



ENVIRONMENTAL PRODUCT DECLARATION

EN

In accordance with
UNI EN ISO 14025 and
UNI EN 15804:2021+A2:2019 for:
**STAINLESS STEEL
WELDED TUBES**

From
Marcegaglia Specialties S.p.A.

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

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EPD International AB

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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

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

Product category rules (PCR):

Construction products (EN 15804:A2), 2019:14, UN CPC 54, version 1.3.1

PCR review was conducted by:

The Technical Committee of the International EPD[®] System. Review chair: Claudia A. Peña
- Contatto tramite il segretariato www.environdec.com/contact

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

Certification of process EPD EPD verification

Third-party verifier:

Bureau Veritas Italia S.p.A.

The certification body is accredited by:

International EPD[®] System Technical Committee.

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

Yes No

The EPD owner has the only 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 EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

COMPANY INFORMATION

Owner of the EPD:

Marcegaglia Specialties S.p.A.
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To obtain more information about this Environment Product Declaration are available this contact:

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Company description:

Marcegaglia Specialties S.p.A. is one of the most important producers of stainless steel products in the world. In the Forlimpopoli plant are produced tubes from stainless-steel coils by welding process.

Product/system certifications:

- Quality Management System by UNI EN ISO 9001:2015 (n° 131/94/S – valid until 26/08/2024);
- Environmental Management System UNI EN ISO 14001:2015 (n° EMS-262/S – valid until 25/07/2025);
- Health & Safety Management System UNI ISO 45001:2018 (n° OHS-260 – valid until 25/09/2025);
- Energy Management System UNI EN ISO 50001:2018 (n° MS-137 – valid until 14/12/2023);
- Social Accountability System SA8000:2014 (n° SA-2040 – valid until 7/04/2025);

Production site's Name and localization:

- Via Mattei, 20 – 47034 Forlimpopoli (FC).

LCA INFORMATION

Functional unit / declared unit:

The functional unit is 1 ton of welded tube.

Reference service life – RSL:

The RLS of the rolled products are estimate around of 50 years [Rif.: Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR)].

Time representativeness:

All the data used for this LCA analysis are referred to the year 2022.

Data Quality

The primary data come from the company and the secondary data come from Ecoinvent database.

Database e software:

Ecoinvent database v.3.9.1, January 2023 / Software SimaPro rel. 9.5

Description of system boundaries:

The study is referred “from cradle to gate with options (A1-A3 + C1-C4 + D)”, like the follow table (rif: PCR 2019:14 “Construction products” version 1.3.1).

The modules A1-A3 describe the raw materials, the transport until the production's site and the production's process.

The modules C1-C4 describe the transport, the demolition process, and the end life of the products. These operations aren't under company's control. For this reason, was used the literature data from the building sectors. And considered an average distance of 50 km from the site and the waste disposal center.

The module D describe the benefits due the recycling of the stainless steel and the calculation of this is based on the document “Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2021 – Par. 6.3.5.6. Benefits and loads beyond the product system boundary, information Module D”.

PRODUCTS INFORMATION

Product name:

Stainless steel welded tubes.

Product identification:

Stainless steel welded tubes.

Product description:

Stainless steel welded tubes with different geometry, thickness, and dimensions for structural, mechanical or automotive application, for fluid handling, for design or for thermal exchange.

The product in made in the site are:

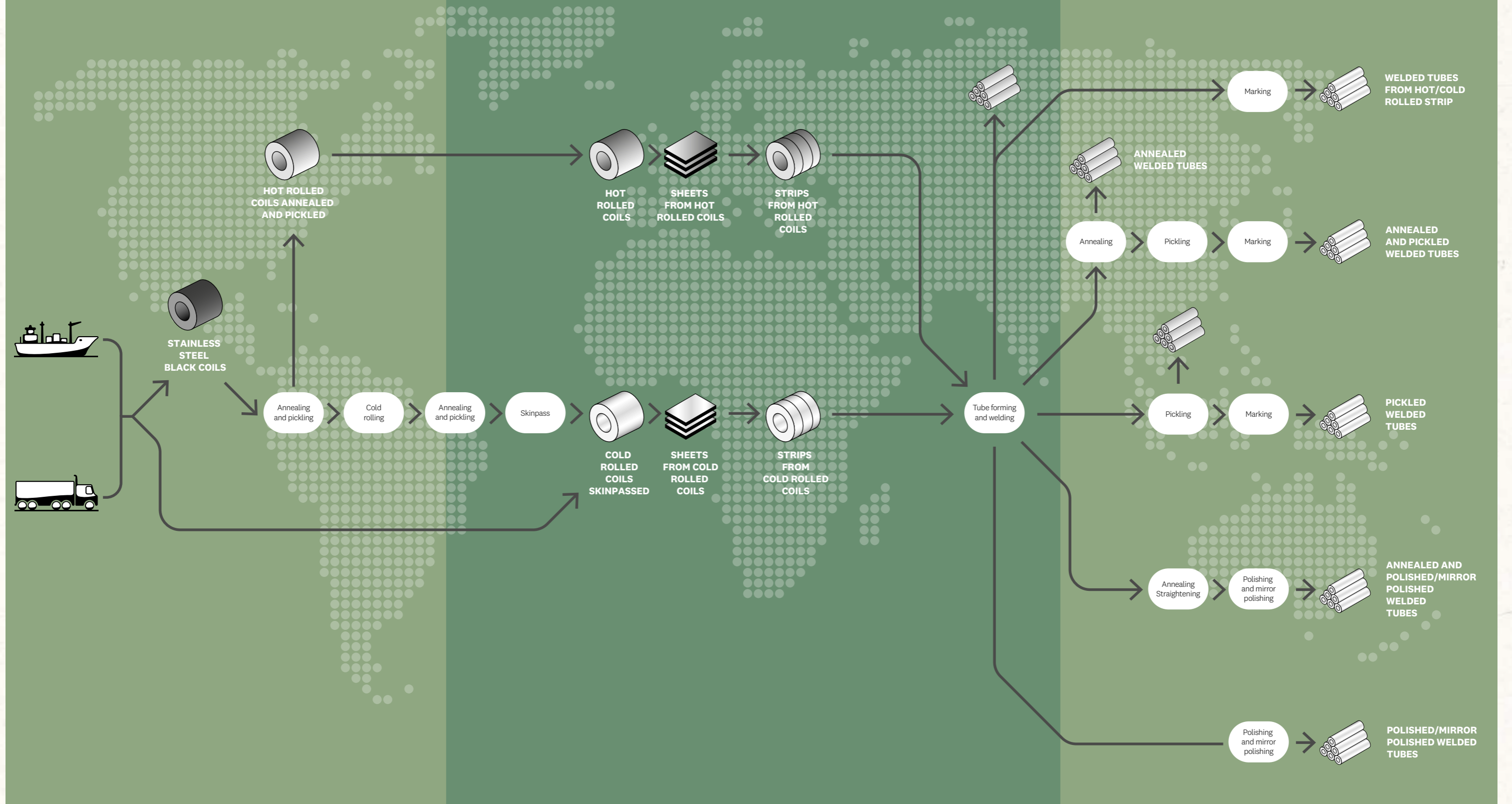
- Welded tubes;
- Welded tubes for automotive;
- Picked and welded tubes;
- Annealed and welded tubes;
- Annealed, picked, and welded tubes.

From the company web site is possible download the catalogue whit the technical information of each product.

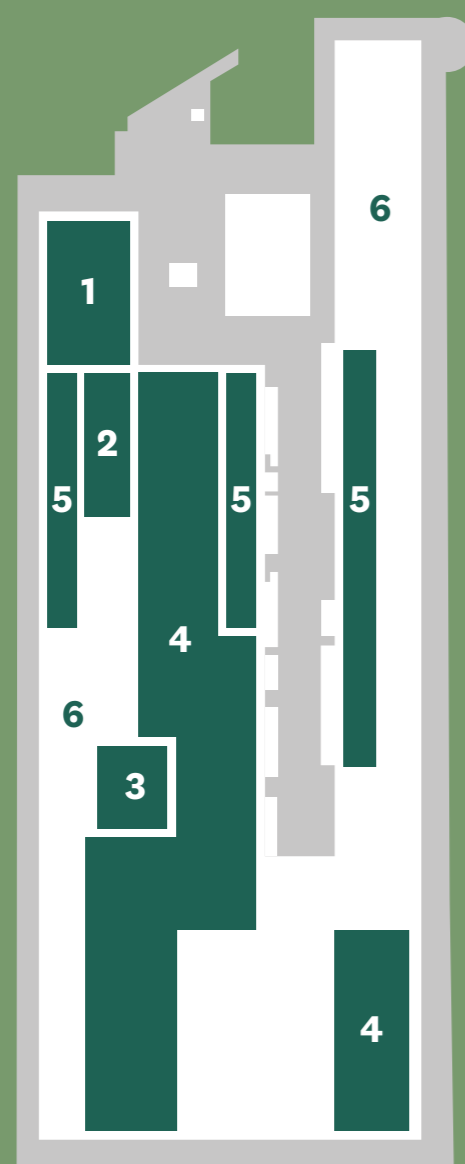
Stainless steel welded tubes

Type	Thickness [mm]	Diameter [mm]
Stainless steel welded tubes	0,8	From 10 to 273
	1,0	
	1,2	
	1,5	
	1,6	
	2,0	
	2,5	
	2,6	
	3,0	
	3,2	
	3,6	
	4,0	
5,0		
6,0		

SYSTEM DIAGRAM:



SYSTEM DIAGRAM:



- ① **Storage coils**
Deposito coils
- ② **Slitter**
Linee di cesoiatura
- ③ **Pickling**
Decappaggio
- ④ **Laser welding**
Saldatura laser
- ⑤ **HF welding**
Saldatura HF
- ⑥ **Storage**
Deposito

More information

DESCRIPTION OF MAIN ACTIVITIES

Forlimpopoli plant produces stainless tubes welded tubes with different geometry, thickness, and dimensions for structural, mechanical, or automotive application, for fluid handling, for design or for thermal exchange.

The production begins with the raw materials arrival at the plant by road, but the journey between the starting steel mill and the Forlimpopoli plant can be by intermodal transport using mainly ships and trucks.

The raw materials are:

- Coils from Marcegaglia Gazoldo Inox plant by road;
- Coils from Italian and European steel mill by road;
- Coils from Asiatic and Iberic steel mill by ship until the Marcegaglia Ravenna S.p.A. plants, and by road until the Forlimpopoli site.

Following there are the phases of the production:

Steel strip cutting

These machines produce a longitudinal cutting action to obtain coils of various widths that will follow a diversified processing cycle to obtain welded tubes according to the desired production.

HIGH FREQUENCY INDUCTION WELDING AND AUTOMOTIVE TUBES PRODUCTION LINE

Strip storage

This is the area in front of the entrance to each line where strips ready for processing into pipe are stored in homogeneous batches. The semi-finished product has special dimensions with widths from 30.6 mm to 470 mm and outside diameters from 1300 to 2200 mm.

Devolver reels

The lines are equipped with two devolver reels, mounted on a rotating structure, which, alternately with 180° rotation, allow the material to be quickly sent to the line.

Strip splicing

Allows the shearing of consecutive parts of the strips, head-to-tail, and the joining of the edges at the right distance for TIG welding.

Floop

The flywheel function is activated by storing a useful amount of material to keep the outflow unchanged during reel change and welding operations. At the end of the activity, it exhausts the strip collected in the storage and adjusts, together with the reel in operation, to the process speed.

Forming roller table, fin passes and guide roller

The entire system consists of a series of shoulders with forming rollers, vertical and horizontal adjusters, in which the strip is progressively shaped until it assumes the shape of a tube with the predetermined diameter. In this transformation, the rollers are lubricated with emulsion.

High Frequency Induction Welding (HFIW) and debeaders

Because of induced current, the pipe edges are superheated to the melting point and, under the action of controlled pressure, are welded, causing the liquid metal containing the melting impurities to escape. This metal, blocked by rapid cooling in the form of external and internal beads on the pipes, is removed mechanically with three debeaders, two of which operate externally to the pipe and one, if required, internally to the pipe.

Cooling tank

The pipe undergoes controlled cooling in a closed-loop tank to be brought to room temperature.

Gauging roller bench, turks heads

This system consists of a series of shoulders with vertical and horizontal groove rollers where the tube is calibrated on the circumferences and then deformed in profile by means of Turk's heads and destined for bars with round, square, rectangular, or special profiles. The operation involves the use of a coolant lubricant emulsion.

Welding identification

Only for the Automotive tubes, at the specific request of the customer, identification of the welding area of the tube with color ink is carried out.

Blowing, deburring

During translation, all round/square/rectangular bars pause briefly in the blowing section where they are reclaimed internally from emulsion and deburring residues. The liquid atomized by pressurized air is collected, together with the de-bonding residue, in a soundproofed structure on the opposite side.

Round tube and square or rectangular tube brushes, pipe markers

Bars shifted on the original generator are conveyed to surface finish brushing machines; these brushing machines also work in soundproofed safety facilities. They are then conveyed through the roller way to the plane for bundling.

Packing and weighing machine

The marked tube is traversed again and grouped, depending on the round, square or rectangular cross-section, into planes to be stacked in packs shaped respectively: hexagonal, square, rectangular; the completed pack reaches the wrapping machine, which provides circumferential strapping.

LASER WELDING

Strip storage

This is the area in front of the entrance to each line where strip ready for processing into pipe is stored in homogeneous batches.

Devolver reels

The lines are equipped with two devolver reels, mounted on a rotating structure, which alternately, with 180° rotation, allow the material to be quickly sent to the line.

Strip splicing

Allows the shearing of the consecutive parts of the strips, head-to-tail, and the joining of the edges at the right distance for an initial weld.

Accumulation floop

The accumulation function is activated by storing a useful amount of material to keep the outflow unchanged during reel change and welding operations. At the end of the activity, the strip collected in the accumulation is exhausted and the material flow adjusts, together with the reel in operation, to the process speed.

Forming roller bench, fin passes and guide roller

The entire system consists of a series of shoulders with forming rollers, vertical and horizontal axes, in which the strip is progressively shaped until it assumes the shape of a tube with the predetermined diameter. The rollers are lubricated with emulsion.

Laser welding and bead rolling

The tube edges are brought together with appropriate pressure and are welded through a laser beam.

Lamellar debadders

To remove the excess material created during welding, the weld bead undergoes an operation like brushing by passing through debadders placed longitudinally (lamellar).

Sizing roller bench, turk heads

This system consists of a series of shoulders with vertical and horizontal groove rollers where the tube is calibrated on the circumferences and then deformed in profile by means of Turk's heads and, if required, destined for bars with round, square, rectangular or special profile sections. In this processing the rolls are chilled with water.

Testing and brushing round, square or rectangular pipe

This tool, closely related to product quality, allows the identification of minimal inaccuracies and irregularities, below a certain threshold, related to weld quality.

Pipes pass through one or more boxes inside which the brushing machines operate, working on the surfaces by reducing roughness.

Bar marking and cutting

In this last section, available for all tubes, inkjet marking takes place. Cutting can take place using the blade method, the disc method, or by using a laser cutter.

Visual check, deburring, strapping and weighing

The tubes are first grouped at the side of the bench by an automatic mechanical structure; the operator performs a visual check of the welding and straightness of the tube. The deburring operator proceeds to grind or check the same on the end of the tube; once this operation is finished, the dust created is removed using compressed air. The tubes, with the consent of the operator, are then discharged into the unloading cradle to be arranged in homogeneous bundles and then compacted by applying and tightening the strapping by means of special pneumatic strapping machine.



ALLOCATION'S RULES

A mass allocation of the energy and water consumption, polluted emission, and waste was done

MODULES DECLARED

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

Module	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	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			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variations-site	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-

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



Environmental information

All the performance indicators are referred of 1 ton of welded tube.

ENVIRONMENTAL IMPACT

Impact category	Abb.	Unit
Climate change - total	GWP - t	kg CO ₂ eq
Climate change - Fossil	ODP	kg CFC11 eq
Climate change - Biogenic	GWP - fossil	kg CO ₂ eq
Climate change - Land use and LU change	GWP - biogenic	kg CO ₂ eq
Climate change - Greenhouse Gases	GWP - luluc	kg CO ₂ eq
Ozone depletion	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
	EP - marine	kg N eq
Eutrophication	EP - terrestrial	mol N eq
	WDP	m ³ depriv.
Water use	ADP - F	MJ
Resource use, fossils	ADP - MM	kg Sb eq
Resource use, minerals, and metals		



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	EE-T	MJ

WELDED TUBES

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	5.71E+03	3.30E+01	-1.67E+03
GWP - fossil	kg CO ₂ eq	5.65E+03	3.26E+01	-1.66E+03
GWP - biogenic	kg CO ₂ eq	5.88E+01	3.78E-01	-1.73E+01
GWP - luluc	kg CO ₂ eq	5.66E+00	7.22E-03	-1.77E+00
GWP - GHG	kg CO ₂ eq	5.67E+03	3.27E+01	-1.66E+03
ODP	kg CFC-11 eq	5.54E-03	7.15E-07	-1.67E-05
POCP	kg NMVOC eq	2.84E+01	1.21E-01	-6.09E+00
AP	mol H+ eq	3.10E+01	9.97E-02	-9.44E+00
EP - freshwater	kg P eq	2.38E+00	3.11E-03	-5.68E-01
EP - marine	kg N eq	7.80E+00	2.56E-02	-1.71E+00
EP - terrestrial	mol N eq	6.65E+01	2.73E-01	-1.81E+01
WDP	m ³ depriv.	1.59E+03	3.22E+00	-3.32E+02
ADP - F	MJ	6.94E+04	4.61E+02	-1.83E+04
ADP - MM	kg Sb eq	8.22E-01	5.17E-05	-4.21E-02
PERE	MJ	1.03E+04	1.11E+01	-2.77E+03
PERM	MJ	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.03E+04	1.11E+01	-2.77E+03
PENRE	MJ	7.94E+04	5.04E+02	-1.68E+04
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	7.94E+04	5.04E+02	-1.68E+04
SM	kg	7.84E+02	3.79E-02	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00
FW	m ³	3.24E+01	1.59E-01	-5.86E+00
HW	kg	6.07E+01	1.83E-02	0.00E+00
NHW	kg	7.85E+00	1.27E-03	0.00E+00
RW	kg	7.80E-01	1.86E-03	0.00E+00
REUSE	kg	0.00E+00	0.00E+00	0.00E+00
RECYCLE	kg	1.70E+01	5.50E-02	0.00E+00
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

It is shown that the indicator deviations of the different type of welded tubes is less than 10.

The impact of the input raw material, which corresponds to 93% of the total impacts for the annealed picked and welded tube and 96% of the total impacts for the welded tubes without every other operation.

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 87.2% in line with what is indicated in the "Special waste report" of ISPRA - No. 367/2022.

All emissions generated by processing are conveyed into the atmosphere and where necessary are equipped with adequate abatement systems before they are released into the environment.

The products manufactured by the plant of Forlimpopoli are characterized by a recycled content of 60,8%. These percentages are calculated as average of the value associated with the incoming raw material and derived from both Type III environmental declarations or from self-declarations in accordance with UNI EN ISO 14021.

The materials used for the packaging of the final products consist of metal straps, and polyvinylchloride caps.

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%.

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. 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.

Reference

General Programme Instructions of the International EPD[®] System. Version 4.0;
 PCR 2019:14 - Version 1.3.1 "CONSTRUCTION PRODUCTS";
 BRE Global Product Category Rules (PCR) for Type III EPD of construction products to EN 15804+A2;
 Ecoinvent database v.3.9.1 - Gennaio 2023;
<http://unstats.un.org/unsd/default.htm>;
 UNI EN ISO 14025: 2010 "Etichette e dichiarazioni ambientali - Dichiarazioni ambientali di Tipo III - Principi e procedure";
 UNI EN ISO 14040: 2021 "Gestione ambientale - Valutazione del ciclo di vita - Principi e quadro di riferimento";
 UNI EN ISO 14044:2021 "Gestione ambientale - Valutazione del ciclo di vita - Requisiti e linee guida";
 UNI EN ISO 15804:2021 "Sostenibilità delle costruzioni - Dichiarazioni ambientali di prodotto - Regole quadro di sviluppo per categoria di prodotto";
 European Residual Mixes 2022 Association of Issuing Bodies "European Residual Mixes Results of the calculation of Residual Mixes for the calendar year 2022" - version 1.0, 2023-06-01;
 ISPRA "Rapporto rifiuti speciali" - n° 367/2022 - Edizione 2022.





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