

Environmental Product Declaration



In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Hot rolled steel plate

from

METINVEST TRAMETAL S.p.A.



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|--------------------------|---|
| Programme: | The International EPD® System, www.environdec.com |
| Programme operator: | EPD International AB |
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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



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 |

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| 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): CONSTRUCTION PRODUCTS, PCR 2019:14, VERSION 1.2.5 |
| PCR review was conducted by: <i>Martin Erlandsson, IVL Swedish Environmental Research Institute, martin.erlandsson@ivl.se</i> |
| Life Cycle Assessment (LCA) |
| LCA accountability: METINVEST TRAMETAL S.p.A. |
| Third-party verification |
| Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: <input checked="" type="checkbox"/> EPD verification by accredited certification body Third-party verification: <i>DNV Business Assurance</i> is an approved certification body accountable for the third-party verification The certification body is accredited by: <i>Accredia</i> |
| Procedure for follow-up of data during EPD validity involves third party verifier: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> 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: METINVEST TRAMETAL S.p.A.

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Description of the organisation

METINVEST TRAMETAL Spa, part of the Metinvest group, is a steel company that produces steel plates, with production site in San Giorgio di Nogaro (UD).

The plant has a production capacity of 600,000 t/year of heavy-duty plates and enjoys a strategic location in San Giorgio di Nogaro, a locality located in the Aussa-Corno industrial area.

Product-related or management system-related certifications

The company has implemented an environmental management system certified according to ISO 14001, a health and safety management system according to ISO 45001 and a quality management system according to ISO 9001.

Name and location of production site: METINVEST TRAMETAL S.P.A., Via Enrico Fermi, 44 - 33058 - San Giorgio di Nogaro (UD).

Product information

Product name: Hot rolled steel plate

Product description

The reference product is hot rolled steel plate, manufactured in a reversing hot-rolling quarto mill from semi-finished steel product (steel slab). Chemical composition of the slab and rolling parameters are set to guarantee the quality and characteristics of the final product

Product identification

Dimensions of the plate range from 4mm to 180mm thickness, maximum width of 3200mm width, maximum length of 25.000mm and maximum piece weight of 15t. The product is manufactured according to a number of European and international standards, in particular, EN 10025 (Non-alloyed structural steels), EN 10149 (Hot-rolled flat products made of high yield strength), EN 10028 (Steels for pressure purposes), EN 10083 (Steels for quenching and tempering), ASTM A131 (Standard specification for structural steel for ships), ASTM A516.

The products are CE marked according to the Regulation CE 305/2011 "laying down harmonised conditions for the marketing of construction products".

Application: Trametel plates are processed by customers to shape them into the final product in various industrial sectors, such as:

- construction and infrastructure (e.g. construction of bridges)
- ship building and offshore structures (manufacturing of cruise ships, specialized and military vessels, offshore platforms)
- machine building (e.g. lifting equipment, plant machinery)
- renewable and conventional energy (manufacturing of wind towers, equipment for gas transportation and storage)

UN CPC code: 41211 Flat-rolled products of non-alloy steel, not further worked than hot-rolled, of a width of 600 mm or more

Geographical scope:

Modules A1, A2, A4, C1, C2, C3, C4, D: Europe.

Module A3: Italia.

LCA information

Functional unit

The functional unit is 1 ton of product.

Within the production range, the declared product, to which the EPD results refer, is the product with the highest environmental impact of the entire production range; it is a low-alloy steel plate, with the highest energetic processing in the factory (4 mm thickness).

Time representativeness: the reference year for the data collection is 2021

Database and LCA software used: Ecoinvent 3.8 cut-off e Sima Pro 9.4

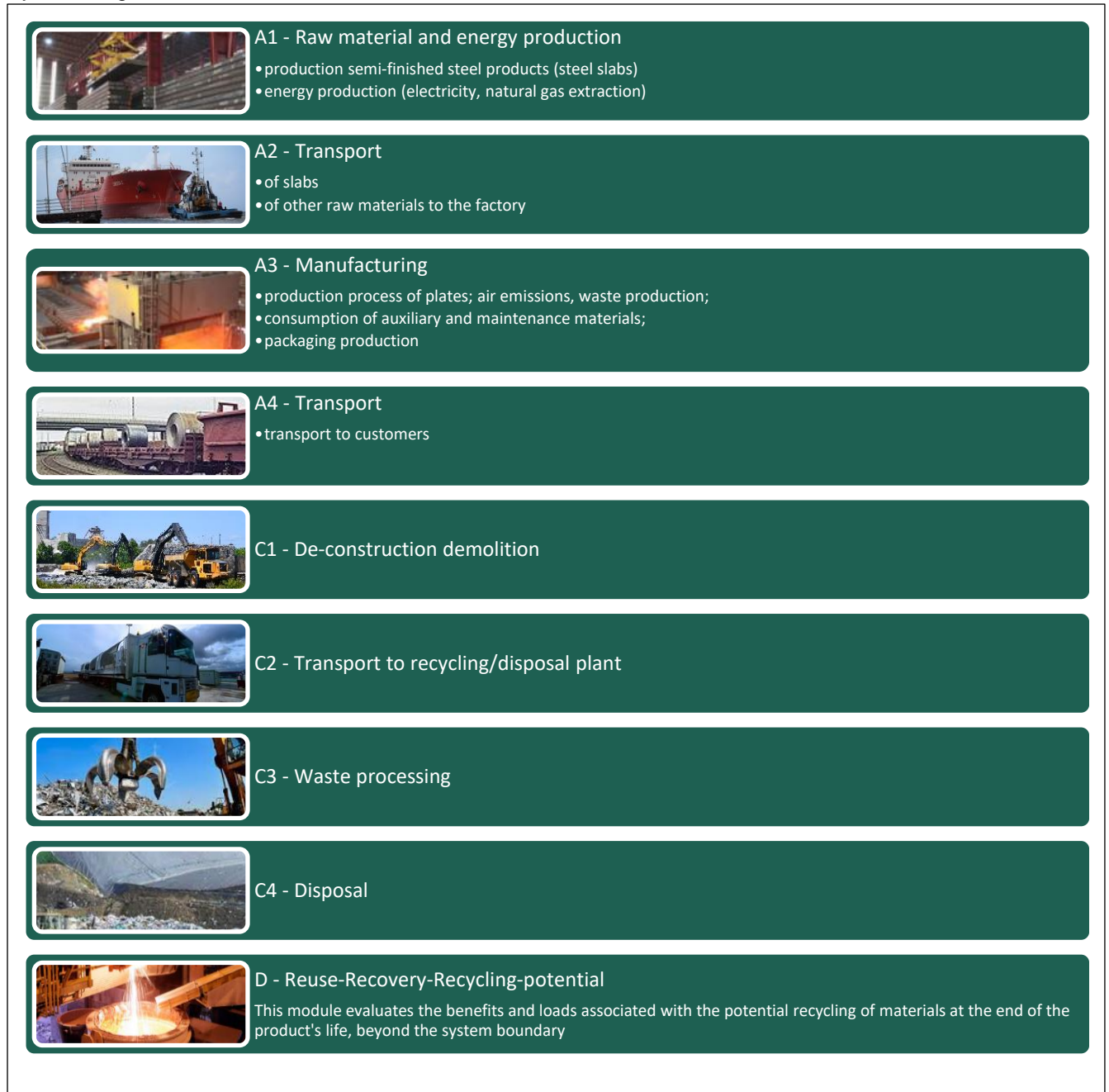
Description of system boundaries

Cradle to gate with options, modules A1-A3 + module A4 + modules C1–C4 and module D.

The system boundaries are from cradle to gate with options and analyse:

- production of semi-finished steel product and auxiliary materials (Module A1)
- transport of semi-finished steel product and auxiliary materials to the production site (Module A2)
- manufacturing of steel plates, waste disposal of production residues, on-site emissions (Module A3)
- transport to customers (module A4)
- end-of-life of products (modules C1-C4)
- module D which calculates the net benefits of product recycling

System diagram:



More information on the LCA study

Within the production range for each indicator, it's declared the highest result of the included products (i.e., the results of a "worst-case product")

To model the steel slabs in the LCA model, the ecoinvent process of low alloy steel from blast furnaces was modified by inserting the energy mix of the country of production.

In San Giorgio di Nogaro plant the energy consumption is specific to each production line, as are the emissions into the atmosphere; the Italian residual mix was used for electricity consumption.

Waste common to all productions has been allocated on a mass basis, as well as wastewater and auxiliary and maintenance products.

A cut-off of 1% in terms of environmental significance was used.

For transport A4, average values for the transport from factory gate to the customers are assumed, based on data of 2021:

| Transport to customers | Unit | Value |
|---|------|--|
| Vehicle used for transportation Usage capacity Density of the product transported | n.a. | 10% by train, 84% by truck (Transport, freight, lorry >32 metric ton, EURO5), 6% by ship |
| Weighted average distance to the customer | km | 565 km |
| Average load factor | t | 15,96 t (GVW 29,96 t) |
| Density of the transported product | kg/m | 7500 kg/mc |

End of life scenario:

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|---|
| C1 – De-construction demolition |
| It is assumed a diesel consumptions for the dismantling operations of 239 MJ/t. |
| C2 – Transport |
| An average distance of 50 km has been assumed for the transport to recycling facility. |
| C3 – Waste processing |
| A 95% recycling rate derived from weighted average recycling rates of country sales was used – Eurostat data for demolition waste in Europe in 2020. |
| C4 – Disposal |
| A landfill percentage of 5% was assumed |
| D – Benefits and loads beyond the system boundary |
| Module D considers the potential environmental benefit of putting recycled steel back on the market. The advantage is considered as the difference between the impacts of a blast furnace, in which virgin ores are used, and an EAF steel mill, using scraps. In calculating the environmental advantage, the melting yield is considered and the content of recycled material already present in the purchased slabs is deducted. |

The LCA study was carried out with the methodological support of e3- studio associato di consulenza

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

| | Product stage | | | Construction process stage | | Use stage | | | | | | | End of life stage | | | | Resource recovery stage |
|----------------------|-------------------------------------|-----------|---------------|----------------------------|---------------------------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-----------|------------------|----------|------------------------------------|
| | 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 | X | ND | ND | ND | ND | ND | ND | ND | ND | X | X | X | X | X |
| Geography | UA | EU | IT | | | | | | | | | | EU | EU | EU | EU | EU |
| Specific data used | 18% | | | | | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation – products | 26% (the worst case is declared) | | | | | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation – sites | N.A. | | | | | - | - | - | - | - | - | - | - | - | - | - | - |

According to the PCR, only the electricity and natural gas consumption data of the plant and the transport data of incoming semi-finished products were considered specific data. The production data of the slabs are not considered specific data, as they are obtained by adapting the Ecoinvent databases to the Ukrainian geographical reality, but not from the primary data of the supplier, as well as the data of the other auxiliary materials used.

Content information

| Product components | Weight, kg | Post-consumer material, weight-% | Biogenic material, weight-% and kg C/kg |
|------------------------------------|------------|----------------------------------|---|
| Unalloyed steel, low alloyed steel | 1000 | 0 | 0 |
| Packaging materials | Weight, kg | Weight-% (versus the product) | Weight biogenic carbon, kg C/kg |
| Steel handle | 0,1 | <0,1% | n.a. |
| Plastic labels | 0,1 | <0,1% | n.a. |
| Wooden slats | 0,6 | <0,1% | 0,18 |

The product does not contain SVHC substances above 0.1%.

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

| Results per functional unit (1t) | | | | | | | | |
|----------------------------------|---|----------|----------|----------|----------|----------|----------|-----------|
| Indicatore | Unità | A1-A3 | A4 | C1 | C2 | C3 | C4 | D |
| GWP-fossil | kg CO ₂ eq. | 2,81E+03 | 4,60E+01 | 2,20E+01 | 0,00E+00 | 2,37E+01 | 2,63E-01 | -1,08E+03 |
| GWP-biogenic | kg CO ₂ eq. | 2,34E+00 | 2,01E-02 | 3,56E-03 | 0,00E+00 | 8,35E-02 | 1,47E-04 | 6,80E-02 |
| GWP-luluc | kg CO ₂ eq. | 1,13E+00 | 1,95E-02 | 2,19E-03 | 0,00E+00 | 4,53E-02 | 2,49E-04 | -1,44E-01 |
| GWP-total | kg CO ₂ eq. | 2,81E+03 | 4,61E+01 | 2,20E+01 | 0,00E+00 | 2,34E+01 | 2,64E-01 | -1,08E+03 |
| ODP | kg CFC 11 eq. | 1,84E-04 | 1,07E-05 | 4,70E-06 | 0,00E+00 | 3,15E-06 | 1,07E-07 | -3,98E-05 |
| AP | mol H ⁺ eq. | 1,14E+01 | 2,11E-01 | 2,28E-01 | 0,00E+00 | 2,83E-01 | 2,48E-03 | -4,31E+00 |
| EP-freshwater | kg P eq. | 1,12E+00 | 3,63E-03 | 6,81E-04 | 0,00E+00 | 1,50E-02 | 2,41E-05 | -4,70E-01 |
| EP-marine | kg N eq. | 2,54E+00 | 6,48E-02 | 1,01E-01 | 0,00E+00 | 6,40E-02 | 8,61E-04 | -9,45E-01 |
| EP-terrestrial | mol N eq. | 2,70E+01 | 7,07E-01 | 1,11E+00 | 0,00E+00 | 7,17E-01 | 9,42E-03 | -1,03E+01 |
| POCP | kg NMVOC eq. | 1,16E+01 | 2,22E-01 | 3,05E-01 | 0,00E+00 | 1,98E-01 | 2,74E-03 | -5,37E+00 |
| ADP-minerals&metals* | kg Sb eq. | 3,57E-02 | 1,12E-04 | 1,13E-05 | 0,00E+00 | 2,81E-03 | 6,01E-07 | -1,92E-02 |
| ADP-fossil* | MJ | 3,19E+04 | 7,14E+02 | 3,01E+02 | 0,00E+00 | 3,28E+02 | 7,35E+00 | -9,42E+03 |
| WDP* | m ³ | 4,38E+02 | 2,68E+00 | 4,72E-01 | 0,00E+00 | 4,32E+00 | 3,31E-01 | -1,32E+02 |
| Acronyms | GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption | | | | | | | |

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

Potential environmental impact – additional mandatory and voluntary indicators

| Results per functional unit (1t) | | | | | | | | |
|----------------------------------|------------------------|----------|----------|----------|----------|----------|----------|-----------|
| Indicatore | Unità | A1-A3 | A4 | C1 | C2 | C3 | C4 | D |
| GWP-GHG ¹ | kg CO ₂ eq. | 2,72E+03 | 4,56E+01 | 2,18E+01 | 0,00E+00 | 2,35E+01 | 2,59E-01 | -1,03E+03 |

Use of resources

| | | | | | Results per functional unit (1t) | | | | |
|------------|--|----------|----------|-----------|----------------------------------|----------|----------|----------|-----------|
| Indicatore | Unità | A1-A3 | A4 | A5* | C1 | C2 | C3 | C4 | D |
| PERE | MJ | 2,31E+03 | 1,23E+01 | 0 | 1,69E+00 | 0,00E+00 | 5,09E+01 | 6,27E-02 | -7,71E+02 |
| PERM | MJ | 1,47E+02 | 0,00E+00 | -1,47E+02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| PERT | MJ | 2,46E+03 | 1,23E+01 | 0 | 1,69E+00 | 0,00E+00 | 5,09E+01 | 6,27E-02 | -7,71E+02 |
| PENRE | MJ | 3,19E+04 | 7,14E+02 | 0 | 3,01E+02 | 0,00E+00 | 3,28E+02 | 7,36E+00 | -9,42E+03 |
| PENRM | MJ | 0,00E+00 | 0,00E+00 | 0 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| PENRT | MJ | 3,19E+04 | 7,14E+02 | 0 | 3,01E+02 | 0,00E+00 | 3,28E+02 | 7,36E+00 | -9,42E+03 |
| SM | kg | 1,98E+02 | 0,00E+00 | 0 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| RSF | MJ | 0,00E+00 | 0,00E+00 | 0 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| NRSF | MJ | 0,00E+00 | 0,00E+00 | 0 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| FW | m ³ | 6,78E+01 | 7,74E-01 | 0 | 1,54E-01 | 0,00E+00 | 1,17E+00 | 1,17E-02 | 3,58E+00 |
| Acronyms | PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water | | | | | | | | |

* The module A5 was added for the sole purpose of balancing the energy stored in the packing material.

¹ This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

Waste production and output flows

Waste production

| Results per functional unit (1t) | | | | | | | | |
|----------------------------------|-------|----------|----------|----------|----------|----------|----------|-----------|
| Indicatore | Unità | A1-A3 | A4 | C1 | C2 | C3 | C4 | D |
| Hazardous waste disposed | kg | 5,97E-01 | 1,70E-03 | 8,26E-04 | 0,00E+00 | 9,44E-04 | 1,11E-05 | -1,09E-01 |
| Non-hazardous waste disposed | kg | 1,17E+03 | 6,37E+01 | 4,10E-01 | 0,00E+00 | 9,60E+02 | 5,00E+01 | -3,10E+02 |
| Radioactive waste disposed | kg | 5,97E-02 | 4,81E-03 | 2,08E-03 | 0,00E+00 | 1,93E-03 | 4,82E-05 | 4,94E-03 |

Output flows

| Results per functional unit (1t) | | | | | | | | |
|----------------------------------|------|----------|----------|----------|----------|----------|----------|----------|
| Indicator | Unit | A1-A3 | A4 | C1 | C2 | C3 | C4 | D |
| Components for re-use | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Material for recycling | kg | 9,82E+01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 9,50E+02 | 0,00E+00 | 0,00E+00 |
| Materials for energy recovery | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported energy, electricity | MJ | 0,00E+00 | 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 | 0,00E+00 |

Additional environmental information

The Metinvest Trameal factory has implemented an environmental management system certified according to the ISO 14001 standard.

References

General Programme Instructions of the International EPD® System. Version 4.0.
 PCR CONSTRUCTION PRODUCTS, PCR 2019:14 VERSION 1.2.5 del 01/11/2022 del sistema EPD®

Studio LCA di lamiera in acciaio – Metinvest Trameal SpA – 29/12/2022

