



ENVIRONMENTAL PRODUCT DECLARATION

EN

In accordance with
ISO 14025:2006 and

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

**HOT ROLLED, ANNEALED & PICKLED
STAINLESS WIRE ROD**

from

Marcegaglia Stainless Sheffield Ltd

Programme:

The International EPD® System
www.environdec.com

Programme operator:

EPD International AB

EPD registration number:

S-P-12332

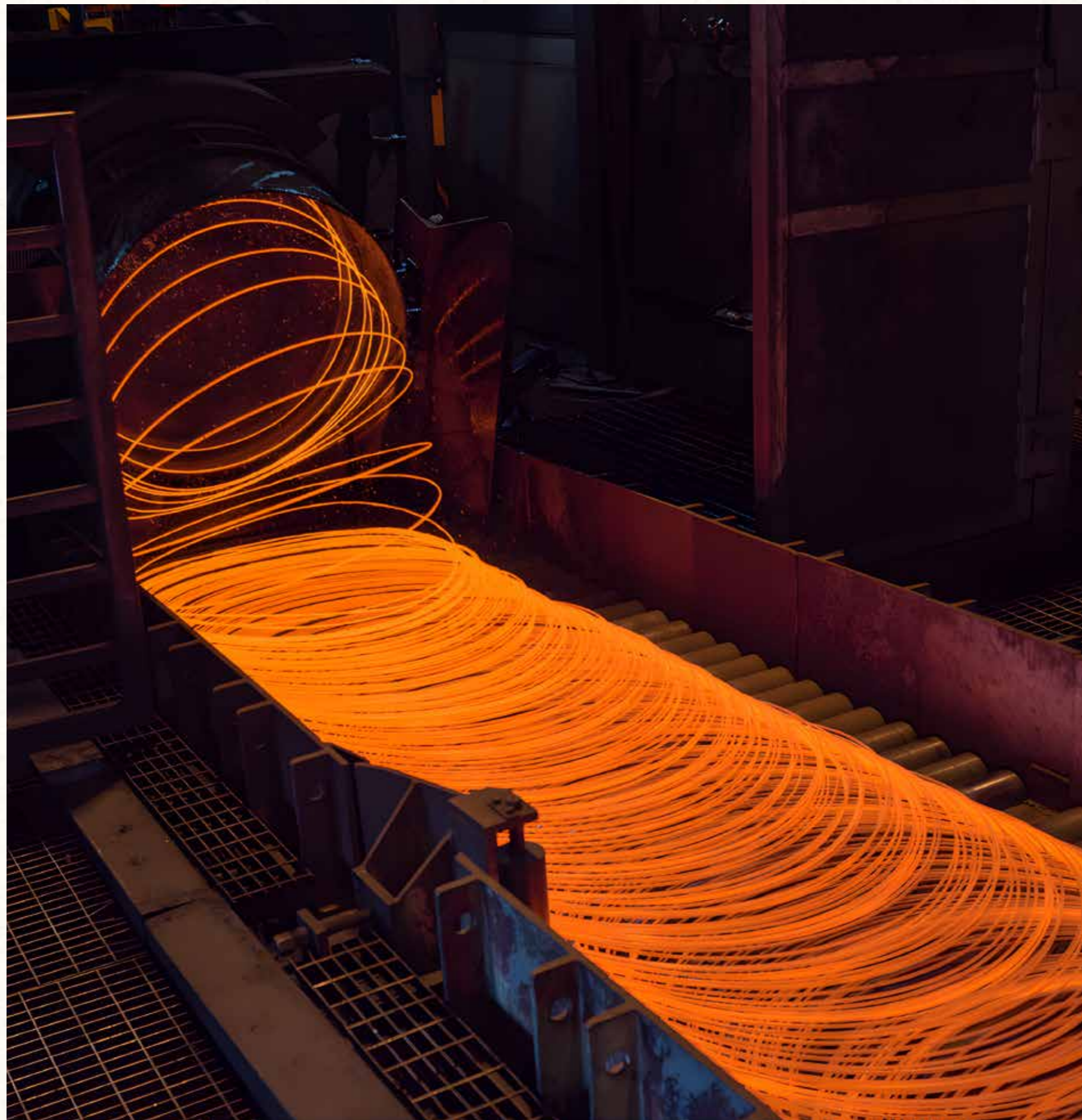
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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com



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General information

PROGRAMME INFORMATION

| | |
|-------------------|---|
| Programme: | The International EPD® System |
| Address: | EPD International AB Box 210 60 SE-100 31 Stockholm Sweden |
| Website: | www.environdec.com |
| E-mail: | info@environdec.com |

Accountabilities for PCR, LCA and independent, third-party verification

Product Category Rules (PCR)

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product Category Rules (PCR): *Constructions products, 2019:14, version 1.3.2, UN CPC code 412*

PCR review was conducted by: *The Technical Committee of the International EPD® System. Review chair: No chair appointed- Contact via the Secretariat www.environdec.com/contact*

Life Cycle Assessment (LCA)

LCA accountability: MADE HSE S.r.l.

Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

EPD verification by accredited certification body

Third-party verification: *Bureau Veritas is an approved certification body accountable for the third-party verification*

The certification body is accredited by: *Accredia*

Procedure for follow-up of data during EPD validity involves third party verifier:

Yes No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, 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 characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

COMPANY INFORMATION

Owner of the EPD:
Marcegaglia Stainless Sheffield Ltd

Contacts:
To obtain more information about this product declaration and / or its configurations, the following references are available:

Mail: ben.lunn@stainless-marcegaglia.com
Tel.: +44 114 261 5226

Description of the organisation:
Marcegaglia is a leading industrial group in the international steel sector, which has been processing steel for over sixty years.

The Group is the world's leading independent steel processor with a product range that covers everything from carbon to stainless steel, from long to flat products, from commodity to specialty.

Product-related or management system-related certifications:

- Quality management system compliant with the requirements of the standard BS EN ISO 9001:2015 (certificate n° GB01982/01 issued by TÜV UK Ltd);
- Environmental management system compliant with the requirements of the standard BS EN ISO 14001:2015 (certificate n° GB01982/01 issued by TÜV UK Ltd);
- Health and safety management system compliant with the requirements of the standard BS ISO 45001:2018 (certificate n° GB01982/01 issued by TÜV UK Ltd).

Name and location of the production site:

ASR (Alloy Steel Rods): Stevenson Rd, Sheffield S9 3XG, United Kingdom.

PRODUCT INFORMATION

Product name:
Hot rolled, annealed & pickled stainless wire rod;

Product identification:
Hot rolled, annealed & pickled stainless wire rod;

Product description:
Continuous cast billets are obtained and are subsequently reheated and rolled to the desired diameter. The rolled coils are annealed and pickled to achieve the required

physical properties and produce a scale free surface to allow for further processing by end customers to achieve their desired product.

UN CPC code
412 Products of iron or steel

Geographical scope
Worldwide

INFORMATION ON THE LCA

Functional unit / declared unit:
The functional unit of the considered system is the tonne of hot rolled, annealed & pickled stainless wire rod produced.

Reference service life:
For the products under study it is not possible to quantify the exact useful life as much also depends on their future use. However, it is emphasized that even when the deadline is reached, the product can be recycled and reused again to generate other raw materials.

Time representativeness:
The data used are representative of the year 2022.

Database(s) and LCA software used:
Ecoinvent database v.3.9.1, January 2023 / Software used SimaPro rel. 9.5.0.0.

Description of system boundaries:
The study is "Cradle to gate with modules C1 - C4 and module D (A1 - A3 + C + D)" (reference: PCR 2019: 14 vers. 1.3.2 valid until 20-12-2024).

Modules A1-A3 include material procurement processes (raw and auxiliary materials) as well as manufacturing processes.

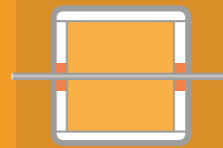
Modules C1-C4 consider the deconstruction, transport, sorting and disposal of components deriving from the end-of-life operations of the product. These operations cannot be controlled directly by the company: in this regard, data from the literature relating to the building sector are therefore used.

- It is considered:
- an average consumption of diesel equivalent to 121 MJ for each ton of material demolished;
 - an average distance of 80 km to transport the material to the recovery center;
 - an average consumption of electricity equal to 28 kWh for each ton of material sorted.

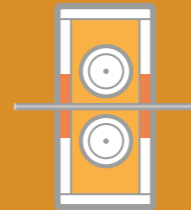
Furthermore, it is assumed that 99% of the material delivered to the treatment center is recoverable. The remaining percentage (1%) is destined for landfill.

Module D considers the recovery and recycling potential of steel deriving from end-of-life processes: the calculation of the environmental benefits deriving from the recovery of steel is based on the indications provided by the document "Product Category Rules for Type III environmental product declaration of construction products to EN 15804: 2012 - Par. 6.3.4.6. Benefits and loads beyond the product system boundary, information Module D ". It should be noted that, in line with what is indicated in the "Life Cycle inventory (LCI) study" of the World Steel Association - May 2021, that the quantity of steel destined for recycling is equal to 85%.

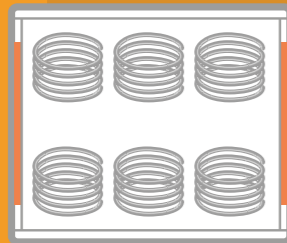
WIRE ROD PRODUCTION



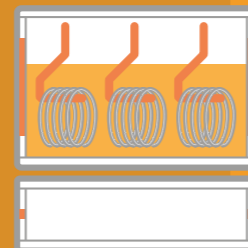
BILLET REHEATING



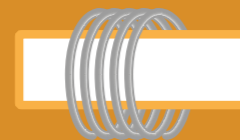
BILLET ROLLING



ANNEALING



PICKLING



FINAL INSPECTION
AND BUNDLING

Other information

DESCRIPTION OF THE MAIN ACTIVITIES

Continuously cast billets are loaded and traversed through two natural gas fired furnaces.

The pre-heating furnace hold roughly 80 billets and reheats billets to around 1000°C.

The billets are then transferred into the final heat furnace which holds and heats around 15 billets to a maximum temperature of 1335°C. This process increases the ductility of the steel to enable the billets to be hot rolled to the desired final diameter.

Billets are roughed down through a 9-pass roughing mill before they are fed into an intermediate and finishing mill. Depending on the final size the rod, the rod is either

fed directly into garret coilers to form a coil, or fed into a Wire Rod block and into a Laying head to form a coil.

The coils are then transferred to a conveyor system and allowed to cool in air. Coils are later loaded into a gas fired rotary hearth annealing furnace where they are heated to 900-1100°C, and subsequently water quenched.

The next step is to remove the scale from the coils via acid pickling (descaling). Coils are descaled in acid baths containing either a mixture of Sulphuric Acid, Hydrofluoric Acid, Hydrogen Peroxide and water or a mixture of Nitric Acid, Hydrofluoric Acid, and water depending on the grade of steel.

ALLOCATION RULES

“Allocation” means the “distribution of pollutant flows to the various products and by-products leaving the supply chain considered according to parameters chosen on a more or less subjective basis (mass, energy value, economic value, etc.)”.

The concept of allocation is a fundamental point of LCA and is linked to the fact that it is practically impossible to analyze a system, referring the available data to each individual activity. For this reason, a phase of subdivision (allocation) of the latter is necessary according to the desired parameters.



MODULES DECLARED

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

| Module | A1-A3 Product stage | | | A4-A5 Construction process stage | | B1-B7 Use stage | | | | | | | C1-C4 End of life stage | | | | D Benefits and loads beyond the system boundary |
|--------------------|---------------------|-----------|---------------|----------------------------------|---------------------------|-----------------|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-----------|------------------|----------|---|
| | Raw material supply | Transport | Manufacturing | Transport | Construction installation | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-Recovery-Recycling-potential |
| Module | A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| Modules declared | X | X | X | ND | ND | ND | ND | ND | ND | ND | ND | ND | X | X | X | X | X |
| Geography | GLO | GLO | GB | - | - | - | - | - | - | - | - | - | GLO | GLO | GLO | GLO | GLO |
| Specific data | > 90% | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Variations-product | Not relevant | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation-site | Not relevant | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

X = Module considered;
 ND = Module not declared;
 GLO = Global;
 GB = Great Britain.



Results of the environmental performance indicators

The environmental performance indicators refer to 1 tonne of hot rolled, annealed & pickled stainless wire rod.

POTENTIAL ENVIRONMENTAL IMPACTS

| Impact category | Abb. | Unit |
|---|------------------|------------------------|
| Climate change - total | GWP - t | kg CO ₂ eq |
| Ozone depletion | ODP | kg CFC11 eq |
| Climate change - Fossil | GWP - fossil | kg CO ₂ eq |
| Climate change - Biogenic | GWP - biogenic | kg CO ₂ eq |
| Climate change - Land use and LU change | GWP - luluc | kg CO ₂ eq |
| Climate change - Greenhouse Gases | GWP - GHG | kg CO ₂ eq |
| Photochemical ozone formation | POCP | kg NMVOC eq |
| Acidification of land and water | AP | mol H+ eq |
| Eutrophication | EP - freshwater | kg P eq |
| | EP - marine | kg N eq |
| | EP - terrestrial | mol N eq |
| Water use | WDP | m ³ depriv. |
| Resource use, fossils | ADP - F | MJ |
| Resource use, minerals and metals | ADP - MM | kg Sb eq |



RESOURCE USE

| Impact category | Abb. | Unit |
|---|-------|----------------|
| Use of renewable primary energy excluding renewable primary energy resources used as raw materials | PERE | MJ |
| Use of renewable primary energy resources used as raw materials | PERM | MJ |
| Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) | PERT | MJ |
| Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials | PENRE | MJ |
| Use of non-renewable primary energy resources used as raw materials | PENRM | MJ |
| Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) | PENRT | MJ |
| Use of secondary material | SM | kg |
| Use of renewable secondary fuels | RSF | MJ |
| Use of non-renewable secondary fuels | NRSF | MJ |
| Use of net fresh water | FW | m ³ |

WASTE PRODUCTION

| Impact category | Abb. | Unit |
|------------------------------|------|------|
| Hazardous waste disposed | HW | kg |
| Non-hazardous waste disposed | NHW | kg |
| Radioactive waste disposed | RW | kg |

OUTPUT FLOW

| Impact category | Abb. | Unit |
|--------------------------------|---------|------|
| Reuse | REUSE | kg |
| Materials for recycling | RECYCLE | kg |
| Materials for energy recovery | EN-REC | kg |
| Exported energy-electricity | EE-E | MJ |
| Exported energy-thermal energy | EE-T | MJ |

HOT ROLLED, ANNEALED & PICKLED STAINLESS WIRE ROD

| Abb. | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|------------------|------------------------|-----------|-----------|-----------|-----------|-----------|------------|
| GWP - t | kg CO ₂ eq | 3,278E+03 | 1,213E+01 | 8,530E+00 | 1,227E+01 | 6,145E-02 | -8,707E+02 |
| GWP - fossil | kg CO ₂ eq | 3,267E+03 | 1,213E+01 | 8,523E+00 | 1,227E+01 | 6,138E-02 | -8,589E+02 |
| GWP - biogenic | kg CO ₂ eq | 8,657E+00 | 2,782E-03 | 3,044E-03 | 1,310E-04 | 3,515E-05 | -1,095E+01 |
| GWP - luluc | kg CO ₂ eq | 2,032E+00 | 1,365E-03 | 4,193E-03 | 1,069E-03 | 3,706E-05 | -8,653E-01 |
| GWP - GHG | kg CO ₂ eq | 3,279E+03 | 1,215E+01 | 8,543E+00 | 1,228E+01 | 6,164E-02 | -8,628E+02 |
| ODP | kg CFC-11 eq | 6,682E-05 | 1,929E-07 | 1,335E-07 | 6,355E-07 | 1,778E-09 | -9,479E-06 |
| POCP | kg NMVOC eq | 1,191E+01 | 1,677E-01 | 4,378E-02 | 2,397E-02 | 6,624E-04 | -3,131E+00 |
| AP | mol H+ eq | 1,486E+01 | 1,124E-01 | 3,081E-02 | 2,446E-02 | 4,625E-04 | -4,927E+00 |
| EP - freshwater | kg P eq | 8,142E-01 | 3,722E-04 | 6,931E-04 | 6,327E-04 | 5,112E-06 | -3,157E-01 |
| EP - marine | kg N eq | 3,002E+00 | 5,209E-02 | 1,025E-02 | 6,685E-03 | 1,776E-04 | -8,665E-01 |
| EP - terrestrial | mol N eq | 3,235E+01 | 5,663E-01 | 1,087E-01 | 6,952E-02 | 1,903E-03 | -9,147E+00 |
| WDP | m ³ depriv. | 1,017E+03 | 3,422E-01 | 6,326E-01 | 3,038E-01 | 6,757E-02 | -1,783E+02 |
| ADP - F | MJ | 4,246E+04 | 1,588E+02 | 1,241E+02 | 2,699E+02 | 1,530E+00 | -9,926E+03 |
| ADP - MM | kg Sb eq | 8,345E-02 | 4,233E-06 | 2,301E-05 | 6,445E-06 | 8,523E-08 | -2,345E-02 |
| PERE | MJ | 4,583E+03 | 1,101E+00 | 1,976E+00 | 8,856E+00 | 1,699E-02 | -2,966E+03 |
| PERM | MJ | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 |
| PERT | MJ | 4,583E+03 | 1,101E+00 | 1,976E+00 | 8,856E+00 | 1,699E-02 | -2,966E+03 |
| PENRE | MJ | 4,317E+04 | 1,571E+02 | 1,250E+02 | 1,948E+02 | 1,523E+00 | -1,126E+04 |
| PENRM | MJ | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 |
| PENRT | MJ | 4,317E+04 | 1,571E+02 | 1,250E+02 | 1,948E+02 | 1,523E+00 | -1,126E+04 |
| SM | kg | 1,021E+01 | 6,661E-02 | 5,019E-02 | 1,961E-02 | 3,684E-04 | -1,043E+02 |
| RSF | MJ | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 |
| NRSF | MJ | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 |
| FW | m ³ | 2,139E+01 | 1,375E-02 | 2,591E-02 | 6,638E-02 | 1,633E-03 | -4,126E+00 |
| HW | kg | 2,622E+02 | 1,095E-01 | 1,965E-01 | 6,113E-02 | 1,657E-03 | -1,114E+02 |
| NHW | kg | 8,501E+02 | 4,659E-01 | 2,149E+01 | 2,365E-01 | 1,663E-02 | -3,687E+02 |
| RW | kg | 1,292E+00 | 1,848E-04 | 2,864E-04 | 1,888E-02 | 2,393E-06 | -2,058E-01 |
| REUSE | kg | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 |
| RECYCLE | kg | 5,404E+02 | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 |
| EN-REC | kg | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 |
| EE-E | MJ | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 |
| EE-T | MJ | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 | 0,000E+00 |

Additional environmental information

CONTENT INFORMATION FOR TONNE OF PRODUCT

| Product components | Weight-t | Post-consumer material, weight-% | Biogenic material, weight-% and kg C/kg |
|--------------------|---------------|----------------------------------|---|
| Chromium | maximum 0.30 | - | - |
| Nickel | maximum 0.38 | - | - |
| Molybdenum | maximum 0.11 | - | - |
| Carbon | maximum 0.012 | - | - |
| Iron | balance | - | - |
| TOTAL | 1 | 77 | - |

| Packaging materials | Weight-t | Weight-% (versus the product) | Weight biogenic carbon, kg C/kg |
|---------------------|----------|-------------------------------|---------------------------------|
| Plastic | 0.000248 | 0.0248 | - |

The materials used for the packaging of the final products consist of plastic bags and straps. The quantities of these packaging compared to one ton of final product identify a value of less than 1%. The products do not contain hazardous substances from the SVHC Candidate List for Authorization in quantities greater than 0,1%.



INTERPRETATION OF THE RESULTS

The raw material purchased by Marcegaglia Stainless Sheffield Ltd, understood as the mix of metal scrap and ferroalloys, is characterized by a recycled content of 77%: this percentage is calculated as a weighted average of the same value associated with the incoming raw material.

The energy mix is modeled considering the British residual electricity mix: the data are reported in the study published by AIB “European Residual Mixes - Results of the calculation of Residual Mixes for the calendar year 2022 - version 1.0, 2023-06-01”.

| Energy Sources | | Value [%] |
|----------------------------------|-------------|--------------|
| Renewable | Biomass | 0.68 |
| | Solar | 2.80 |
| | Wind | 0.39 |
| Nuclear | - | 23.02 |
| Fossil | Hard coal | 2.71 |
| | Oil | 1.01 |
| | Gas | 65.24 |
| | Unspecified | 4.15 |
| CO2 emissions [kgCO2/kWh] | | 0.365 |

The materials used for the packaging of the final products consist of plastic and / or metal straps, wooden saddles and polyester bands. The quantities of these packaging compared to one ton of final product identify a value of less than 1%.

Considering that the raw material contains a percentage of recycled material equal to 77%, this equivalent quantity is not considered in determining the value of the potentially recoverable steel.

The products do not contain hazardous substances from the SVHC Candidate List for Authorization in quantities greater than 0,1%.

The final result is mainly influenced by the types of raw materials arriving at the plant, and in particular by elements such as scrap, ferronickel and ferrochrome. The contribution determined by the energy used on the site (in particular electricity) is also not negligible. The impact caused by the transport of the raw material is insignificant.

It should be noted that at the end of its useful life, the product is destined for recycling. In particular, the amount of steel destined for recycling is 85% in line with what is indicated in the “Life Cycle inventory (LCI) study” of the World Steel Association - May 2021.



References

General Programme Instructions of the International EPD® System. Version 4.0;
 PCR 2019:14 - Version 1.3.2 "CONSTRUCTION PRODUCTS" - Date 2023-12-08;
 BRE "Global Product Category Rules (PCR) For Type III EPD of Construction Products to EN 15804+A2" PN 514 Rev 3.0;
 Ecoinvent database v.3.9.1 - January 2023;
 UNI EN ISO 14025: 2010 "Environmental labels and declarations - Type III environmental declarations - Principles and procedures";
 UNI EN ISO 14040: 2021 "Environmental management - Life cycle assessment - Principles and framework";
 UNI EN ISO 14044:2021 "Environmental management - Life cycle assessment - Requirements and guidelines";
 UNI EN ISO 15804:2021 "Sustainability of buildings - Environmental product declarations - Development framework rules by product category";
 Association of Issuing Bodies - AIB "European Residual Mixes - Results of the calculation of Residual Mixes for the calendar year 2022" - version 1.0, 2023-06-31;
 CSIRO "Metal recycling: The need for a life cycle approach" - May 2013;
 World Steel Association "Life Cycle inventory (LCI) study" - May 2021.





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