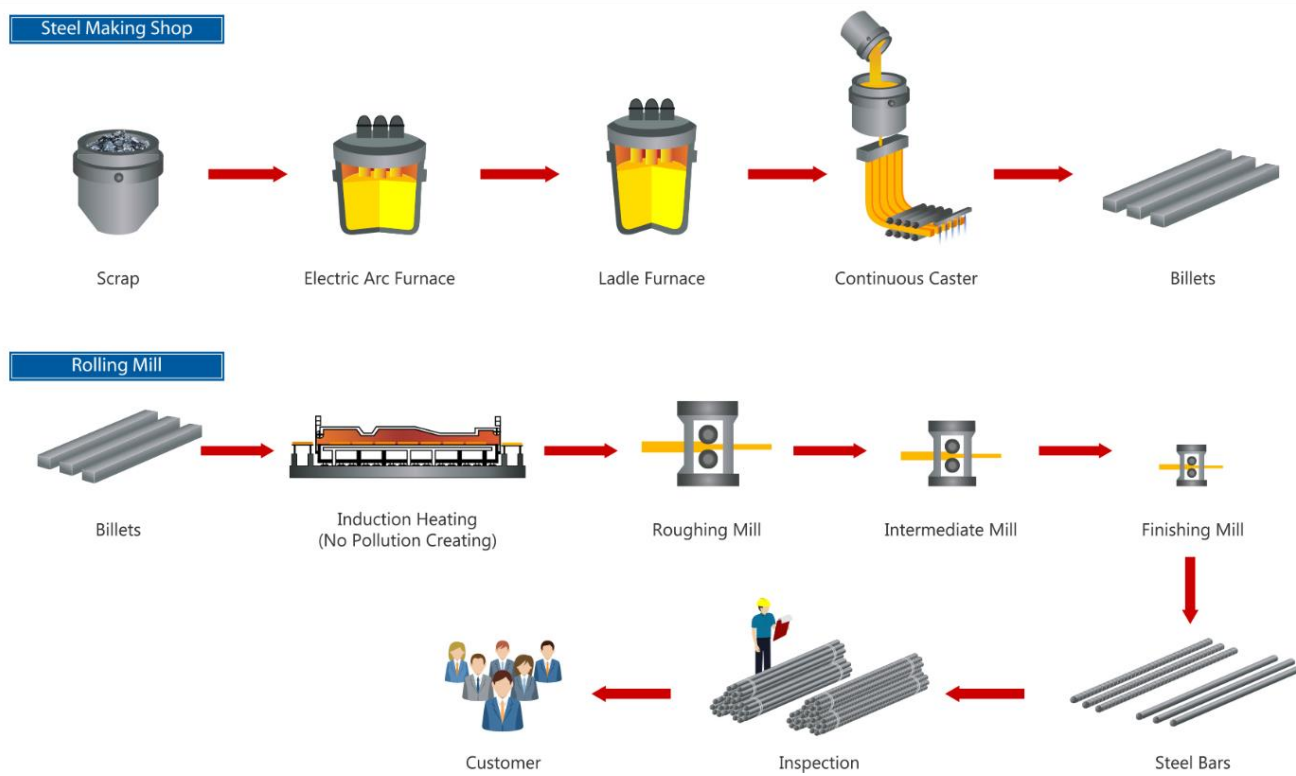


Figure 1: Simplified flow scheme of Steel Rebar processing.



Construction process stage A4-A5

The construction process stage is subdivided into modules A4 transport to the site and A5 installation.

A4 Transport to the construction site

This module includes the transport of system components from the production site to the place of use, with the possibility of intermediate storage. However, this stage is not covered by the current declaration.

A5 Installation

This module includes the transport of system components from the production site to the place of use, with the possibility of intermediate storage. However, this stage is not covered by the current declaration.

Module A5 refers to the product's installation on site. Since installation methods vary depending on the final application and are not managed by Riva Industries, this stage is excluded from the life cycle assessment.

Additionally, no packaging waste treatment is required

B1 - B7 Stage of Use (excluding possible savings)

This stage refers to the operation of the building including any emission to the environment caused using the product (module B1) or by subsequent technical operations: maintenance (B2), repair (B3), replacement (B4) or rehabilitation (B5).

These stages are not considered.

End of life stage, C1 - C4

This phase consists of the modules related to the end of useful life, C1 to C4, detailed below:

- C1 Deconstruction, demolition: As the demolition and/or disassembly of the product is an integral part of the project where the product is installed, it is not considered as it is outside the scope of the organization.
- C2 Transport: Includes the transfer of construction waste from the construction site to the waste treatment plant.
- C3 Waste treatment: Includes the reuse, recovery and/or recycling of waste. The pre-processing of sorting of steel at recycling is considered.
- C4 Waste disposal: It is assumed that 5% of the waste is taken to a controlled landfill.
- **Table 4: End of life assumptions.**

PARAMETER	VALUE (expressed by declared unit)
Collection process (mixed with the rest of the RCDs)	1 ton of Scrap Steel
Recovery system	95%
Disposal (in landfill)	5%
Transport assumptions for scenario development	Medium load truck 16-32 t (euro 4)
Distance to recovery center	100km

Recycled material content

Steel is a completely recyclable material. Due to the high value of steel scrap, it makes it worthwhile for separate collection and sorting, which is therefore the main reason for its high recycling rates. The high end-of-life recycling rate indicates that steel is recycled efficiently.

As indicated, the main component of the product is recycled steel (scrap) at 93,8%.

Reuse/recovery/recycling potential, D

Steel is a recyclable material; module D reports the environmental aspects of recycled scrap generated at the end of life minus that used at the production stage.



6 Environmental information

The LCA results are detailed in the tables on the following pages together with interpretation of global impacts produced per declared unit (one ton of **STEEL REBAR**).

The estimated impact results are only relative statements that do not indicate impact category endpoints, exceedance of threshold values, safety margins or risks. Additionally, a disclaimer discouraging the use of the results of modules A1-A3 without considering the results of module C should be noted.

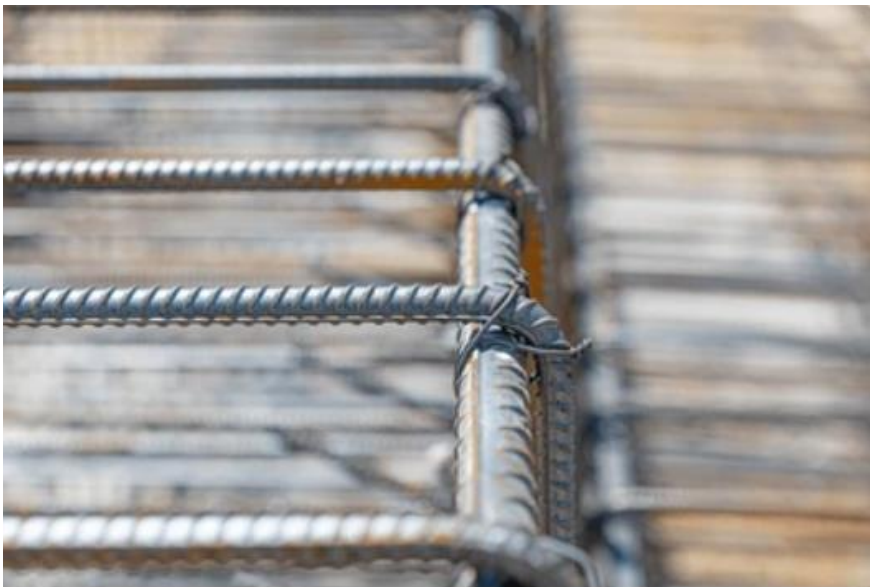
Simapro 9.6.0.1 software was used to perform the LCA, together with the Ecoinvent 3.10 database. Disclaimer-(1)- This impact category mainly refers to the eventual impact of low doses of ionizing radiation on the human health of the nuclear fuel cycle. It does not

consider the effects due to possible nuclear accidents, occupational exposure or underground radioactive waste disposal facilities. Potential ionizing radiation from soil, radon, and some building materials is also not measured by this indicator.

Disclaimer-(2)- The results of this environmental impact indicator should be used with caution, as uncertainties about these results are high or experience with the indicator is limited.

The following impact models have been used:

- CML-IA baseline V3.07/ EU25.
- ReCiPe 2016 Midpoint (H) V1.06 / World (2010) H.
- EDIP 2003 V1.07 / Default.
- Cumulative Energy Demand V1.11
- EF 3.1 Method (adapted) V1.00 / EF 3.1 normalization and weighting set.
- IPCC 2021



POTENTIAL ENVIRONMENTAL IMPACTS OF BILLET STEEL

POTENTIAL ENVIRONMENTAL IMPACTS OF BILLET STEEL							
Parameters		Product Stage	End of life stage				Resource recovery stage
		A1 / A2 / A3	C1	C2	C3	C4	D
GWP	Fossil- kg CO2 Eq	1,34E+03	6,24E+01	1,94E+01	5,85E+01	3,81E+01	-1,22E+03
	Biogenic- kg CO2 Eq	-9,69E-01	-2,31E-01	5,72E-04	4,10E+01	1,11E-01	-4,08E+00
	Land use and transformation- kg CO2 Eq	5,77E-01	2,54E-02	7,80E-03	1,29E-01	1,11E-01	-6,98E-01
	TOTAL– kg CO2 Eq	1,34E+03	6,22E+01	1,94E+01	9,95E+01	3,84E+01	-1,22E+03
ODP	kg CFC11 eq (NA)	1,27E-05	2,18E-07	2,88E-07	6,99E-07	7,05E-07	-6,65E-06
EP-freshwater	kg P eq	3,43E-01	2,49E-02	1,52E-03	1,25E-02	1,63E-02	-4,91E-01
EP-marine	kg N eq (NA)	1,87E+00	8,23E-02	2,95E-02	1,53E-01	7,47E-02	-1,29E+00
EP-terrestrial	mol N eq (NA)	1,98E+01	8,61E-01	3,22E-01	1,37E+00	8,02E-01	-1,11E+01
POCP	kg NMVOC eq (NA)	6,45E+00	2,44E-01	1,12E-01	4,36E-01	2,78E-01	-3,91E+00
ADP - minerals &metals	kg Sb eq (2)	2,79E-03	4,50E-05	6,27E-05	4,93E-04	1,12E-04	-2,49E-03
ADP -fossil	MJ, net calorific value (2)	6,71E+03	5,23E+02	2,66E+01	1,54E+02	5,94E+01	-1,29E+04
WDP	m³ depriv, (2)	2,44E+02	3,61E+00	1,23E+00	5,58E+00	-1,24E+02	-4,71E+02
Disclaimer-(1)- This impact category mainly refers to the eventual impact of low doses of ionizing radiation on the human health of the nuclear fuel cycle, It does not take into account the effects due to possible nuclear accidents, occupational exposure or underground radioactive waste disposal facilities, Potential ionizing radiation from soil, radon, and some building materials is also not measured by this indicator,							

Disclaimer-(2)- The results of this environmental impact indicator should be used with caution, as uncertainties about these results are high or experience with the indicator is limited,

GWP =Global Warming Potential; AP = Acidification potential of soil and water resources; EP-freshwater= Eutrophication potential, Fraction of nutrients that reach fresh water as a final compartment; EP-marine = Eutrophication potential, Fraction of nutrients that reach seawater as a final compartment; EP-terrestrial= Eutrophication potential, Accumulated excess; POCP =Tropospheric Ozone Formation Potential; ADP - minerals &metals = Potential for abiotic resource depletion for non-fossil resources; ADP - fossil= Potential for depletion of abiotic resources for fossil resources; WDP= Water (use) potential weighted and water consumption

POTENTIAL ENVIRONMENTAL IMPACTS OF BILLET STEEL ADDITIONAL AND MANDATORY IMPACTS

Parameters		Product Stage	End of life stage				Resource recovery stage
		A1 / A2 / A3	C1	C2	C3	C4	D
GWP –GHG2	kg CO2 eq	1,34E+03	6,22E+01	1,94E+01	9,95E+01	3,84E+01	-1,22E+03

Disclaimer-(1)- This impact category mainly refers to the eventual impact of low doses of ionizing radiation on the human health of the nuclear fuel cycle, it does not consider the effects due to possible nuclear accidents, occupational exposure or underground radioactive waste disposal facilities, Potential ionizing radiation from soil, radon, and some building materials is also not measured by this indicator,

Disclaimer-(2)- The results of this environmental impact indicator should be used with caution, as uncertainties about these results are high or experience with the indicator is limited,

POTENTIAL ENVIRONMENTAL IMPACTS OF BILLET STEEL ADDITIONAL AND VOLUNTARY IMPACTS

Parameters		Product Stage	End of life stage				Resource recovery stage
		A1 / A2 / A3	C1	C2	C3	C4	D
Potential incidence of PM (PM)	disease inc, (NA)	7,08E-05	8,54E-07	1,58E-06	1,74E-05	4,32E-06	-1,24E-04
Potential human exposure efficiency relative to U235 (IRP)	kBq U-235 eq (1)	1,74E+01	4,87E-01	2,25E-01	1,49E+00	5,42E-01	-5,16E+01
Potential comparative toxic unit for	CTUh (2)	6,68E+03	1,42E+02	7,17E+01	9,19E+02	3,99E+02	-3,89E-05
Potential comparative toxic unit for	CTUh (2)	1,11E-05	5,44E-08	1,01E-07	5,29E-07	2,02E-07	-7,77E-05
Potential comparative toxic unit for	CTUe (2)	1,44E-05	3,01E-07	1,68E-07	1,39E-06	4,80E-07	-2,25E+04
Potential soil quality index (SQP)	Pt (2)	6,64E+03	1,08E+02	1,63E+02	1,23E+03	7,88E-01	-2,98E+03

Disclaimer-(1)- This impact category mainly refers to the eventual impact of low doses of ionizing radiation on the human health of the nuclear fuel cycle, it does not take into account the effects due to possible nuclear accidents, occupational exposure or underground radioactive waste disposal facilities, Potential ionizing radiation from soil, radon, and some building materials is also not measured by this indicator,

Disclaimer-(2)- The results of this environmental impact indicator should be used with caution, as uncertainties about these results are high or experience with the indicator is limited,

BILLET STEEL RESOURCE USAGE

Parameters		Product Stage	End of life stage				Resource recovery stage
		A1 / A2 / A3	C1	C2	C3	C4	D
Resource use, fossils	Used as an energy source MJ, net calorific value	6,71E+03	5,23E+02	2,66E+01	1,54E+02	5,94E+01	-1,29E+04
Resource use, minerals and metals	kg Sb eq	2,79E-03	4,50E-05	6,27E-05	4,93E-04	1,12E-04	-2,49E-03
Non-renewable secondary fuels	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net freshwater use	m ³	5,03E+00	1,13E-01	3,47E-02	1,56E-01	-2,87E+00	-1,54E-02

OTHER OF BILLET STEEL OUTPUT FLOWS							
Parameters		Product Stage	End of life stage				Resource recovery stage
		A1 / A2 / A3	C1	C2	C3	C4	D
Components for reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery (energy recovery)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Energy exported, electricity	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	Mj	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

CATEGORY OF STEEL REBAR WASTE							
Parameters		Product Stage	End of life stage				Resource recovery stage
		A1 / A2 / A3	C1	C2	C3	C4	D
Hazardous waste disposed of	kg	7,93E-02	6,53E-04	1,89E-03	4,25E-03	4,21E-03	-5,32E-05
Non-hazardous waste disposed of	kg	4,78E+02	1,30E+00	1,29E+01	3,12E+01	8,20E+02	-1,82E-01
Radioactive waste disposed of	kg	4,19E-03	1,12E-04	5,50E-05	3,65E-04	1,33E-04	-1,26E-05

7 Other information

Information related to Sector EPD

This is a single Product EPD

Differences versus previous versions

This is the first version of the EPD

Development of scenarios

Statement that the scenarios included are currently in use and are representative for one of the most probable alternatives, Additional declaration of representative mixes for the relevant region is permissible,

8 References

- 1, General Program Instructions of the International EPD® System, Version 4,0
- 2, ISO 14020:2000: Environmental labels and declarations — General principles
- 3, ISO 14025:2006, Environmental labels and declarations –Type III environmental declarations – Principles and procedures (2010),
- 4, ISO 14040, Environmental management — Life cycle assessment — Principles and framework (2006),
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- 6, LCA MAGHREB STEEL (2022),
- 7, PCR 2019:14 Construction products - version 1,3,4 CEN (2019): EN 15804:2012+A2:2019, Sustainability of construction works – Environmental product declarations – Core rules for product category of construction products)
- 8, General Program Instructions of the International EPD® System, Version 3,01,
- 9,ISSF, I, S, (2020), Retrieved from https://www.worldstainless.org/files/issf/non-image-files/PDF/Team_Stainless/The_Global_Life_Cycle_of_Stainless_Steels.pdf
- 10, Product Environmental Footprint Category Rules Guidance, Version 6,3, May 2018.