



ENVIRONMENTAL PRODUCT DECLARATION

EN

In accordance with
ISO 14025:2006 and

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

**FLAT/LONG PRODUCT FROM
CONTINUOUS CASTING
IN STAINLESS STEEL**

from

Marcegaglia Stainless Sheffield Ltd

Programme:

The International EPD® System
www.environdec.com

Programme operator:

EPD International AB

EPD registration number:

S-P-12330

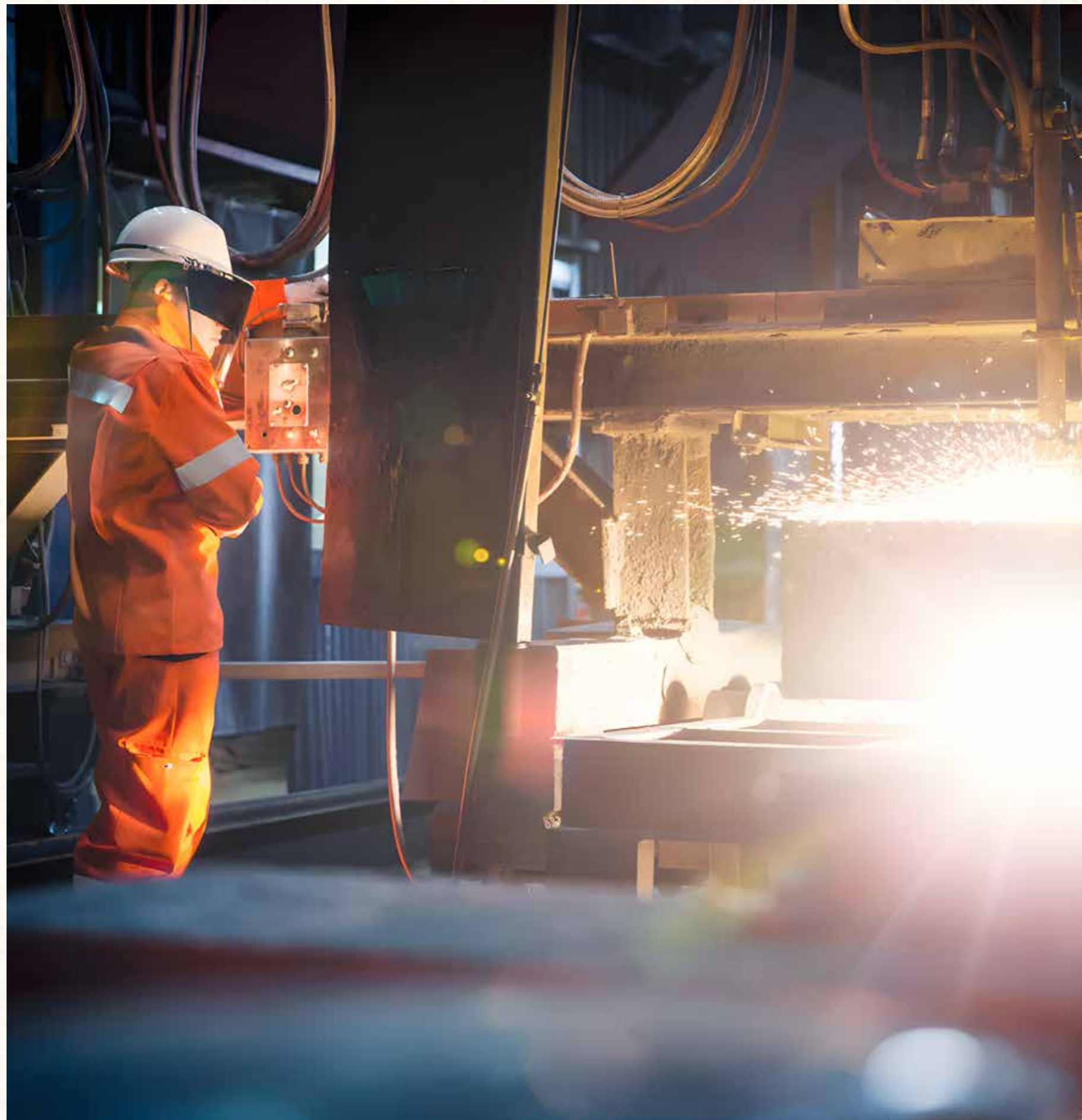
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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com



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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: neil.schofield@stainless-marcegaglia.com
Tel.: +44 114 261 6284

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:

Site SMACC (Stainless Melting and Continuous Casting):
Europa Link, Tinsley, Sheffield S9 1TZ, United Kingdom.

PRODUCT INFORMATION

Product name:
Flat/long product from continuous casting (slab, bloom, or billets);

Product identification:
Flat/long product from continuous casting (slab, bloom, or billets);

Product description:
Through continuous casting, slabs, blooms and billets are obtained which are subsequently sent to customers who will subject them to further specific processes in relation to the semi-finished product to be obtained.

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 flat/long product from continuous casting (slab, bloom, or billets) 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%.



Other information

DESCRIPTION OF THE MAIN ACTIVITIES

Continuous casting is carried out at the site identified as SMACC in Sheffield. Scrap and alloys are delivered and stored in an open yard or covered pens. The selected mix from these raw materials is loaded into scrap baskets and charged into an Electric Arc Furnace (EAF), with a nominal capacity of 130 tonnes, and melted.

The molten steel is transferred to an Argon Oxygen Decarburising (AOD) vessel, using a preheated transfer ladle. Here impurities are removed, and further additions of scrap and alloys are made. At a point close to the final specification, the molten metal is tapped into a casting ladle and the ladle placed under the hood of a ladle furnace (a small EAF) and further small additions of alloys made to bring the melt to its final specification and temperature.

The casting ladle is then transferred to one of two continuous casting machines. One is capable of casting either a single slab or two blooms, the other is a six-strand billet caster. The solidified metal strand(s) are cut

off into suitable lengths using oxy/propane/iron powder cutters. Certain grades may have to be slow cooled to prevent clinking (internal splits).

The surface of the material may then be ground to remove imperfections before being dispatched to customer by either road or rail.

Slag is produced as a by-product from each of the melting stages. Following processing on site, some is used in the landfill as engineering material, the rest is taken off site to be used in roadstone.

Dust collected from the main process in a bag filter plant is transferred, via silos, to a DC Arc Furnace where it is mixed with pulverised coal, reduced and melted. (N.B. if there is insufficient capacity on site to treat the dust it is sent off site to an alternative facility).

The recovered metal is recycled back into the main process. The secondary dust from the DC Arc is rich in zinc and forwarded on to a zinc smelter.

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 flat/long product from continuous casting (slab, bloom, or billets).

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
	EP - freshwater	kg P eq
Eutrophication	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

FLAT/LONG PRODUCT FROM CONTINUOUS CASTING (SLAB, BLOOM OR BILLETS)

Abb.	Unit	A1-A3	C1	C2	C3	C4	D
GWP - t	kg CO ₂ eq	2,426E+03	1,213E+01	8,530E+00	1,227E+01	6,145E-02	-8,707E+02
GWP - fossil	kg CO ₂ eq	2,418E+03	1,213E+01	8,523E+00	1,227E+01	6,138E-02	-8,589E+02
GWP - biogenic	kg CO ₂ eq	5,782E+00	2,782E-03	3,044E-03	1,310E-04	3,515E-05	-1,095E+01
GWP - luluc	kg CO ₂ eq	1,756E+00	1,365E-03	4,193E-03	1,069E-03	3,706E-05	-8,653E-01
GWP - GHG	kg CO ₂ eq	2,427E+03	1,215E+01	8,543E+00	1,228E+01	6,164E-02	-8,628E+02
ODP	kg CFC-11 eq	4,652E-05	1,929E-07	1,335E-07	6,355E-07	1,778E-09	-9,479E-06
POCP	kg NMVOC eq	9,599E+00	1,677E-01	4,378E-02	2,397E-02	6,624E-04	-3,131E+00
AP	mol H+ eq	1,198E+01	1,124E-01	3,081E-02	2,446E-02	4,625E-04	-4,927E+00
EP - freshwater	kg P eq	7,059E-01	3,722E-04	6,931E-04	6,327E-04	5,112E-06	-3,157E-01
EP - marine	kg N eq	2,464E+00	5,209E-02	1,025E-02	6,685E-03	1,776E-04	-8,665E-01
EP - terrestrial	mol N eq	2,621E+01	5,663E-01	1,087E-01	6,952E-02	1,903E-03	-9,147E+00
WDP	m ³ depriv.	5,875E+02	3,422E-01	6,326E-01	3,038E-01	6,757E-02	-1,783E+02
ADP - F	MJ	3,094E+04	1,588E+02	1,241E+02	2,699E+02	1,530E+00	-9,926E+03
ADP - MM	kg Sb eq	7,343E-02	4,233E-06	2,301E-05	6,445E-06	8,523E-08	-2,345E-02
PERE	MJ	4,013E+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	4,013E+03	1,101E+00	1,976E+00	8,856E+00	1,699E-02	-2,966E+03
PENRE	MJ	3,168E+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	3,168E+04	1,571E+02	1,250E+02	1,948E+02	1,523E+00	-1,126E+04
SM	kg	9,730E+02	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	1,243E+01	1,375E-02	2,591E-02	6,638E-02	1,633E-03	-4,126E+00
HW	kg	2,324E+02	1,095E-01	1,965E-01	6,113E-02	1,657E-03	-1,114E+02
NHW	kg	6,763E+02	4,659E-01	2,149E+01	2,365E-01	1,663E-02	-3,687E+02
RW	kg	1,033E+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	3,711E+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
Steel	0.000085	0.0085	-
Wood	0.00108	0.108	< 5%

The materials used for the packaging of the final products consist of metal straps and wooden saddles. 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%.



Flat/long product from continuous casting in stainless steel

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

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.

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 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.



Flat/long product from continuous casting in stainless steel

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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