MEGASA

Hot-rolled reinforcing bars and coils

from electric arc furnace

EN ISO 14025:2010 | EN 15804:2012+A2:2019/AC:2021 | UNE 36904-1:2018

Issue date:
2025-12-19

Revision date:
2026-03-27

Expiry date:
2030-12-18

The declared validity is subject to registration and publication at www.aenor.com

Registration code:
GlobalEPD 001-032-rev2

INDEX

The holder of this Declaration is responsible for its content, as well as for keeping the supporting documentation that justifies the data and statements included in it for the duration of its validity.

AENOR is a founding member of ECO Platform, the European Association of Environmental Product Declaration Verification Programmes.

Holder of the Declaration

Metalúrgica Galaica S.A. Ctra. de Castilla, 802-8200. 15570 Narón Spain.

+34 981 399 000
info@megasa.com
www.megasa.com

LCA study

Abaleo S.L.
D. José Luis Canga Cabañes.
c/ Poza de la Sal, 8; 3º A.
28031 Madrid, Spain

(+34) 639 901 043
jlcanga@abaleo.es / info@abaleo.es
www.abaleo.es

GlobalEPD Programme Administrator

AENOR CONFÍA, S.A.U.
C/ Génova 6
28004 Madrid
Spain

(+34) 902 102 201
aenordap@aenor.com
www.aenor.com

AENOR is a founding member of ECO Platform, the European Association of Environmental Product Declaration Verification Programmes.

UNE 36904-1:2018

European Standard EN 15804:2012+A2:2019/ AC:2021 serves as RCP

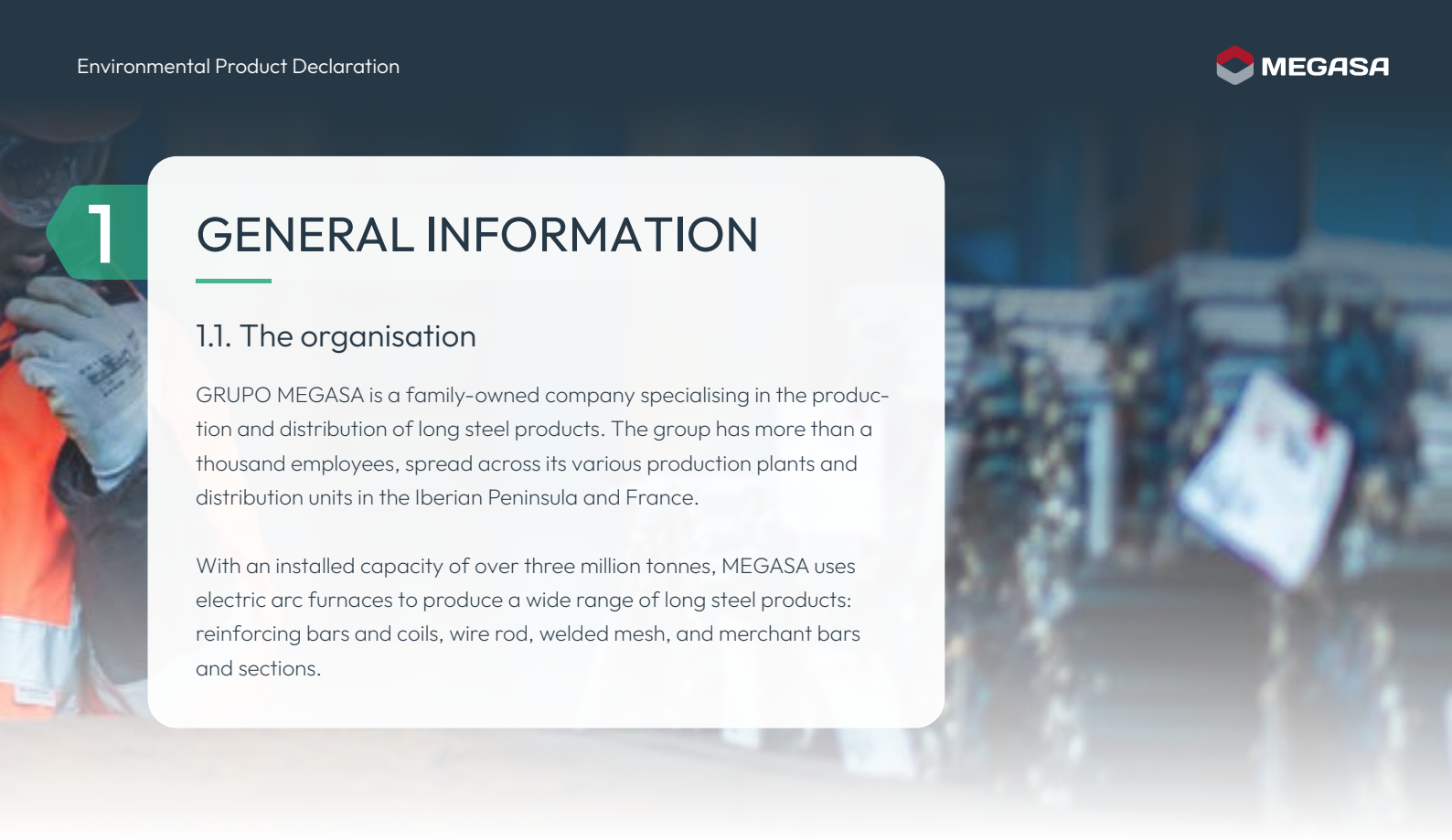
Independent verification of the declaration and data, in accordance with Standard EN ISO 14025:2010

☐ Internal ☑ External

Verification body:

AENOR

Product certification body accredited by ENAC with accreditation No. 1/C-PR468



1 GENERAL INFORMATION

1.1. The organisation

GRUPO MEGASA is a family-owned company specialising in the production and distribution of long steel products. The group has more than a thousand employees, spread across its various production plants and distribution units in the Iberian Peninsula and France.

With an installed capacity of over three million tonnes, MEGASA uses electric arc furnaces to produce a wide range of long steel products: reinforcing bars and coils, wire rod, welded mesh, and merchant bars and sections.

Megasa Siderúrgica, S.L.

Founded in 1953, it is located in Narón, in the north-west of the province of A Coruña (Spain), in a strategic geographical position, just 9 km from the port of Ferrol. It produces reinforcing bars and coils in a wide range of grades.

Megasider Zaragoza, S.A.U.

In 2016, Megasider Zaragoza S.A.U. joined the MEGASA GROUP. Recently relocated to the outskirts of the city, it is strategically located in the northeast of the Iberian Peninsula with excellent transport links to the country's most important industrial areas, as well as to France.

This factory specialises in the manufacture of merchant bars, with a wide range of dimensions and grades. It is complemented with reinforcing bars and some sections.

SN Seixal, Siderurgia Nacional, S.A.

Located on the outskirts of Lisbon, this factory specialises in the manufacture of low, medium and high carbon wire rod. Thanks to its flexibility, it can offer reinforcing bars and coils.

SN Maia Siderurgia Nacional, S.A.

SN MAIA is a producer of reinforcing bars.
The factory is located in Maia, near the city of Porto (Portugal) and fifteen kilometres from the port of Leixoes. It is the group's largest reinforcing bar production factory.

1.2. Scope of the Declaration

This environmental product declaration describes the environmental information relating to the cradle-to-gate life cycle with options, modules C1-C4 and module D (A1-A3 + A4 + C + D) of reinforcing steel from electric arc furnaces manufactured by Grupo Megasa at its plants in Spain and Portugal.

> The function performed by the product system studied is the production of reinforcing steel for use as a structural element in the construction sector.

1.3. Life cycle and compliance

This EPD has been developed and verified in accordan-ce with UNE-EN ISO 14025:2010 and EN 15804:2012+A2:2019/AC:2021 and UNE 36904-1:2018.

Steel industry. Environmental product declarations. Product category rules. Steel products for structures. Part 1: Basic products.

Registration/version	UNE 36904-1
Date of issue	2018
Administrator	AENOR

System boundaries. Information modules considered			
Product stage	A1	Supply of raw materials	X
	A2	Transport to factory	X
	A3	Manufacturing	X
Construc-tion	A4	Transport to site	X
	A5	Installation/construction	ND
Stage of use	B1	Use	ND
	B2	Maintenance	ND
	B3	Repair	ND
	B4	Replacement	ND
	B5	Rehabilitation	ND
	B6	Energy use in service	ND
	B7	Water consumption during operation	ND
End of life	C1	Deconstruction/demolition	X
	C2	Transport	X
	C3	Waste treatment	X
	C4	Disposal	X
	D	Potential for reuse, recovery and/or recycling	X

***X** = Module included in the LCA; **ND** = Module not declared.*

This EPD may not be comparable with those developed in other programmes or in accordance with different reference documents; specifically, it may not be comparable with declarations not developed and verified in accordance with Standard EN 15804.

Similarly, EPDs may not be comparable if the source of the data is different (e.g. databases), not all relevant information modules are included, or they are not based on the same scenarios.

The comparison of construction products must be made on the same function, applying the same declared unit and at the level of the building (or architectural or engineering work), i.e. including the behaviour of the product throughout its life cycle, as well as the specifications of section 6.7.2 of Standard EN ISO 14025.

1.4. Differences from previous versions of this EPD

Revision 1 of this EPD has been issued to change the format and to correct some errors in the text.

Revision 2 of this EPD has been issued to correct SM and MER indicators.

2 THE PRODUCT

2.1. Product identification

This EPD applies to hot-rolled reinforcing steel for construction produced in an electric arc furnace.

The MEGASA GROUP manufactures high-ductility steel and special-ductility steel, the latter being specially designed for structures subject to seismic stress, providing greater safety against brittle fractures.

It is produced at four plants: Seixal and Maia in Portugal, and Zaragoza and Narón in Spain.

Reinforcing steel, together with concrete, constitutes reinforced concrete, which is the most widely used construction element in Spain and many other countries.

This product is supplied in diameters from 6 mm to 40 mm, in different formats (bar, coil, re-spooled coil or spool).

The intended use of the product is as a structural element in the construction sector.

CPC code: 4124 – Bars and wire rod, hot-rolled, of iron or steel.

2.2. Product composition

The following average composition of the product studied is declared, obtained on the basis of the total tonnes manufactured by each plant:

Material	% by weight
Post-consumer scrap	81,70%
Pre-consumer scrap	17,68%
Pre-reduced	0,61%

During the product's life cycle, no hazardous substances listed in the "Candidate List of Substances of Very High Concern (SVHC) for authorisation" are used in a percentage greater than 0.1% of the product's weight.

2.3. Packaging

The primary packaging used to ship the product (distribution packaging) has been included in the study, obtained as an average of all the plants participating in the study.

Material	kg/unit declared
Cardboard	1.72E-03
Labels	3.98E-02
Wooden bars	1.38E+00
Binding wire	9.63E-01

Material	kg/unit declared
Hooks	3.31E-03
Plastics	7.42E-05
Metal bars	5.75E-03
Tapes	4.16E-03

2.4. Regulations applicable to the product

The chemical composition and other properties are established in the various applicable product standards:

Normativa - Corrugado	
UNE 36068	Weldable reinforcing bars for structural use in concrete reinforcement
UNE 36065	Weldable rebars with special ductility characteristics for concrete reinforcement
BS 4449	Steel for the reinforcement of concrete. Weldable reinforcing steel. Bar, coil and decoiled product. Specification
EN 10080	Steel for the reinforcement of concrete. Weldable reinforcing steel. General
EN 1992-1-1	Eurocode 2 part 3.2 and appendix C
DIN 488	Reinforcing steel – Reinforcing steel bars.
NF A35-080	Steel for reinforced concrete – Weldable steel – Part 1: Bars and coils
LNEC E449	A400NR steel bars for concrete reinforcement
LNEC E450	A500NR steel bars for concrete reinforcement
LNEC E455	A400NR steel bars with special ductility for concrete reinforcement
LNEC E460	A500NR steel bars with special ductility for concrete reinforcement
ASTM A615/615M	Standard specification for deformed and plain carbon steel bars for concrete reinforcement
ASTM A706/706M	Standard specification for deformed and plain low-alloy steel bars for concrete reinforcement
BRL0501 + NEN 6008	Steel for reinforcement of concrete
EN 10080 + SS 212540	Product specification for SS-EN 10080:2005 - Steel for reinforcement of concrete – Weldable reinforcing steel. Technical delivery conditions for bars, coils, welded fabrics, and lattice girders
NS 3576-1	Steel for Reinforcement of Concrete – Dimensions and Properties – Part 1: Reinforcing steel Steel B500NA, NB, NC
SFS 1300	Reinforcing steel. Minimum requirements for weldable reinforcing steel and welded fabrics
NBN A 24-30	Steel products. Steel for reinforcement
PN-H-93220	Steel for concrete reinforcement. Weldable reinforcing steel B500SP – Reinforcing bars and wires
NM 01.4.097	Steel products – Reinforcement for concrete – Weldable bars and wires [MOROCCO]
G30.18-21	Carbon steel bars for concrete reinforcement
NMX-B-506-CANACERO	Steel Industry – Reinforcing steel rods for concrete reinforcement – specifications and test methods
NMX-B-A457-CANACERO	Steel Industry – Low-alloy Reinforcing steel rods for concrete reinforcement – specifications and test methods
IS 4466 (Part 3)	Steel for the Reinforcement of Concrete: Reinforcing Bars
NTP 341.031	Concrete. Carbon steel bars with ribs and plain bars for reinforced concrete. Specifications [PERU]
AS/NZS 4671	Steel for the Reinforcement of Concrete
DS/INF 165	Reinforcing steel for concrete structures - Identification and classification according to EN 10080 and EN 10138
EN 10080 + EN 1992-1-1/A1 part 3.2 Appendix C	Eurocode 2 – Design of concrete structures Part 1-1: General rules and rules for Buildings – Annex C, requirements for materials

3 INFORMATION ON LCA

3.1. Life cycle analysis

The Life Cycle Assessment Report for the EPD of Megasa Group steel products, dated December 2025, was carried out by the company Abaleo S.L.

The LCA study follows the recommendations and requirements of international standards:

ISO 14040:2006 ISO 14044:2006

UNE 36904-1:2018 EN 15804:2012+A2:2019/AC:2021.

3.2. Scope of the study

The scope of this EPD covers the production of the crib with options and modules C and D (A1-A3 + A4 + C + D) made of reinforcing steel manufactured by the Megasa Group.

The specific data on the production process comes from the plants where the product is manufactured, located in Portugal and Spain, and corresponds to production data for the year 2024, which is considered representative:

- **Megasa Siderúrgica, S.L.**
  Carretera de Castilla, 802-820 - 15570 Narón (Spain).
- **Megasider Zaragoza, S.A.U.**
  Avenida de José López Soriano, 100, 50007, Zaragoza, (Spain).
- **SN Maia, S.A.**
  Rua Siderurgia s/n, 4425-514 S. Pedro Fins, Maia (Portugal).
- **SN Seixal, S.A.**
  Rua Independência Nacional 10, 2840-996 Aldeia de Paio Pires, Seixal, (Portugal).

The product is manufactured in Spain and Portugal and distributed worldwide, although the LCA calculation has been carried out for Europe.

The LCA does not include the following:

- DRIs briquetting process to obtain the pre-reduced materials used, as there is no process in the databases used.
- All equipment with a useful life of more than 3 years.
- The construction of the plant buildings or other capital goods.
- Staff business trips nor staff commute to and from work.
- Research and development activities.
- Long-term emissions.

3.3. Declared unit

The declared unit is one tonne (1,000 kg) of product, plus its distribution packaging.

3.4. Allocation criteria

In accordance with the criteria of the reference standard, the allocation of inputs and outputs from the system has been applied on the basis of economic values, as the difference between the income from the product and the co-products is very high. This allocation criterion has been applied to the general consumption of the plants (consumption of raw materials and energy), emissions, transport and waste. The quantities of the different materials used and produced in the manufacturing process come from measurements taken at the steelworks themselves.

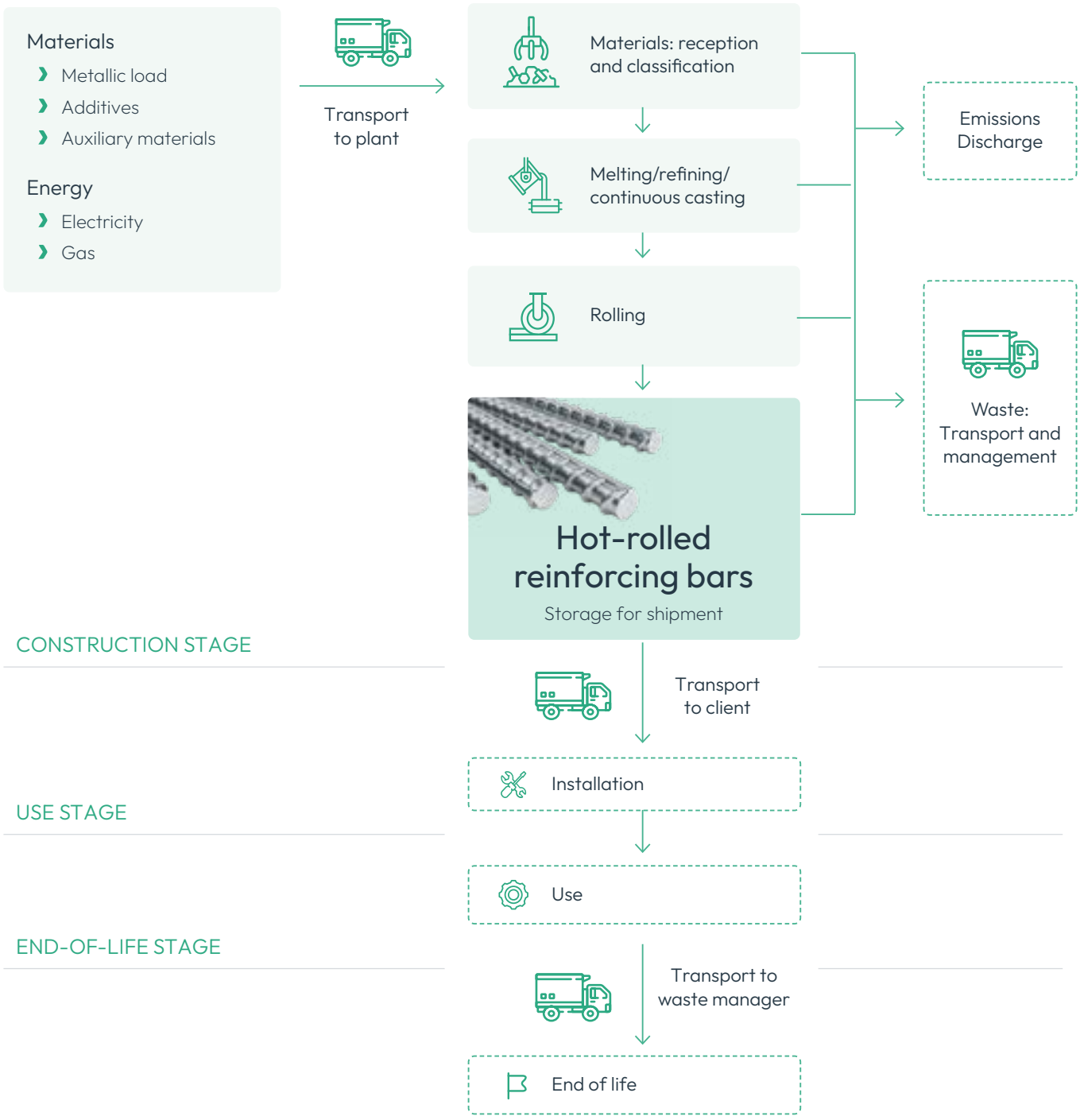
All the group's plants have provided data for the year 2024. The criterion used to calculate the average reinforcing steel's LCA has been that each plant contributes the environmental load of its production process, in the same proportion as it contributes to the production of the total reinforcing steel of the Megasa Group. To this end, each product manufactured by each plant has been modelled independently.

The LCA results for the life cycle of the final product were obtained as a weighted average of the impacts of each product stage at each plant, according to its production in relation to the total manufactured.

3.5. Cut-off rule

The LCA includes the gross weight/volume of all materials used in the manufacturing process, so that at least 99% of the environmental impacts are obtained. No energy consumption has been excluded.

3.6. Manufacturing process diagram



The Megasa Group's factories produce steel using the electric arc furnace route. The steelworks mainly melt scrap metal, adjusting the chemical composition to obtain the required steel specifications. The resulting material is solidified into billets of different sections and lengths, which constitute the intermediate product used as raw material in the hot rolling process.

At this stage, the billets are reheated to the appropriate temperature and rolled through successive roller mills, where the section is progressively reduced and the material elongated until achieving the dimensions and characteristics of the final product. After cooling, the steel is in the form of bars or coils, ready for shipment or further processing.

3.7. Representativeness, quality and selection of data

To model the manufacturing process of the product under study, specific production data from the four steel plants that manufacture the product under study were used for the year 2024, which is a period with representative production data.

The plants participating in this LCA are authorised as ferrous metal waste treatment facilities for recovery operations, using the scrap they receive directly as secondary raw material in the production process without any treatment prior to melting in electric furnaces; therefore, the scrap metal used as raw material is considered to be burden free, as is its transport to the steelworks, whose impact corresponds to the previous product system.

Internal scrap metal consumption has not been considered in the calculation of the secondary material indicator used. Where necessary, the Ecoinvent 3.11 database (March 2025) has been used, which is the latest version available at the time of the LCA.

SimaPro 10.2.0.0 software, which is the most up-to-date version available at the time of the study, was used for the inventory data, to model the LCA and to calculate the environmental impact categories required by the reference standard.

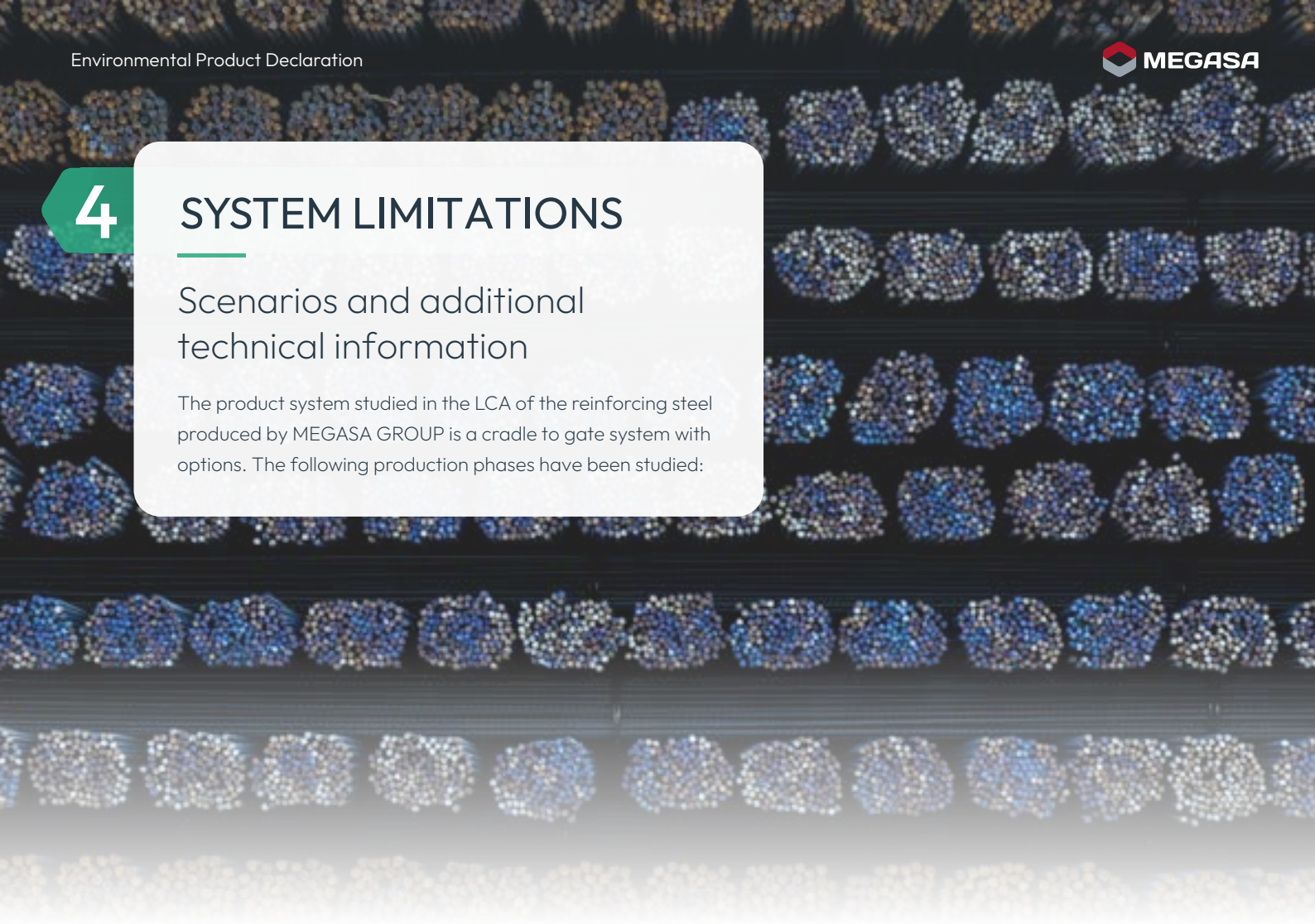
The semi-quantitative data quality assessment criteria proposed by the European Union in its Environmental Footprint Guide for Products and Organisations were applied to assess the quality of the primary data used in the LCA. The following results were obtained:

- Technological representativeness (TeR) – 1.99
- Geographical representativeness (GeR) – 2.23
- Temporal representativeness (TiR) – 1.86
- Accuracy (A) – 1.00.

According to the above data, the Data Quality Rating (DQR) takes the following value 1.79, indicating that the data quality is very good.

To better understand the data quality assessment carried out, it should be noted that the rating for each of the criteria ranges from 1 to 5 (the lower the rating, the higher the quality) and that the following table is used to obtain the final rating:

Overall data quality rating (DQR)	Overall data quality level
≤ 1.6	Excellent quality
1.6 to 2.0	Very good quality
2.0 to 3.0	Good quality
3 to 4.0	Reasonable quality
> 4	Insufficient quality



4 SYSTEM LIMITATIONS

Scenarios and additional technical information

The product system studied in the LCA of the reinforcing steel produced by MEGASA GROUP is a cradle to gate system with options. The following production phases have been studied:

Module A1:
Raw material production

This module covers the raw material production process, which considers:

- The extraction of resources and production of raw materials.
- Transportation to raw material processing/production centres.
- Energy and fuel consumption during the production of raw materials.
- The consumption of other resources (such as water) during the production of raw materials.
- The generation of waste and emissions into the air and discharges into water and soil during the production of raw materials.
- The generation of electricity used in the manufacturing process.

Module A2:
Transport

Transport by lorry, ship and train of raw and auxiliary materials from the production sites (suppliers) to the steelworks has been considered. The transport distances have been provided by the plant managers, who are aware of the location of their suppliers' facilities.

Internal plant transport is also included.

Module A3:
Manufacturing

This stage considers the consumption of auxiliary materials for production (auxiliary materials and general plant consumption); the production of packaging necessary for product distribution to customers; emissions to air and water; and the transport and treatment of waste generated during this stage of the life cycle.

The transport distances for waste have been provided by plant managers, who are aware of the location of their waste managers' facilities.

Module A4:
Transport to the place of use

Finished product transport – from the plants where the steel is manufactured to the customer – has been considered, with data from 2024, distinguishing the means of transport used: EURO 6 lorry (18-32 tonnes), average European freight train or container ship.

Parameter		Value (per declared unit)
Litres of diesel	EURO 5 Lorry (GVW: 15.9 ton)	0.044 l/tkm
	Ship	0.003 l/tkm
	Train	0.013 l/tkm
Average distance	EURO 5 Lorry (GVW: 15.9 ton)	247.97 km
	Ship	1,975.10 km
	Train	27.39 km
Occupancy rate (including empty return journey)		50%
Apparent density of transported products		7,850 kg/m3
Useful capacity factor		1

Module C1:
Deconstruction/demolition

The LCA assumes that 100% of the processed steel product has been used as concrete reinforcement, i.e. integrated into other structures.

A generic process from the Ecoinvent 3.11 database has been used to represent the demolition process.

Module C2:
Transport to the waste treatment/ recovery site

It is assumed that, at the end of its useful life, the product under consideration is transported to the waste management facility by EURO 5 lorry (18-32 tonnes), average European freight train or container ship. The average transport of scrap metal received at steelworks authorised as waste treatment facilities for recovery operations (R4 – recycling or recovery of metals and metal compounds) has been considered.

Life Cycle Information UNE-EN 15804															Additional information
A1 to A3			A4 to A5		B1 to B7							C1 to C4				D
Product stage			Construction process stage		Use stage							End-of-life stage				Benefits and burdens beyond the system
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	MNE	MNE	MNE	MNE	MNE	MNE	MNE	MNE	X	X	X	X	X
Supply of raw materials	Transport	Manufacturing	Transport	Construction/installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Energy use in service	Water consumption during operation	Deconstruction, demolition	Transport	Waste treatment	Waste disposal	Potential for reuse, recovery and recycling
			Scenario	Scenario	Scenario	Scenario	Scenario	Scenario	Scenario	Scenario	Scenario	Scenario	Scenario	Scenario	Scenario	

X: Module evaluated. / **MNE:** Module not declared.

Module C3 and C4:
Waste treatment, and Waste disposal

To determine the recycling and landfill/incineration percentages for the products studied, the criteria in Part C of Annex 2 V2.1 (May 2020) of the Circular Footprint Formula of the European Union's Environmental Footprint methodology are applied (COMMISSION RECOMMENDATION (EU) 2021/2279 of 15 December 2021 on the use of environmental footprint methods to measure and communicate the environmental performance of products and organisations throughout their life cycle).

Parameter	Value (per declared unit)
Demolition	0.626 MJ
Recovery system, specified by type	0 kg for reuse.
	950 kg for recycling.
Disposal, specified by type	27.5 kg for final disposal (landfill)
	22.5 kg for incineration.
Assumptions for scenario development	Waste transport to the waste manager's: Lorry: 117.42 km
	Ship: 672.96 km
	Train: 23.83 km

Module D:
Benefits and burdens beyond the system

This module declares the benefits and burdens resulting from the net flow of fuels or secondary materials leaving the product system, excluding flows classified as co-products.

It is assumed that metals reach their final waste state after a sorting and shredding process. Treatment, as well as the net benefits and burdens of reuse or recycling potentials (only for the net amount of scrap), are grouped in this module.

The potential environmental benefits are presented for the net steel scrap produced at the end of the product's life, calculated as follows: Net scrap = Amount of steel recycled at the end of life – Scrap from previous product life cycles. It is therefore considered the percentage of non-secondary raw material that reaches the condition of waste, excluding the 1.16% of virgin raw material that enters the product stage, applying a reduction coefficient of 10% for material loss in the recovery of avoided product.

5 DECLARATION OF LCA AND LCI ENVIRONMENTAL PARAMETERS

The results of the end-of-life stages (modules C1-C4) must be considered when using the results of the product stage (modules A1-A3). The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks. The EN 15804 characterisation factors are based on EF 3.1.

Mandatory impact category indicators according to EN 15804							
Parameter	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	3.01E+02	5.73E+01	5.92E+01	2.49E+01	4.81E+00	2.66E-01	9.33E-01
GWP-fossil	2.98E+02	5.73E+01	5.92E+01	2.49E+01	4.79E+00	2.66E-01	6.86E-01
GWP-biogenic	4.99E-01	2.12E-03	2.97E-03	1.75E-03	7.47E-03	3.19E-04	2.46E-01
GWP-luluc	2.02E+00	1.26E-03	2.44E-03	1.61E-03	9.66E-03	8.49E-06	2.67E-04
ODP	7.47E-06	1.14E-06	9.02E-07	5.08E-07	7.29E-08	5.37E-09	7.28E-09
AP	9.70E-01	6.47E-01	5.47E-01	2.49E-01	3.02E-02	1.96E-03	2.12E-03
EP-freshwater	7.02E-03	3.89E-05	5.58E-05	5.28E-05	3.18E-04	9.00E-07	1.33E-05
EP-marine	2.31E-01	1.63E-01	2.58E-01	6.82E-02	9.07E-03	9.04E-04	1.60E-03
EP-terrestrial	2.20E+00	1.81E+00	2.83E+00	7.55E-01	9.99E-02	9.92E-03	8.87E-03
POFP	9.64E-01	5.45E-01	8.44E-01	2.27E-01	3.03E-02	3.03E-03	2.80E-03
ADP-minerals&-metals [2]	1.02E-04	1.16E-06	2.08E-06	5.49E-07	2.67E-07	8.82E-09	1.56E-08
ADP-fossil [2]	5.24E+03	7.42E+02	7.75E+02	3.28E+02	9.64E+01	3.52E+00	5.65E+00
WDP [2]	1.55E+02	2.42E-01	5.78E-01	1.82E-01	6.94E-01	4.31E-03	1.65E-02

- **GWP-total (kg CO_2 eq):** Global warming potential.
- GWP-fossil (kg CO_2 eq): Global warming potential of fossil fuels.
- **GWP - biogenic (kg CO_2 eq):** Biogenic global warming potential.
- **GWP - luluc (kg CO_2 eq):** Global warming potential of land use and land use change.
- **EP-marine (kg N eq):** Eutrophication potential, fraction of nutrients reaching the final marine water compartment.
- **EP-terrestrial (mol N eq):** Eutrophication potential, cumulative surplus.
- **POFP (kg NMVOC eq):** Tropospheric ozone formation potential.
- **ODP (kg CFC-11 eq):** Ozone depletion potential.
- **AP (mol H+ eq):** Acidification potential, cumulative surplus.
- **EP-freshwater (kg P eq):** Eutrophication potential, fraction of nutrients reaching the final freshwater compartment.
- **ADP-minerals&metals (kg Sb eq):** Abiotic depletion potential for non-fossil resources.
- **APD-fossil (MJ, v.c.n):** Abiotic depletion potential for fossil resources.
- **WDP (m^3):** Water deprivation potential (user), weighted water deprivation consumption.

Additional mandatory and voluntary impact category indicators							
Parameter	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG*	3.01E+02	5.73E+01	5.92E+01	2.49E+01	4.81E+00	2.66E-01	9.33E-01
PM	2.03E-05	2.81E-06	1.58E-05	1.37E-06	4.66E-07	7.28E-08	3.65E-08
IRP [1]	3.26E+01	6.64E-02	6.44E-02	1.06E-01	6.73E-01	3.74E-04	1.85E-02
ETP-fw [2]	5.74E+02	2.74E+01	2.22E+01	1.34E+01	6.68E+00	5.16E+00	4.72E+00
HTP-c [2]	3.97E-07	5.09E-09	3.16E-09	2.19E-09	4.26E-10	3.65E-10	2.84E-10
HTP-nc [2]	6.21E-06	2.88E-07	5.82E-08	1.34E-07	1.80E-08	1.48E-09	6.95E-09
SQP [2]	4.89E+02	9.48E-01	1.32E+00	1.40E+00	8.65E+00	3.42E+00	5.42E-01

- **GWP-GHG.** Global warming potential excluding biogenic carbon.
- **PM (disease incidence).** Potential for disease incidence due to particulate matter emissions.
- **IRP (kBq U235 eq).** Human exposure efficiency relative to U235.
- **ETP-fw (CTUe).** Comparative toxic unit potential for ecosystems - freshwater.
- **HTP-c (CTUh).** Comparative toxic unit potential for ecosystems - carcinogenic effects.
- **HTP-nc (CTUh).** Comparative toxic unit potential for ecosystems - non-carcinogenic effects.
- **SQP (Pt).** Soil quality potential index.

Note 1. This impact category deals mainly with the potential impacts of low doses of ionising radiation on human health from the nuclear fuel cycle. It does not consider the effects of possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The ionising radiation potential of soil due to radon or certain building materials is also not measured in this parameter.

Note 2. The results of this environmental impact indicator should be used with caution as the uncertainties in the results are high and experience with this parameter is limited.

*This indicator accounts for all greenhouse gases except the absorption and emissions of biogenic carbon dioxide and biogenic carbon stored in the product. Therefore, the indicator is identical to the total GWP, except that the conversion factor for biogenic CO_2 is set to zero.

Indicators for resource use							
Parameter	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	1.24E+03	1.69E+00	1.66E+00	2.63E+00	1.65E+01	1.18E-02	4.54E-01
PERM	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	1.24E+03	1.69E+00	1.66E+00	2.63E+00	1.65E+01	1.18E-02	4.54E-01
PENRE	5.24E+03	7.42E+02	7.75E+02	3.28E+02	9.69E+01	3.54E+00	5.65E+00
PENRM	5.31E-01	0.00E+00	0.00E+00	0.00E+00	-5.05E-01	-2.66E-02	0.00E+00
PENRT	5.24E+03	7.42E+02	7.75E+02	3.28E+02	9.64E+01	3.52E+00	5.65E+00
SM	9.96E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	3.22E+00	1.41E-02	2.35E-02	1.13E-02	4.54E-02	1.67E-04	1.18E-03

- PERE (MJ, v.c.n.). Use of renewable primary energy excluding renewable primary energy resources used as raw materials.
- PERM (MJ, v.c.n.). Use of renewable primary energy used as raw materials.
- PERT (MJ, v.c.n.). Total use of renewable primary energy.
- PENRE (MJ, v.c.n.). Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials.
- PENRM (MJ, v.c.n.). Use of non-renewable primary energy used as raw materials.
- PENRT (MJ, v.c.n.). Total use of non-renewable primary energy;.
- SM (kg). Use of secondary materials.
- RSF (MJ, v.c.n.). Use of renewable secondary fuels
- NRSF (MJ, v.c.n.). Use of non-renewable secondary fuels.
- FW (m3). Net use of fresh water resources.

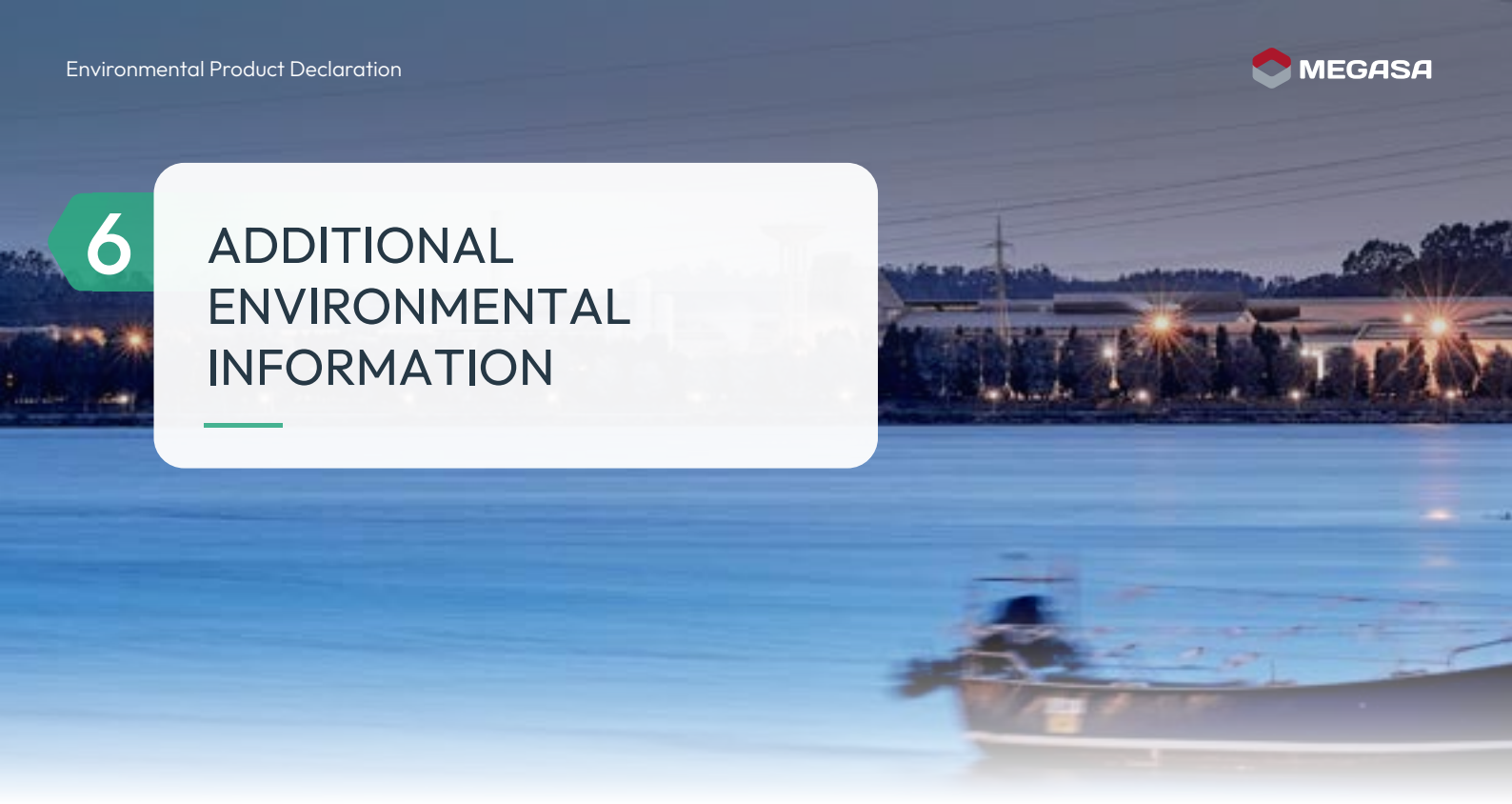
> The balance of biogenic CO_2 and the energy used as raw material for packaging has been calculated in modules A1-A3.

Waste categories							
Parameter	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	1.84E-02	4.52E-03	5.32E-03	2.00E-03	2.88E-04	2.30E-05	2.86E-05
NHWD	1.82E+01	2.13E-02	2.77E-02	1.51E-02	4.95E-02	4.23E+01	5.22E-01
RWD	1.83E-02	4.03E-05	3.61E-05	8.12E-05	5.53E-04	2.34E-07	1.51E-05

- HWD (kg). Hazardous waste disposed of.
- NHWD (kg). Non-hazardous waste disposed of.
- RWD (kg). Radioactive waste disposed of.

Output flows							
Parameter	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
CRU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	1.37E+01	0.00E+00	0.00E+00	0.00E+00	9.50E+02	0.00E+00	0.00E+00
MER	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.25E+00	0.00E+00
EEE	9.16E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	1.23E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

- CRU (kg). Components for reuse.
- MFR (kg). Materials for recycling.
- MER (kg). Materials for energy recovery.
- EEE (MJ). Electrical energy exported.
- EET (MJ). Thermal energy exported.



6 ADDITIONAL ENVIRONMENTAL INFORMATION

6.1. Other indicators

The manufacture of the steel products studied generates the following co-products for sale to third parties:

Parameter	Kg (per declared unit)
Flakes/Mill scale	1.68E+01
Scrap soil	2.07E+01
Black slag	1.10E+02

6.2. Indoor air emissions

The manufacturer declares that the steel studied does not generate emissions to indoor air during its useful life.

6.3. Emissions to soil and water

The manufacturer declares that the steel studied does not generate significant emissions to soil or water during its useful life.

6.4. Biogenic carbon content

The manufacturer declares that the products studied do not contain materials with biological content.

The packaging with biogenic carbon content used for the distribution of the products is shown in the following table:

Parameter	kg biogenic carbon (per declared unit)
Product	0
Packaging	6.25E-01

6.5. Electricity mix used

The following electricity mix has been used:

- Plants in Spain: the residual mix of the electricity supplier, obtained from the CNMC annual report for 2024.
- Plants in Portugal: the base energy mix of the Portuguese mainland system.

In addition, the plants have energy with Guarantees of Origin:

- 8.623% wind GdO
- 0.011% solar thermal GdO

Mix - GWP - gCO2 eq/kWh	
Average mix	147.86

REFERENCES

1

UNE 36904-1:2018. Steel industry. Environmental product declarations. Product category rules. Steel products for structures. Part 1: Basic products.

2

EN 15804:2012+A2:2019/AC:2021. Sustainability in construction. Environmental product declarations. Basic product category rules for construction products.

3

General Instructions for the GlobalEPD Programme, 3rd revision. AENOR. October 2023.

4

EN ISO 14025:2010 Environmental labels. Type III environmental claims. Principles and procedures (ISO 14025:2006).

5

EN ISO 14040:2006/A1:2021. Environmental management. Life cycle assessment. Principles and framework. Amendment 1. (ISO 14040:2006/Amd 1:2020).

6

EN ISO 14044:2006/A1:2021. Environmental management. Life cycle assessment. Requirements and guidelines. Amendment 2. (ISO 14044:2006/Amd 2:2020).

7

Life cycle analysis report for environmental product declarations for Megasa Group steel products, prepared by Abaleo S.L., December 2025. Version 2.

8

Databases and environmental impact assessment methodologies applied using SimaPro 10.2.0.0.

MEGASA

A verified environmental declaration