MEGASA

# Hot-rolled reinforcing bars

## from the electric arc furnace at the Megasider plant

EN ISO 14025:2010

EN 15804:2012+A2:2019/AC:2021

UNE 36904-1:2018

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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.

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## 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

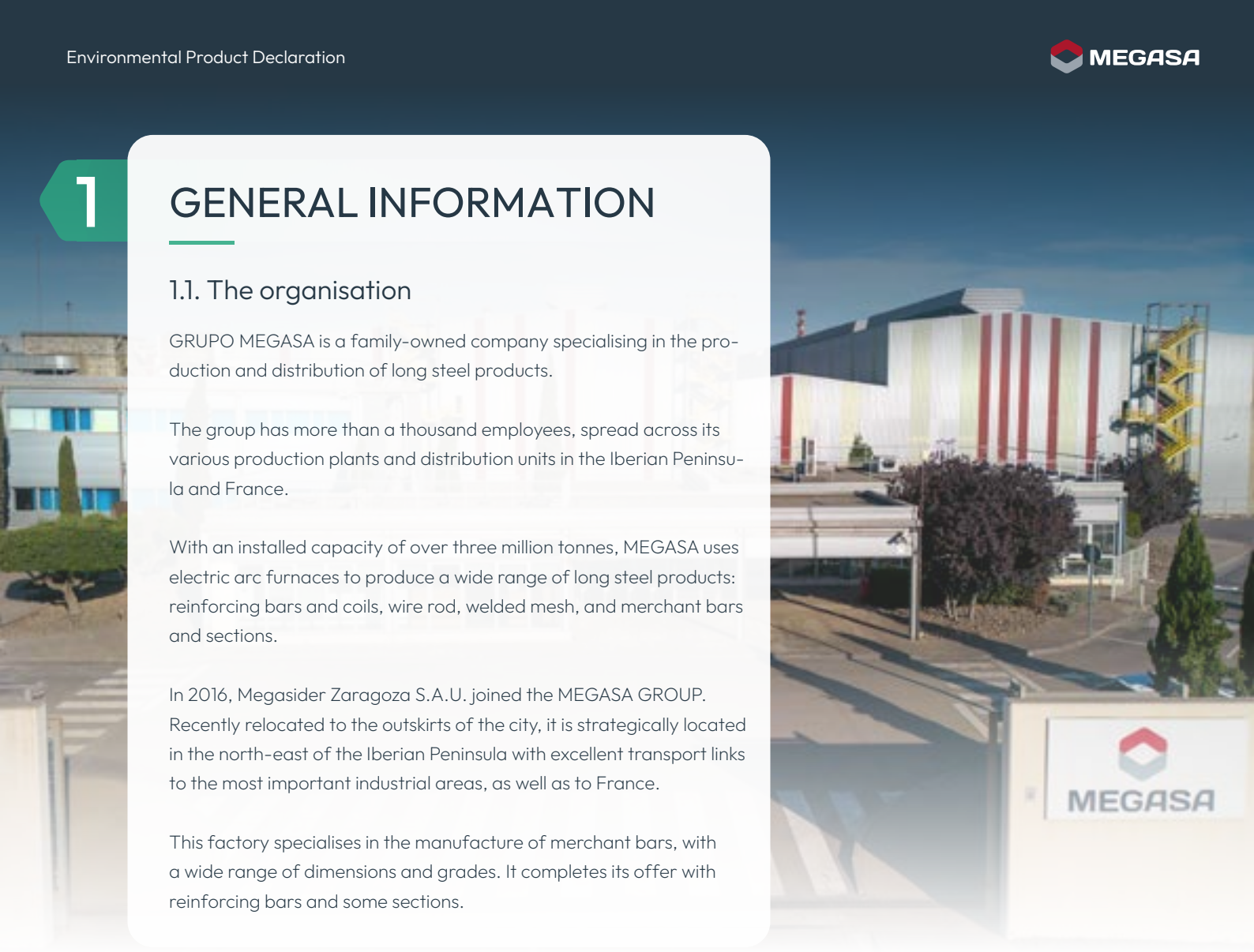
GRUPO MEGASA is a family-owned company specialising in the production and distribution of long steel products.

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.

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 north-east of the Iberian Peninsula with excellent transport links to the 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 completes its offer with reinforcing bars and some sections.




## 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 bars from an electric arc furnace manufactured by Megasider Zaragoza S.A.U.

**Megasider Zaragoza, S.A.U.**
Avenida de José López Soriano, 100, 50007, Zaragoza, (Spain).

## 1.3. Life cycle and compliance

This EPD has been developed and verified in accordance with Standards 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 |

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

| System boundaries. Information modules considered | | | |
|---|---|---|---|
| Product stage | A1 | Supply of raw materials | X |
| | A2 | Transport to factory | X |
| | A3 | Manufacturing | X |
| Construction | 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*

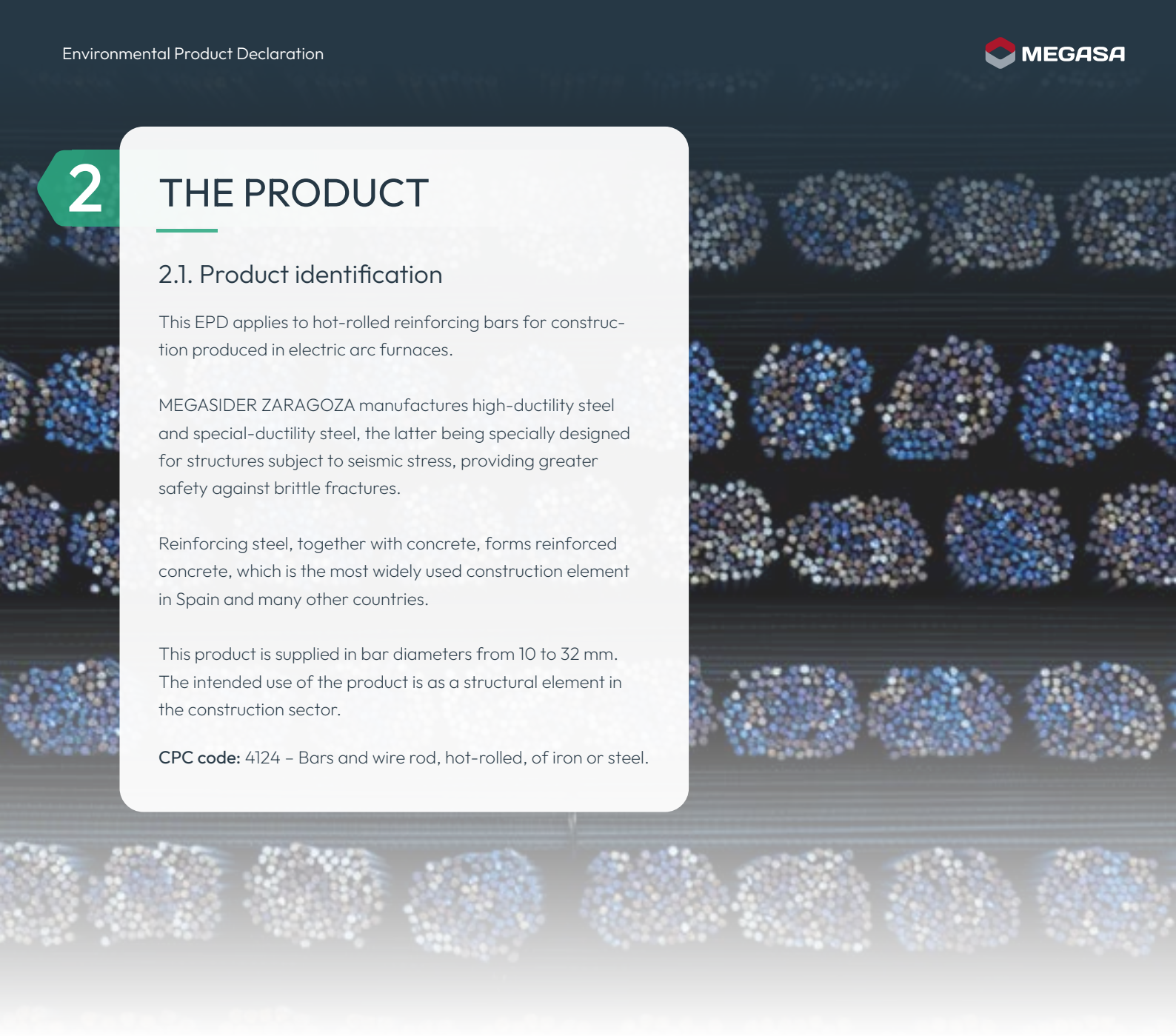
This EPD may not compare with those developed in other programmes or in accordance with different reference documents; specifically, it may not compare with declarations not developed and verified in accordance with Standard EN 15804.

Similarly, EPDs may not compare 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.
Rev2 has been issued to correct SM and MER indicators.
Rev3 has been issued to correct MER indicator.



# 2 THE PRODUCT

## 2.1. Product identification

This EPD applies to hot-rolled reinforcing bars for construction produced in electric arc furnaces.

MEGASIDER ZARAGOZA 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.

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

This product is supplied in bar diameters from 10 to 32 mm. 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:

| Material | % by weight |
|---|---|
| Post-consumer scrap | 87.57 |
| Pre-consumer scrap | 12.43 |

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 in the shipment of the product (distribution packaging) has been included in the study:

| Material | kg/unit declared |
|---|---|
| Labels | 1.08E+00 |
| Wooden bars | 1.59E+00 |
| Binding wire rod | 7.68E-01 |

| Material | kg/unit declared |
|---|---|
| Metal hooks | 1.99E-03 |
| Metal bars | 1.63E-01 |

## 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 reinforced concrete reinforcement |
| UNE 36065 | Weldable reinforcing bars with special ductility characteristics for reinforced 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 | Steels for reinforced concrete – Weldable steels – Part 1: Bars and coils |
| LNEC E449 | A400NR steel bars for reinforced concrete reinforcement |
| LNEC E450 | A500NR steel bars for reinforced concrete reinforcement |
| LNEC E455 | A400NR steel bars with special ductility for reinforced concrete reinforcement |
| LNEC E460 | A500NR steel bars with special ductility for reinforced 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 | Steels for Reinforcement of Concrete – Dimensions and Properties – Part 1: Reinforcing 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 reinforced 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 is the production of the cradle-to-door with options and modules C and D (A1-A3 + A4 + C + D) of reinforcing bars manufactured by Megasider Zaragoza.

The specific data on the production process comes from the Zaragoza plant where the product is manufactured and corresponds to production data for the year 2024, which is considered representative.

The product is manufactured in Spain and distributed worldwide, although the LCA calculation has been carried out for Europe. The LCA does not include the following:

- 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 plant's general consumption (consumption of raw materials and energy), emissions, transport and waste.

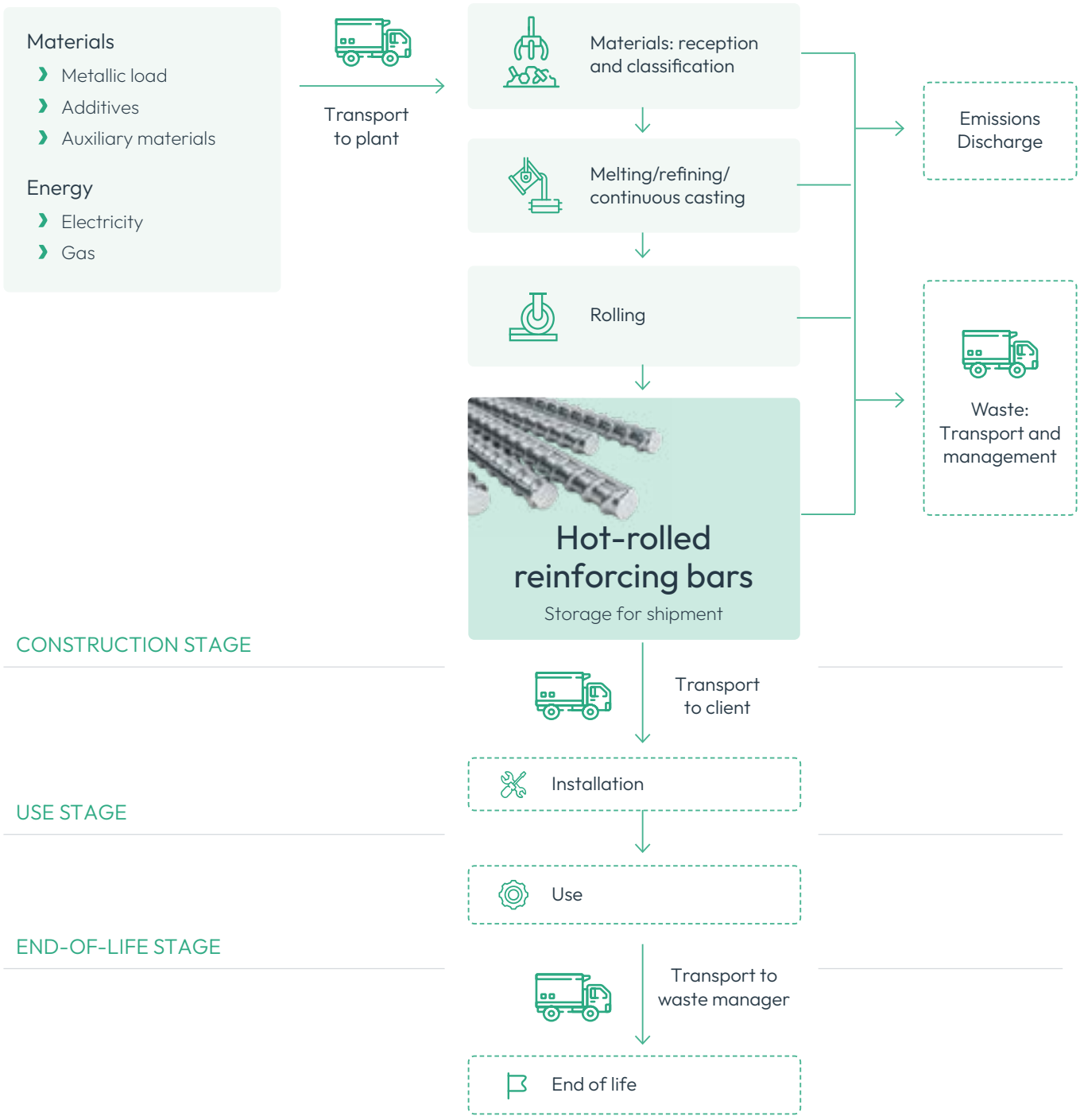
The quantities of the different materials used and produced in the manufacturing process come from measurements taken at the steel plant itself.

## 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 factory produces 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 presented in the form of bars, 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 Zaragoza plant for the year 2024, which is a period with representative production data, has been used.

The plant is authorised as a ferrous metal waste treatment facility for recovery operations, using the scrap metal it receives directly as secondary raw material in the production process without any treatment prior to melting in the electric furnace; therefore, the scrap metal used as raw material is considered to be burden free, as is its transport to the steelworks, the impact of which 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 – 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 Guidance for Products and Organisations were applied to assess the quality of the primary data used in the LCA. The following results were obtained:

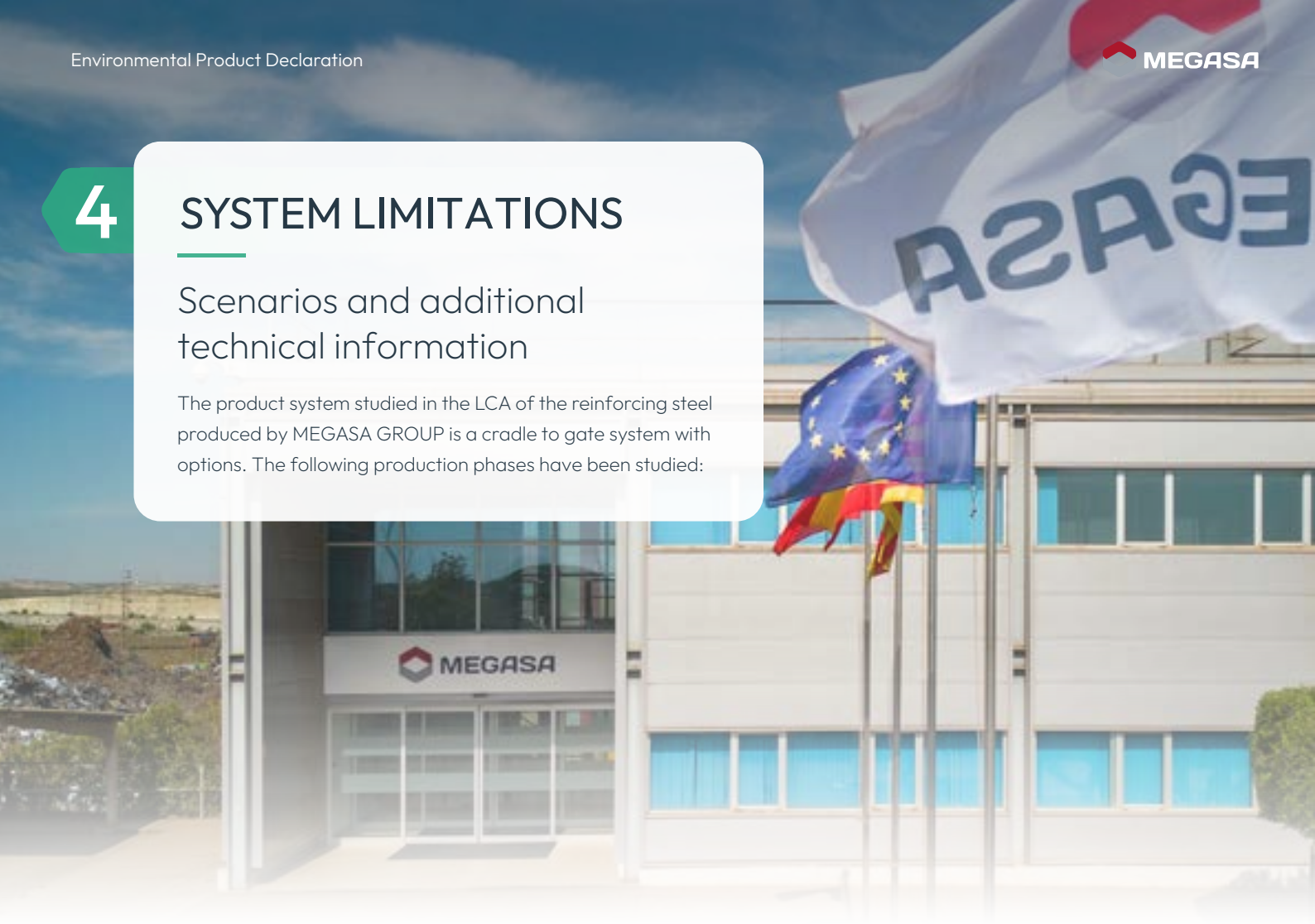
- Technological representativeness (TeR) – 1.99
- Geographical representativeness (GeR) – 2.23
- Temporal representativeness (TiR) – 1.86
- Accuracy (A) – 1.00.



Based on the above data, the Data Quality Rating (DQR) is 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 criterion 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 includes:

- The extraction of resources and production of raw materials.
- Transport to raw material treatment/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 to air and discharges to water and soil during the production of raw materials.
- The generation of electricity used in the manufacturing process.

### Module A2:
### Transport

Transport by truck and ship 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 plant where the steel is manufactured to the customer has been considered, using data from 2024, distinguishing the means of transport used: EURO 6 lorry (18-32 tonnes) or container ship.




| Parameter | | Value (per unit declared) |
|---|---|---|
| Litres of diesel | Lorry | 0.044 l/tkm |
| | Ship | 0.003 l/tkm |
| Average distance | Lorry | 327.59 km |
| | Ship | 2,138.13 km |
| Occupancy rate (including empty return journeys) | | 50% |
| Apparent density of transported products | | 7,850 kg/m3 |
| Useful capacity factor | | 1 |

## Module C1:
## Deconstruction/demolition

In the LCA, it has been assumed that 100% of the steel product manufactured has been used as reinforcement in construction, i.e., integrated into other structures.

To represent the demolition process, a generic process from the Ecoinvent 3.11 database has been used.

## Module C2:
## Transport to the waste treatment/ recovery site.

It is considered that, at the end of its useful life, the product studied is transported to the waste management point in a EURO 5 lorry (18-32 tonnes). The average transport of scrap metal received at the steel plant, authorised as a waste treatment facility for recovery operations (R4 - recycling or recovery of metals and metal compounds), has been considered.

| Life Cycle Information | | | | | | | | | | | | | | | Additional information |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 to A3 | | | A4 to A5 | | B1 to B7 | | | | | | | C1 to C4 | | | | D |
| Product stage | | | Cons-truction 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).



| Parámetro | Valor (por ud. declarada) |
|---|---|
| **Demolition** | 0.626 MJ |
| **Recovery system, specified by type** | 0 kg - reuse |
| | 950 kg - recycling |
| **Disposal, specified by type** | 27.5 kg - final disposal (landfill) |
| | 22.5 kg - incineration |
| **Assumptions for scenario development** | Waste transport to the waste managers Lorry: 275.25 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 | 3.39E+02 | 7.63E+01 | 5.92E+01 | 4.22E+01 | 4.81E+00 | 2.66E-01 | 2.04E+00 |
| GWP-fossil | 3.38E+02 | 7.63E+01 | 5.92E+01 | 4.22E+01 | 4.79E+00 | 2.66E-01 | 1.50E+00 |
| GWP-biogenic | 2.13E-01 | 2.80E-03 | 2.97E-03 | 1.47E-03 | 7.47E-03 | 3.19E-04 | 5.37E-01 |
| GWP-luluc | 1.66E-01 | 1.59E-03 | 2.44E-03 | 6.67E-04 | 9.66E-03 | 8.49E-06 | 5.82E-04 |
| ODP | 6.77E-06 | 1.56E-06 | 9.02E-07 | 9.58E-07 | 7.29E-08 | 5.37E-09 | 1.59E-08 |
| AP | 1.22E+00 | 7.05E-01 | 5.47E-01 | 1.09E-01 | 3.02E-02 | 1.96E-03 | 4.61E-03 |
| EP-freshwater | 8.26E-03 | 5.10E-05 | 5.58E-05 | 2.61E-05 | 3.18E-04 | 9.00E-07 | 2.91E-05 |
| EP-marine | 3.01E-01 | 1.74E-01 | 2.58E-01 | 4.15E-02 | 9.07E-03 | 9.04E-04 | 3.49E-03 |
| EP-terrestrial | 2.75E+00 | 1.93E+00 | 2.83E+00 | 4.54E-01 | 9.99E-02 | 9.92E-03 | 1.94E-02 |
| POFP | 1.14E+00 | 6.06E-01 | 8.44E-01 | 1.80E-01 | 3.03E-02 | 3.03E-03 | 6.10E-03 |
| ADP-minerals&-metals [2] | 5.57E-05 | 1.63E-06 | 2.08E-06 | 1.10E-06 | 2.67E-07 | 8.82E-09 | 3.39E-08 |
| ADP-fossil [2] | 6.78E+03 | 9.94E+02 | 7.75E+02 | 5.61E+02 | 9.64E+01 | 3.52E+00 | 1.23E+01 |
| WDP [2] | 1.14E+02 | 3.24E-01 | 5.78E-01 | 1.79E-01 | 6.94E-01 | 4.31E-03 | 3.59E-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* | 3.39E+02 | 7.63E+01 | 5.92E+01 | 4.22E+01 | 4.81E+00 | 2.66E-01 | 2.04E+00 |
| PM | 2.04E-05 | 3.83E-06 | 1.58E-05 | 2.81E-06 | 4.66E-07 | 7.28E-08 | 7.96E-08 |
| IRP [1] | 5.52E+01 | 9.03E-02 | 6.44E-02 | 5.39E-02 | 6.73E-01 | 3.74E-04 | 4.03E-02 |
| ETP-fw [2] | 4.93E+02 | 3.47E+01 | 2.22E+01 | 2.01E+01 | 6.68E+00 | 5.16E+00 | 1.03E+01 |
| HTP-c [2] | 3.49E-07 | 6.44E-09 | 3.16E-09 | 2.84E-09 | 4.26E-10 | 3.65E-10 | 6.18E-10 |
| HTP-nc [2] | 6.50E-06 | 4.14E-07 | 5.82E-08 | 2.80E-07 | 1.80E-08 | 1.48E-09 | 1.52E-08 |
| SQP [2] | 6.58E+02 | 1.27E+00 | 1.32E+00 | 7.13E-01 | 8.65E+00 | 3.42E+00 | 1.18E+00 |

- **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 | 1.08E+03 | 2.30E+00 | 1.66E+00 | 1.38E+00 | 1.65E+01 | 1.18E-02 | 9.90E-01 |
| PERM | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| PERT | 1.08E+03 | 2.30E+00 | 1.66E+00 | 1.38E+00 | 1.65E+01 | 1.18E-02 | 9.90E-01 |
| PENRE | 6.78E+03 | 9.94E+02 | 7.75E+02 | 5.61E+02 | 9.69E+01 | 3.54E+00 | 1.23E+01 |
| PENRM | 5.33E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | -5.07E-01 | -2.67E-02 | 0.00E+00 |
| PENRT | 6.78E+03 | 9.94E+02 | 7.75E+02 | 5.61E+02 | 9.64E+01 | 3.52E+00 | 1.23E+01 |
| SM | 9.5E+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 | 2.48E+00 | 1.91E-02 | 2.35E-02 | 1.09E-02 | 4.54E-02 | 1.67E-04 | 2.58E-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 | 1.96E-02 | 6.17E-03 | 5.32E-03 | 3.73E-03 | 2.88E-04 | 2.30E-05 | 6.23E-05 |
| NHWD | 1.18E+01 | 2.96E-02 | 2.77E-02 | 1.89E-02 | 4.95E-02 | 4.23E+01 | 1.14E+00 |
| RWD | 3.52E-02 | 5.51E-05 | 3.61E-05 | 3.38E-05 | 5.53E-04 | 2.34E-07 | 3.29E-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 | 1.87E+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+01 | 0.00E+00 |
| EEE | 9.47E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| EET | 1.28E+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 reinforcing steel studied generates the following co-products for sale to third parties:

| Parameter | Kg (per declared unit) |
|---|---|
| Flakes/Mill scale | 1.70E+01 |
| Scrap soil | 1.96E+01 |
| Black slag | 1.14E+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 | 1.17E+00 |

## 6.5. Electricity mix used

The residual electricity mix of the supplier has been used, obtained from the CNMC annual report for 2024.

In addition, the plant has energy with Guarantees of Origin: 30.29% from wind power and 0.31% from solar thermal power.

| Mix - GWP - gCO2 eq/kWh | |
|---|---|
| Average Mix | 197.05 |

# REFERENCES


1

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

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

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

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Life Cycle Assessment Report for Environmental Product Declarations for Megasa Group steel products, prepared by Abaleo S.L., December 2025. Version 2.

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Environmental impact assessment databases and methodologies applied using SimaPro 10.2.0.0.

MEGASA

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## A verified environmental declaration

