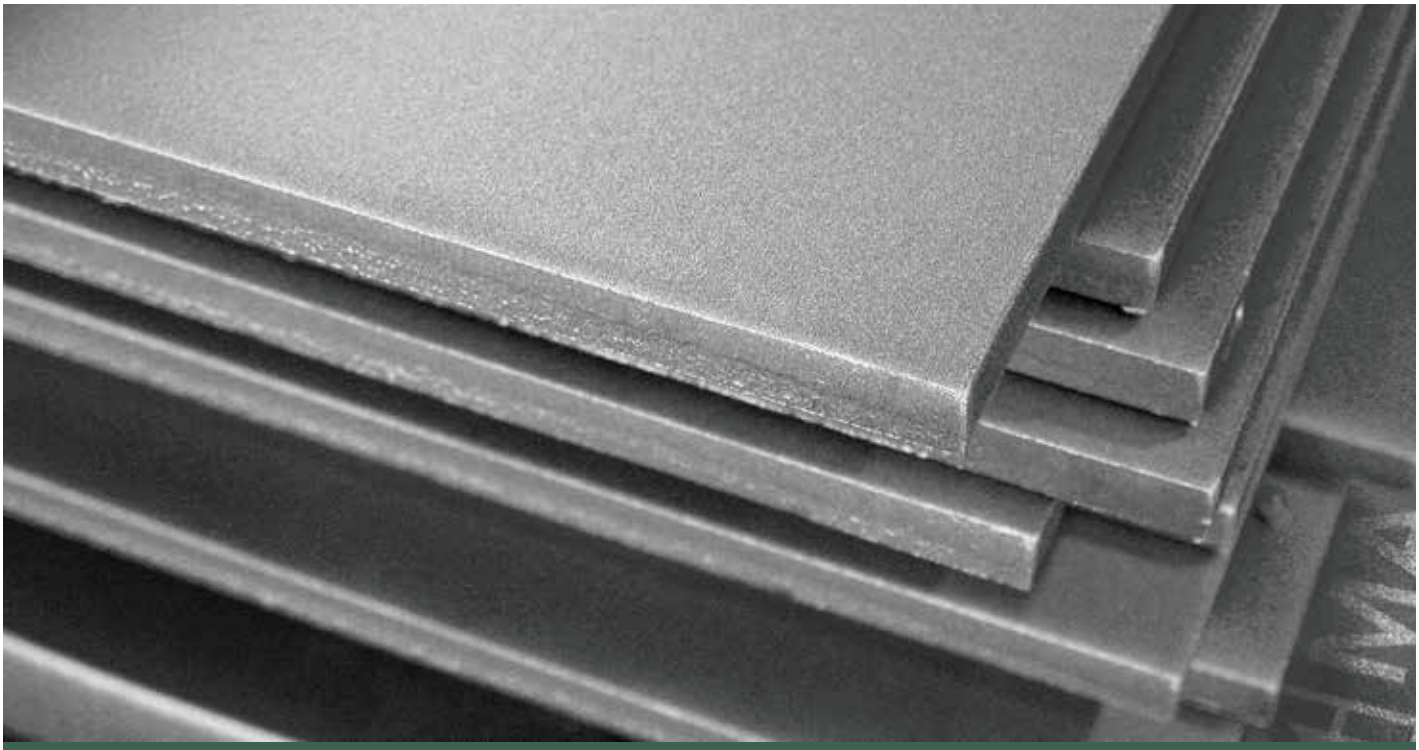


ENVIRONMENTAL PRODUCT DECLARATION

EN

Programme:
The International EPD® System
www.environdec.com

Programme operator:
EPD International AB

EPD registration number:
S-P-07868

Publication date:
23-12-2022

Revision date
2023-02-15

Valid until:
23-12-2027

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

In accordance with
ISO 14025 and
EN 15804:2012+A2:2019 for:

HOT ROLLED STEEL PLATE

From:

Marcegaglia Plates S.p.A.

MARCEGAGLIA PLATES

ECO PLATFORM EPD VERIFIED

EPD®

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

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

Product Category Rules (PCR):
Construction products, 2019:14, version 1.11, UN CPC 4123, *valid until 31-03-2023*

PCR review was conducted by:
The Technical Committee of the International EPD® System. Review chair: Claudia A. Peña
Contact via the Secretariat www.environdec.com/contact

Independent third-party verification of the declaration and data, according to ISO 14025:2010, via:

☒ EPD verification by individual verifier

Third-party verifier:
Guido Croce

Approved by:
International EPD® System Technical Committee, supported by the Secretariat

Procedure for follow-up of data during EPD validity involves third party verifier:
☒ Si ☐ No

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

EPDs within the same product category but from different programmes may not be comparable.

EPDs of construction products may not be comparable if they do not comply with UNI EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

COMPANY INFORMATION

Owner of the EPD:
Marcegaglia Plates S.p.A.
lamieretreno@marcegaglia.com

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

Mail: info@marcegaglia.com

Tel.: +39 0376 6851

Description of the organisation:
Marcegaglia Plates S.p.A, located in San Giorgio di Nogaro, operates in the hot rolling sector and produces heavy plates using a quarto rolling mill. The production process is powered by a single raw material, a semi-finished steel product called slab which, thanks to integrated logistics, first arrives by ship or train and is then transported by truck to the factory.

Thanks to the versatility of the various production lines present, it is possible to obtain a multiple range of products, also upon customer request, by means of subsequent processing of the train plate. Products can be made with different dimensions, thermal resistance or surface finish.

Product-related or management system-related certifications:

- Quality management system compliant with the requirements of the standard UNI EN ISO 9001:2015 (certificate n° 16499/07/S – valid until 19/06/2025);
- Environmental management system compliant with the requirements of the standard UNI EN ISO 14001:2015 (certificate n° EMS-262/S – valid until 25/07/2025);
- Health and safety management system compliant with the requirements of the standard UNI ISO 45001:2018 (certificate n° OHS-260 – valid until 25/09/2025);
- Energy management system compliant with the requirements of the standard UNI CEI EN ISO 50001:2018 (certificate n° EnergyMS-136 – valid until 23/11/2023);
- Social responsibility management system compliant with the requirements of the standard SA 8000:2014 (certificate n° SA-2040 – valid until 07/04/2025).

Name and location of production site(s):

- Plant located in Enrico Fermi street, 33 - San Giorgio di Nogaro (UD).

PRODUCT INFORMATION

Product name:
Hot rolled steel plate

Product identification:
Hot rolled steel plate

Product description:
The production cycle begins with the arrival of the slabs (raw material) at the company. The raw material is delivered to the rolling mill after undergoing an initial oxy-cutting process (slab cuts). The loading phase of the slabs consists in feeding the reheating furnace by means of a bridge crane equipped with an electromagnet.

The kiln is a three-way “push” type with vaulted burners (the temperature inside the kiln reaches a heat of about 1250°C); the slabs travel the route in about six hours, to reach the optimum temperature for lamination At the exit of the furnace, descaling is carried out in order to remove the scale formed by oxidation during the heating of the iron and steel product.

Subsequently, the slab is subjected to rolling by making it make a series of passages between a pair of cylinders, until the moment in which the desired thickness is obtained, then the sheet is transferred through the roller conveyor for cutting to size

Different reworkings can then be applied: trimming, milling, shot blasting with flattening, normalization heat treatment.

From the company website it is possible to consult the product catalogs within which the technical characteristics of the same are described in detail.

UN CPC CODE:
UN CPC 4123 Flat-rolled products of steel, further worked than hot-rolled or cold-rolled.

Geographical scope:
Worldwide

LCA INFORMATION

Functional unit:
The functional unit of the system considered is 1 tonne of product.

Reference service life - RSL:
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 2021.

Database(s) and LCA software used:
Ecoinvent database v.3.8, November 2021 / Software used SimaPro rel. 9.3.0.3.

Description of the system boundaries:
The study is “Cradle to gate with modules C1 – C4 and module D (A1 – A3 + C + D)” (reference: PCR 2019: 14 vers. 1.11 valid until 31-03-2023).

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

Modules C1-C4 consider the uninstallation, transport, sorting and disposal of components deriving from the end-of-life operations of road barriers. These operations are not directly controllable by the company: in this regard, literature data relating to the construction sector are therefore used. It is considered:

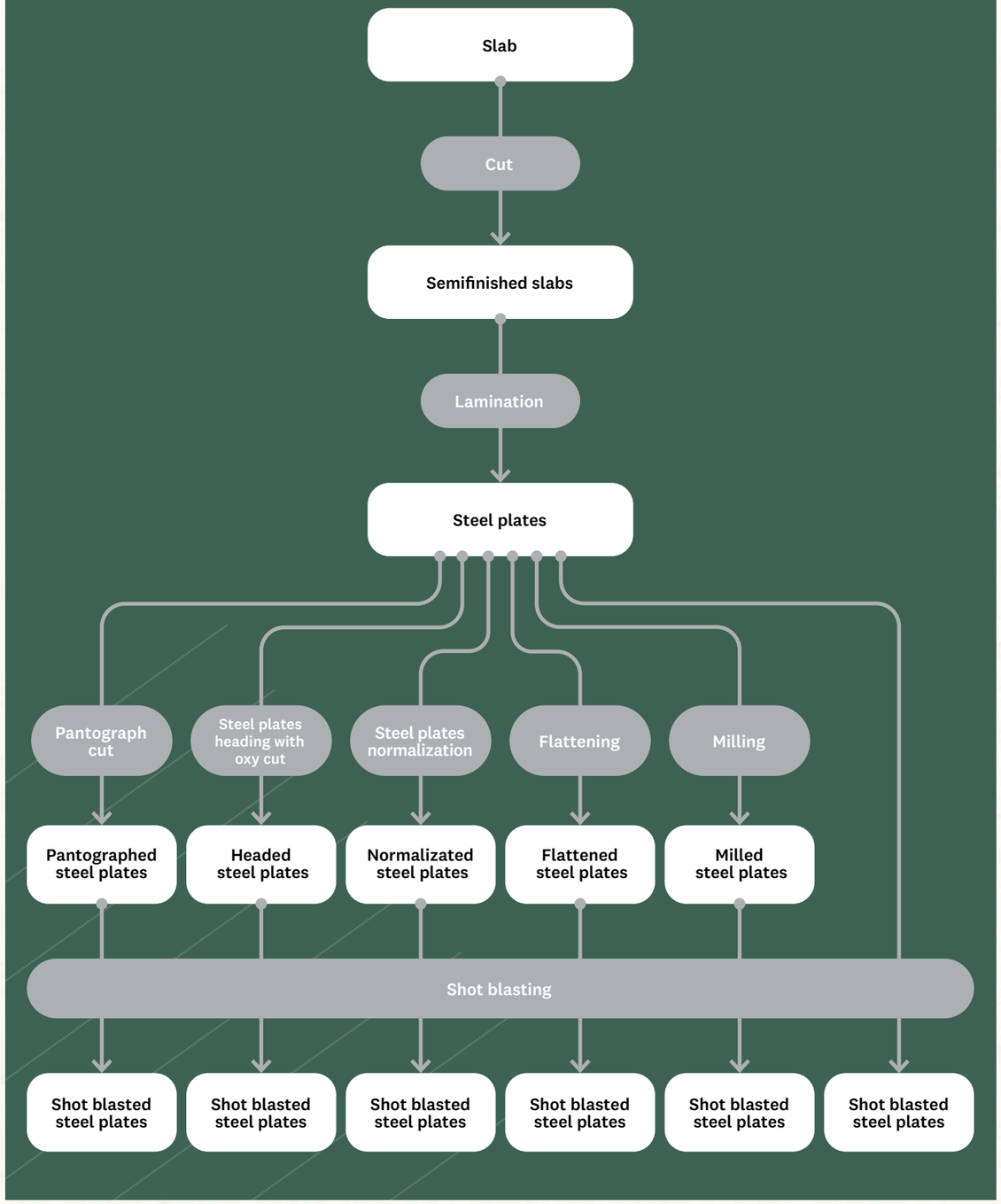
- an average consumption of diesel fuel equivalent to 239 MJ as well as 28 kWh of electricity for each ton of demolished material;
- an average distance of 80 km to transport the material to the recovery center;
- the same energy consumption already mentioned for the demolition activity also for the waste treatment activity.

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 “.

DIFFERENCES VERSUS PREVIOUS VERSIONS

Compared to the previous version, the results of the environmental impact indicators have not changed. In the paragraph “Information on the content” a more exhaustive explanation is given on the method of calculating the percentage value of recycled material content referred to the raw material of the product covered by the Declaration.

BLOCK DIAGRAM OF THE SHEET METAL PRODUCTION PROCESS



- A Reception and vehicle check zone
- B Covered area
- C Raw material inventory area
- 1 Slab oxy cut
- 2 Slab pre-heating furnace
- 3 Rolling mill
- 4 Shearer
- 5 Hot leveller
- 6 Cooling area
- 7 Plasma cut
- 8 Normalizing furnace
- 9 Indoor inventory area
- 10 Shot blasting
- 11 Service center
- 12 Mechanical trimmer
- 13 Flattening machine
- 14 Plate butting

Other informations:

DESCRIPTION OF THE MAIN ACTIVITIES

The Marcegaglia Plates rolling process begins with the marking of the slabs (for full product traceability) and continues with their cutting and preheating. The fourth rolling plant processes approximately 400.000 tons/year of heavy plates which partly supply the service centre, and partly are subject to normalization during processing – with temperature control – if not normalization in the furnace for specific applications.

The production cycle begins with the arrival at the company of the steel slabs transported by road and delivered to the factory. The raw materials consist of:

- Slabs arriving from third party companies

In detail, the processing cycle takes place through the phases described below:

Slab cutting
the raw material arrives at the rolling mill after undergoing an initial oxy-cutting process (slab cuts). The slabs, in order to obtain dimensions compatible with the subsequent rolling phase, are transferred from the storage area to the cutting line. The oxy-cutting takes place on a line by means of two stations with four torches, fed with oxygen and methane. There is also a slab preheating station before oxyfuel cutting to bring the cutting area to 300°C.

Heating furnace
The loading phase of the slabs consists in feeding the heating form by means of a bridge crane equipped with an electromagnet. It is a three-way pusher furnace with vaulted burners.

The slabs positioned on the loading surface of the furnace are moved by special pushers which insert them into the furnace so that in correspondence with a slab leaving the furnace, there is one entering.

The temperature inside the furnace reaches a value of about 1250°C; the slabs travel the journey in about six hours, to reach the optimum temperature for lamination.

At the exit of the furnace, a chute conveys the slabs onto the roller conveyor of the rolling mill; from the pulpit, positioned above the rolling mill, the operators start the cycle which initially involves descaling in order to remove the scale formed by oxidation during the heating of the iron and steel product. This process is performed by spraying a high pressure jet of water on the surface of the slab itself, causing the detachment of the surface layer of incandescent material.

Quarto rolling mill
Once the descaling has taken place, the slab is subjected to rolling (of the reversible type IV 2 shoulder rollers 2 shoulder rollers) making it go through a series of passages between a pair of cylinders controlled from the pulpit.

With each pass, the distance between the cylinders decreases and the slab reduces in thickness and increases in length and width, until the desired thickness is obtained.

Cutting and flattening
Once the lamination has been completed and the desired sheet thickness has been reached, the sheet is transferred through the roller conveyor to the guillotine cutter where the operator in charge proceeds to cut the sheet metal to size, from here the pieces are transferred, again via roller conveyor, to the station flattening process where the sheet passes through rollers which give it the final flatness appearance, partially spreading the deformations and tensions inherent in the material generated by the dragging of the lamination.

Discharging
After flattening, the plates pass over a plate with mobile side members where they undergo cooling in the ambient air before being picked up with special devices equipped with electromagnets for transport and storage in the warehouse.

The plates obtained are made recognizable by entering the identification data; they are then deposited in the warehouse, ready for delivery to customers or to be subjected to possible cutting, milling, shot blasting or subsequent flattening.

Service centre
The cut, intended as head-to-tail cut or trimming, is carried out using pantographs. In the plant there are 5 pantographs with “oxy-cutting” technology and n. 1 pantograph with “plasma cutting” technology. The “oxy-cutting” system uses torches mounted on mobile supports powered by oxygen and methane while the “plasma cutting” system uses mobile supports powered by compressed air and electricity. Both types of pantograph reduce the sheet metal to marketable dimensions based on customer needs. The pantographs consist of a fixed pallet and a mobile cutting carriage on which the torches are mounted.

The positioning of the cutting torches and the advancement of the carriage are controlled by numerical control, whose console, located on the edge of the line, is integral with the carriage.

Milling is performed to remove surface layers of metal until the required dimensional characteristics are reached. The milling machine consists of a mobile bench on which the plates are positioned and fixed and of two milling heads which work the lateral edges of the same.

Shot blasting with in-line flattening is a surface treatment of steel which allows the mechanical removal of iron oxides by throwing manganese steel spheres against the surface being processed to prepare the surface of the sheet metal for subsequent treatments or surface machining. The sheet metal flattening is also performed in line: this process consists of a series of opposing rollers through which the sheet metal is passed. These rollers are controlled from the control pulpit, which offers a good view of the work area.

The machine, in its entirety, is preceded and followed by a roller path which feeds the sheets being processed and is in line with a leveler so that the sheet is leveled after processing.

Normalization
Normalization is a heat treatment which consists in heating the pieces coming from the rolling plant to a certain temperature in order to obtain a chemical, structural and mechanical balance of the material. The loading phase takes place via a roller way. Inside the heating chamber, the plates undergo heating that varies from about 800°C to about 950°C depending on the type of steel treated. Once out of the furnace, the plates are then cooled to room temperature.

Raw material storage and shipping
The finished products are then stored in special areas, concluding with the handling of the products that leave the factory, it is reported that the most used means of transport is represented by vehicles that leave daily, which reach the final destination or transport the product up to the nearby logistic point for subsequent transport by train or ship.

ALLOCATION RULES

An allocation was made on a mass basis for energy consumption, water discharges, atmospheric emissions and waste.

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

	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	IT	-	-	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	IT
Specific data	> 90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variations-product	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variaition-site	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-

X = Module considered
ND = Module not declared
GLO = Global
IT = Italy

Additional information

The raw material purchased by Marcegaglia Plates S.p.A. it is characterized by a recycled content of 29,9%: this percentage is calculated as a weighted average of the same value associated with the incoming raw material and deriving both from Type III environmental declarations as well as from self-declarations compliant with the UNI EN ISO standard 14021.

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%.

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

Environmental information

The environmental performance indicators refer to 1 tonne of tube product.

POTENTIALL 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 FLOWS

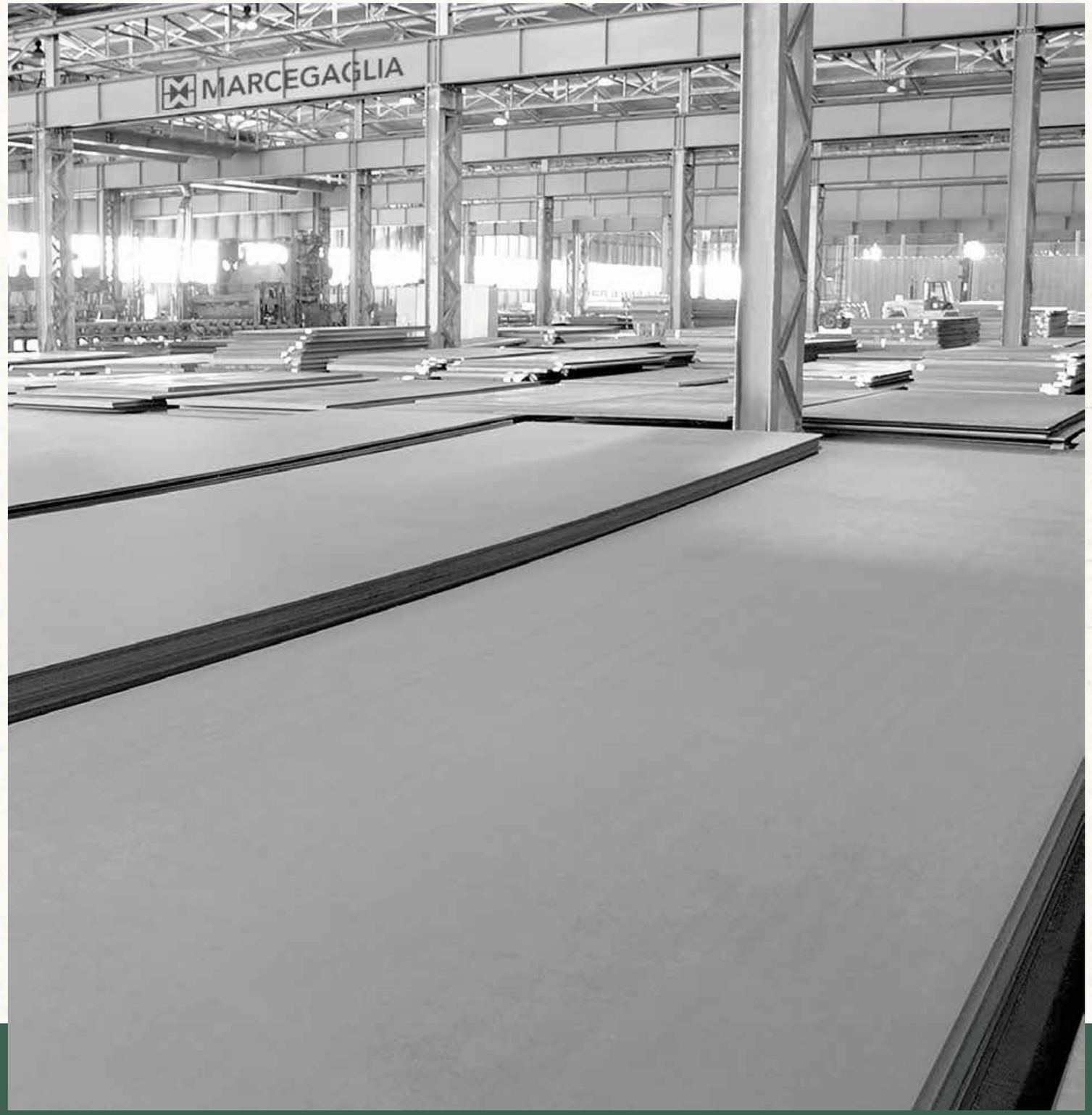
Impact category	Abb.	Unit
Reuse	REUSE	kg
Materials for recycling	RECYCLE	kg
Materials for energy recovery	EN - REC	kg
Exported energy-electricity	EE - E	MJ
Exported energy-thermal energy	EE - T	MJ

HEAVY PLATE

Abb.	U.d.m.	A1-A3	C1+C4	D
GWP - t	kg CO_2 eq	2,049E+03	4,313E+01	-6,927E+02
GWP - fossil	kg CO_2 eq	2,047E+03	4,311E+01	-6,907E+02
GWP - biogenic	kg CO_2 eq	1,185E+00	1,175E-02	-1,279E+00
GWP - luluc	kg CO_2 eq	1,161E+00	6,331E-03	-5,433E-01
GWP - GHG	kg CO_2 eq	1,979E+03	4,260E+01	-6,673E+02
ODP	kg CFC-11 eq	1,185E-04	8,528E-06	-3,350E-05
POCP	kg NMVOC eq	9,138E+00	3,672E-01	-3,070E+00
AP	mol H+ eq	9,319E+00	3,156E-01	-3,104E+00
EP - freshwater	kg P eq	9,986E-01	3,400E-03	-3,232E-01
EP - marine	kg N eq	2,182E+00	1,200E-01	-7,429E-01
EP - terrestrial	mol N eq	2,117E+01	1,312E+00	-7,051E+00
WDP	m³ depriv.	5,195E+02	2,788E+00	-1,707E+02
ADP - F	MJ	2,244E+04	6,271E+02	-7,191E+03
ADP - MM	kg Sb eq	2,493E-02	4,094E-05	-8,817E-03
PERE	MJ	2,29E+03	3,09E+01	-8,14E+02
PERM	MJ	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,29E+03	3,09E+01	-8,14E+02
PENRE	MJ	2,69E+04	6,22E+02	-8,81E+03
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,69E+04	6,22E+02	-8,81E+03
SM	kg	4,27E+02	1,32E-01	-1,27E+02
RSF	MJ	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00
FW	m³	1,80E+01	1,05E-01	-7,96E+00
HW	kg	1,217E+02	2,57E-01	-3,98E+01
NHW	kg	7,512E+02	1,25E+00	-2,80E+02
RW	kg	6,374E-01	3,93E-02	-2,19E-01
REUSE	kg	0,00E+00	0,00E+00	0,00E+00
RECYCLE	kg	5,08E+00	2,18E-01	-3,49E+02
EN - REC	kg	0,00E+00	0,00E+00	0,00E+00
EE - E	MJ	0,00E+00	0,00E+00	0,00E+00
EE - T	MJ	0,00E+00	0,00E+00	0,00E+00

"REWORKED" HEAVY PLATE

Abb.	U.d.m.	A1-A3	C1+C4	D
GWP - t	kg CO_2 eq	2,336E+03	4,313E+01	-6,338E+02
GWP - fossil	kg CO_2 eq	2,332E+03	4,311E+01	-6,320E+02
GWP - biogenic	kg CO_2 eq	1,629E+00	1,175E-02	-1,171E+00
GWP - luluc	kg CO_2 eq	1,259E+00	6,331E-03	-4,972E-01
GWP - GHG	kg CO_2 eq	2,258E+03	4,260E+01	-6,106E+02
ODP	kg CFC-11 eq	1,478E-04	8,528E-06	-3,065E-05
POCP	kg NMVOC eq	1,020E+01	3,672E-01	-2,809E+00
AP	mol H+ eq	1,019E+01	3,156E-01	-2,840E+00
EP - freshwater	kg P eq	1,078E+00	3,400E-03	-2,958E-01
EP - marine	kg N eq	2,481E+00	1,200E-01	-6,798E-01
EP - terrestrial	mol N eq	2,348E+01	1,312E+00	-6,452E+00
WDP	m³ depriv.	5,839E+02	2,788E+00	-1,562E+02
ADP - F	MJ	2,640E+04	6,271E+02	-6,580E+03
ADP - MM	kg Sb eq	2,673E-02	4,094E-05	-8,068E-03
PERE	MJ	2,52E+03	3,09E+01	-7,45E+02
PERM	MJ	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,52E+03	3,09E+01	-7,45E+02
PENRE	MJ	3,13E+04	6,22E+02	-8,06E+03
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	3,13E+04	6,22E+02	-8,06E+03
SM	kg	4,58E+02	1,32E-01	-1,16E+02
RSF	MJ	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00
FW	m³	1,98E+01	1,05E-01	-7,28E+00
HW	kg	1,342E+02	2,57E-01	-3,64E+01
NHW	kg	8,091E+02	1,25E+00	-2,56E+02
RW	kg	7,143E-01	3,93E-02	-2,01E-01
REUSE	kg	0,00E+00	0,00E+00	0,00E+00
RECYCLE	kg	5,76E+00	2,18E-01	-3,19E+02
EN - REC	kg	0,00E+00	0,00E+00	0,00E+00
EE - E	MJ	0,00E+00	0,00E+00	0,00E+00
EE - T	MJ	0,00E+00	0,00E+00	0,00E+00



Additional information

HEAVY PLATE

The most impacting element in the production of heavy plate is the slab entering the plant, whose construction and subsequent procurement account for approximately 92%. The processing of the rolling with the fourth rolling mill technology accounts for the remaining 8%, mainly due to the natural gas used during the hot process (4.9% of the impact).

“REWORKED” HEAVY PLATE

Analyzing the reworked heavy plate, sold after processing through specific treatments, it can be observed that the assumptions regarding the impact indicated above remain valid. Although the sheet metal marketed can undergo multiple processes, both heat treatment and mechanical treatment, the impact of the same is equal to about 5% for the heat treatment process while 1.2% for mechanical processes while the greater weight is due to the production of train plate.

SUSTAINABILITY

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 88% in line with what is indicated in the “Special waste report” of ISPRA - No. 367/2022.

MANAGEMENT SYSTEM

With reference to the management systems used by the company, it is emphasized that the presence of an environmental management system (certified pursuant to UNI EN ISO 14001: 2015) and safety (certified pursuant to UNI ISO 45001: 2018) testify to the company’s commitment to pursue the continuous improvement of its environmental and safety performance, for example by properly managing the hazardous substances, the waste produced by its business as well as maintaining the pollutants emitted into the atmosphere as well as water discharges. Within the environmental management system there is also a specific data management procedure for the study of the product life cycle. Year after year, the company plans new improvement objectives aimed at increasing its performance.

The company has implemented an energy management system certified in accordance with the UNI CEI EN ISO 50001: 2018 standard to identify the most relevant plants in terms of energy as well as define opportunities for improvement in order to reduce the energy consumption determined by the carrying out its business.

References

General Programme Instructions of the International EPD® System. Version 3.01.

PCR 2019:14 - Version 1.11 “CONSTRUCTION PRODUCTS” – Date 2021-02-05;

Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012;

Ecoinvent database v.3.8 – Novembre 2021;

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”;

European Residual Mixes 2021 Association of Issuing Bodies “European Residual Mixes - Results of the calculation of Residual Mixes for the calendar year 2021” – version 1.1, 2022-05-31;

CSIRO “Metal recycling: The need for a life cycle approach” – May 2013;

Environmental engineering “WASTE FROM CONSTRUCTION AND LCA DEMOLITION FROM THE DEMOLITION OF 51 RESIDENTIAL BUILDINGS” - Michele Paleari, Politecnico di Milano – 26-11-2015;

ISPRA “ Special waste report” – n° 367/2022 – Ed. June 2022.

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