



Environmental Product Declaration

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

STAINLESS STEEL WELDED TUBES

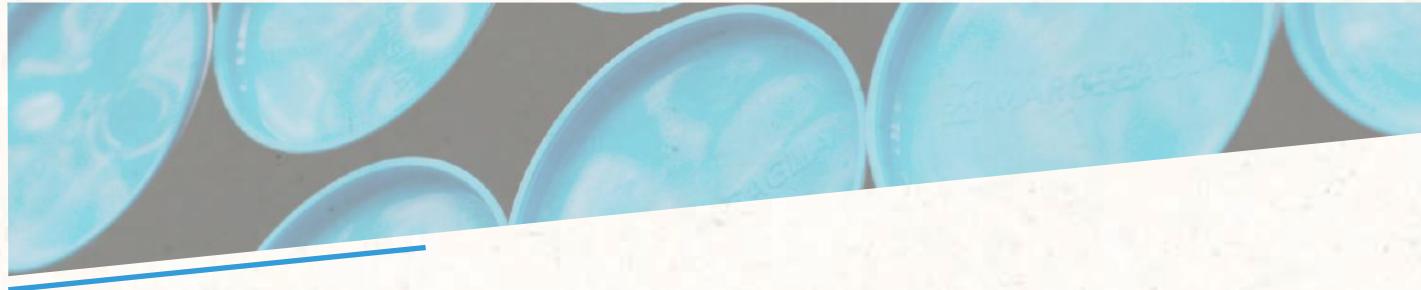
Marcegaglia Specialties S.p.A.

This EPD covers multiple products, based on the average results of the product group

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

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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
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Standard EN 15804 serves as the core Product Category Rules (PCR)

Product Category Rules (PCR):

Construction products, 2019:14, version 1.3.1, CPC 4128

PCR review was conducted by: The Technical Committee of the International EPDR System.
Review chair: Claudia A. Peña - 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, via:

EPD verification by an accredited certification body

Third-party verification:

Bureau Veritas Italia S.p.A. 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 Specialties S.p.A. - www.specialties.marcegaglia.com

Contact:

For more information on this product declaration and/or its configurations, the following references are available:

Mail: francesco.fronzoni@marcegaglia.com - Tel.: +39 0543 470309 / +39 335 1797674

Company description:

Marcegaglia Specialties S.p.A. is one of the world's leading players in the stainless steel products sector, thanks to its various production plants in Italy and abroad. It manufactures and sells hot-rolled and cold-rolled flat products, hot-rolled and cold-rolled long products, welded tubes, and drawn and peeled bars. Specifically, the Forlimpopoli plant only manufactures welded stainless steel tubes for structural applications, fluid transport, heat exchange, decoration, mechanical and automotive applications.

Product/system certifications:

- Quality management system ISO 9001
- Environmental management system ISO 14001
- Health and safety management system ISO 45001
- Energy management system ISO 50001
- Social responsibility management system SA 8000
- Carbon Footprint Product Systematic Approach ISO 14067
- Greenhouse gases - Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals ISO 14064

Production site's name and localization:

Via Mattei, 20 – 47034 Forlimpopoli (FC).

PRODUCT INFORMATION

Product name:

Stainless steel welded tubes.

Product identification:

Stainless steel welded tubes.

Product description:

A wide range of welded stainless steel tubes, in various thicknesses, diameters, and lengths, with circular or regular cross-sections, for structural applications, fluid transport, heat exchange, decoration, mechanical, and automotive applications. Specifically, the products manufactured at the plant are:

- Welded tubes;
- Welded tubes for the automotive industry;
- Welded and pickled tubes;
- Welded and annealed tubes;
- Annealed and pickled welded tubes.

Product catalogs can be downloaded from the company website, providing comprehensive descriptions of the technical characteristics of the products and the relevant standards for the various applications.

Stainless steel welded tubes

Type of processing	Thickness [mm]	Diameter [mm]
	0,8	
	1,0	
	1,2	
	1,5	
	1,6	
	2,0	
	2,5	
Stainless steel welded tubes	2,6	From 6 to 406,4
	3,0	
	3,2	
	3,6	
	4,0	
	5,0	
	6,0	

UN CPC CODE: 4128 Tubes, pipes and hollow profiles, of steel.

Geographical scope: Global.

LCA INFORMATION

Functional unit:

The functional unit of the system considered is the ton of welded tube.

Reference service life - RSL:

The products in this study have an estimated useful life of 50 years [Ref.: 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 2024.

Data Quality:

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

Database and LCA software used:

Ecoinvent database v.3.11, April 2025 / Software used SimaPro rel. 10.2.0.2.

Description of system boundaries:

The study is "from cradle to gate with options (A1-A3 + A4 + C1-C4 + D)", as outlined in the table below (reference: 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 of life of the products.

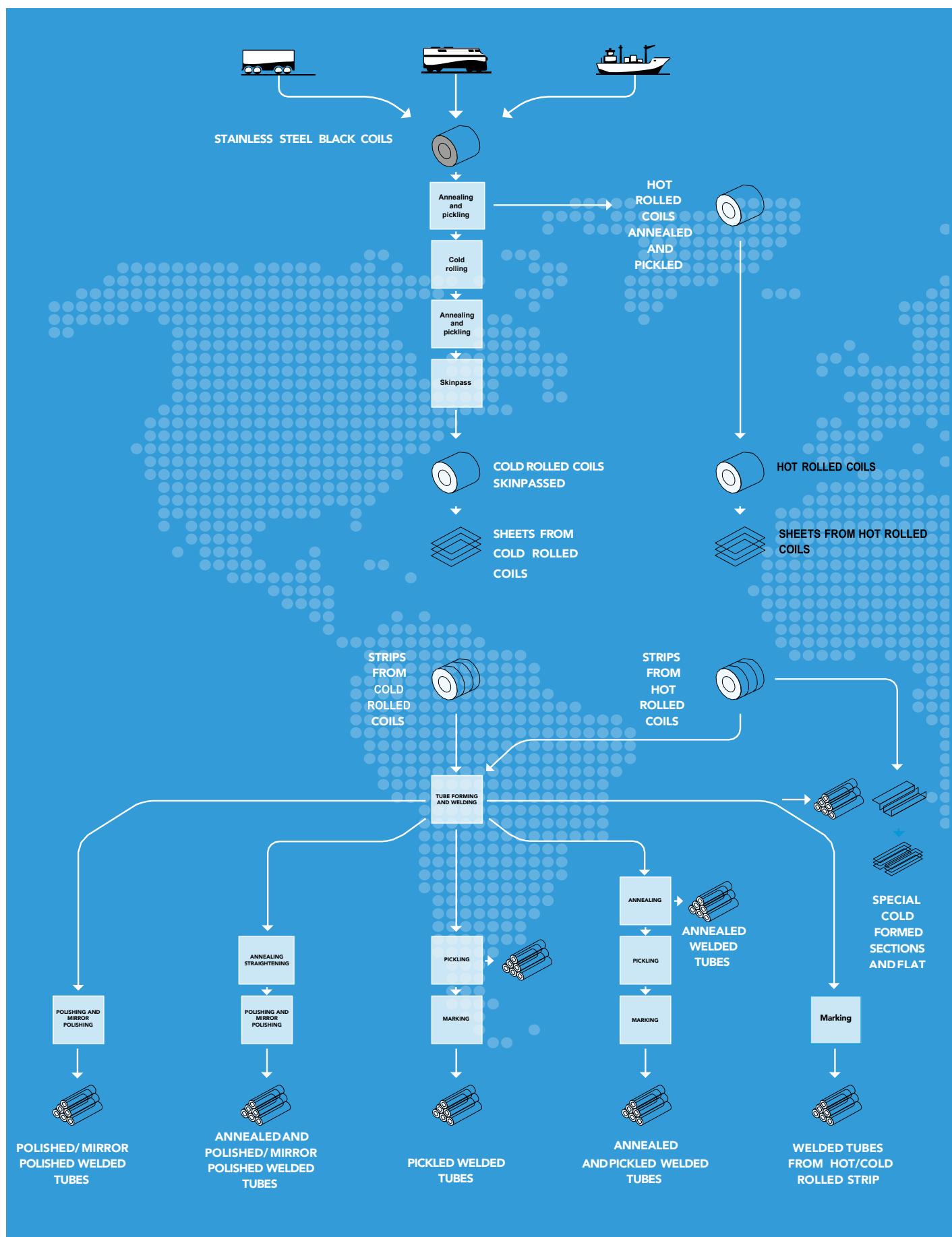
These operations aren't under the company's control. In this regard, literature relating to the construction sector is used. It is considered:

- an average diesel consumption equivalent to 46 MJ for each ton of material demolished;
- an average distance of 80 km to transport the material to the recovery center;
- an average electricity consumption of 28 kWh for each ton of material sorted.

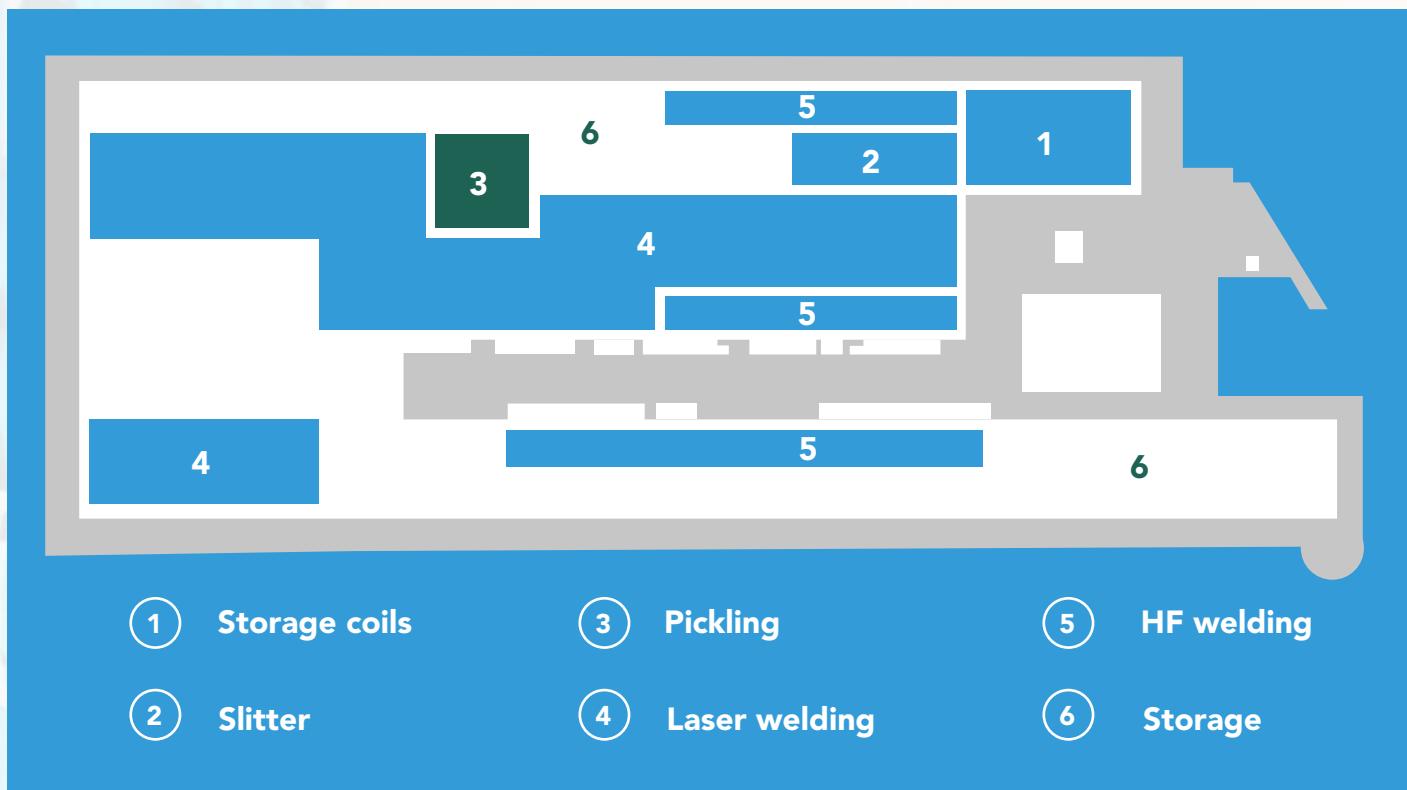
Module D considers stainless steel obtained from the demolition of tubes after use and intended for recycling. The calculation of the environmental benefits from stainless steel recovery is based on the guidelines provided in the document "Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2021 – Par. 6.3.5.6. Benefits and loads beyond the product system boundary, information Module D."



STAINLESS STEEL PRODUCTS MANUFACTURING PROCESS



SYSTEM DIAGRAM



DESCRIPTION OF MAIN ACTIVITIES

The Marcegaglia Specialties S.p.A. plant in Forlimpopoli manufactures a wide range of stainless steel tubes in various diameters and thicknesses for structural applications, fluid transport, heat exchange, decoration, mechanical and automotive applications.

The production cycle begins with the delivery of raw materials to the plant by road. However, the journey from the steelworks of origin to the Forlimpopoli plant also involves intermodal transport, particularly for materials coming from Asia, which arrive by ship. Due to the geographical location of the plant, the last stage of the journey is then carried out exclusively by road.

The raw materials consist of:

- Coils from the Marcegaglia Gazoldo Inox plant, transported by road;
- Coils arriving from other Italian steelworks, also transported by road;
- Coils imported from Asian steelworks, which arrive by ship at the Marcegaglia Ravenna S.p.A. plant, equipped with a port quay, and then continue by road to Forlimpopoli.



In detail, the processing cycle takes place through the stages described below.

SLITTING LINES

The coil is unwound and cut into strips, the width of which corresponds to the circumference of the pipe to be produced. The cutting is done using circular slitting knives, after which the strips are rewound individually and sent to the subsequent production lines, listed below.

HFIW (High Frequency Induction Welding) STAINLESS STEEL TUBE PRODUCTION LINES AND AUTOMOTIVE DEPARTMENT

STRIP STORAGE

This is the area in front of the entrance to each line where the strips ready for transformation into tubes are stored in homogeneous batches. The semi-finished product has specific dimensions, with a width ranging from 30.6 mm to 470 mm and external diameters from 1300 to 2200 mm.

UNWINDING REELS

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

BELT JOINING

This allows the consecutive parts of the belts to be sheared, head-to-tail, and the edges to be aligned at the correct distance for TIG welding.

FLOOP

The flywheel function comes into action by accumulating a certain amount of material, which is useful for ensuring continuity of the output flow during reel change and welding operations. Once this phase is complete, the system uses up the strip in the accumulation and synchronizes itself, together with the reel in operation, with the speed of the production process.

FORMING ROLLER BANK, FIN PASSES, AND GUIDE ROLLER

The entire system consists of a series of shoulders with forming rollers and vertical and horizontal regulators, in which the strip is progressively shaped until it takes on the form of a tube with a predetermined diameter. During this transformation, the rollers are lubricated and cooled with a 4% emulsion.

HIGH FREQUENCY INDUCTION WELDING (HFIW) AND DEBURRING

Due to the effect of the induced current, the edges of the pipe are heated to the melting point and, under controlled pressure, are welded together, causing the liquid metal containing the melting impurities to escape. This metal, which is locked in place by rapid cooling in the form of external and internal beads on the pipes, is mechanically removed with three deburring machines, two of which operate externally on the pipe and one, if required, internally on the pipe itself.

COOLING TANK

The tube undergoes controlled cooling in a closed-circuit tank to bring it to room temperature.

CALIBRATING ROLLER BANK, PROFILING HEADS

This system consists of a series of shoulders with vertical and horizontal grooved rollers where the pipe is calibrated on its circumference and then deformed into shape by the profiling heads and destined for bars with round, square, rectangular, or special profiles. The operation involves the use of a 4% cooling lubricant emulsion.

WELD IDENTIFICATION

Only for the Automotive department, upon specific customer request, the pipe weld area is identified with red dye. The operation is performed automatically using a special spray applicator installed on the lines.

BLOWING, DEBURRING

During translation, all round/square/rectangular tubes stop briefly in the blowing sector where they are cleaned internally of emulsion and deburring residues. The liquid sprayed by the pressurized air is collected, together with the deburring residues, in a soundproof structure on the opposite side.

ROUND TUBE AND SQUARE OR RECTANGULAR TUBE BRUSHING MACHINES, TUBE MARKING MACHINES

The tubes transferred to the original generator are conveyed to the brushing machines for surface finishing; these brushing machines also operate in soundproofed safety structures. They are then conveyed via the roller conveyor to the packing table.

PACKAGING AND WEIGHING MACHINE

The marked tube is moved again and grouped into planes according to the product section: round, square, or rectangular. The planes are then stacked to form hexagonal, square, or rectangular packages. The package thus formed is finally transferred to the packaging machine, which performs circumferential strapping.

STAINLESS STEEL LASER LINES

STRIP STORAGE

This is the area in front of the entrance to each line where the strips ready for transformation into tubes are stored in homogeneous batches. The semi-finished product has specific dimensions, with widths ranging from 33.7 mm to 855.3 mm and external diameters from 700 to 2000 mm.

UNWINDING REELS

The lines are equipped with two unwinding reels, mounted on a rotating structure, which alternately, with a 180° rotation, allow the material to be quickly sent to the line. The strip that is to go into production is placed on the waiting reel so that during unwinding, the dribble is oriented upwards.

BELT JOINING

This allows the consecutive parts of the belts to be sheared, head-to-tail, and the edges to be brought together at the correct distance for initial welding.

FLOOR

The accumulation function is activated by storing a quantity of material sufficient to maintain the output flow unchanged during reel change and welding operations. At the end of the operation, the strip collected in the accumulation loop is used up and the flow of material is adjusted, together with the reel in operation, to the process speed.

FORMING ROLLER BANK, 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 takes on the shape of a tube with a predetermined diameter. The rollers are lubricated and cooled with a 4% emulsion.

LASER WELDING AND SEAM LAMINATION

The edges of the tube are brought together with the appropriate pressure and welded using a laser beam. The source protection mask is connected to a limit switch which, when activated, puts the line into emergency mode.

CLOTH DEBURRERS AND LAMELLAR DEBURRERS

To remove excess material created during welding, the weld bead is subjected to a brushing-like operation by passing through deburrers positioned longitudinally (lamellar) and transversely (cloth) to the direction of tube advancement.

CALIBRATING ROLLER BANK, PROFILING HEADS

This system consists of a series of shoulders with vertical and horizontal grooved rollers where the tube is calibrated on its circumference and then deformed into the desired profile by the profiling heads and, if required, turned into tubes with round, square, rectangular or special profiles. During this transformation, the rollers are cooled with water.

TESTING AND BRUSHING OF ROUND, SQUARE OR RECTANGULAR TUBES

This tool, closely linked to product quality, allows the identification of minimal inaccuracies and irregularities, below a certain threshold, related to the quality of the weld. The pipes pass through one or more boxes inside which the brushers operate, reducing surface roughness.

MARKING AND CUTTING INTO BARS

In this last stage, common to all tubes, inkjet marking takes place.

Cutting can be done using the blade method, the disc method, or laser cutting.

VISUAL INSPECTION, DEBURRING, STRAPPING, AND WEIGHING

The tubes are first grouped at the side of the bench using an automatic mechanical structure; the operator performs a visual inspection of the weld and the straightness of the tube. The deburring operator proceeds to grind or check the end of the tube; once this operation is complete, the dust created is removed using compressed air. With the operator's consent, the pipes are then unloaded into the unloading cradle to be arranged in uniform bundles and then compacted by applying and tightening the strapping using a special pneumatic strapping machine.

CONTENT INFORMATION

Product content	Weight, kg	Post-consumer recycled content	Biogenic material, weight-% and kg C/kg
Stainless steel	1,000	73 %	0

The materials used for packaging the final products consist of metal strapping and plastic caps. The quantities of such packaging in relation to one ton of final product represent less than 1%.

Allocation rules:

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

MODULES DECLARED

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

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	Reuse-Recovery-Recycling potential
	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		
A1	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X		
A2																		
A3																		
A4																		
A5																		
B1																		
B2																		
B3																		
B4																		
B5																		
B6																		
B7																		
C1																		
C2																		
C3																		
C4																		
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	> 80%				-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variations product	Not relevant				-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variations site	Not relevant				-	-	-	-	-	-	-	-	-	-	-	-	-	-

X = Module considered

ND = Module not declared

GLO = Global

IT = Italy

ENVIRONMENTAL INFORMATION

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

Environmental impact

IMPACT CATEGORY	ABB.	UNIT
Climate change - total	GWP - t	kg CO ₂ 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
Ozone depletion	ODP	kg CFC11 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

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

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 recycle	RECYCLE	kg
Materials for energy recovery	EN-REC	kg
Exported energy-electricity	EE-E	MJ
Exported energy-thermal energy	EE-T	MJ

WELDED TUBE

ABB	UNIT	A1-A3	C1	C2	C3	C4	D
GWP - t	kg CO2 eq	4.06E+03	8.69E+00	9.49E+00	8.69E+00	8.52E-01	-8.96E+02
GWP - fossil	kg CO2 eq	4.03E+03	8.62E+00	9.48E+00	8.62E+00	8.51E-01	-8.86E+02
GWP - biogenic	kg CO2 eq	2.22E+01	7.09E-02	5.59E-03	7.09E-02	4.09E-04	-9.69E+00
GWP - luluc	kg CO2 eq	3.14E+00	8.93E-04	3.41E-03	8.93E-04	4.87E-04	-1.00E+00
GWP - GHG	kg CO2 eq	4.29E+03	8.62E+00	9.49E+00	8.62E+00	8.52E-01	-8.88E+02
ODP	kg CFC-11 eq	6.87E-03	1.62E-07	2.07E-07	1.62E-07	2.37E-08	-6.28E-06
POCP	kg NMVOC eq	1.48E+01	2.46E-02	4.97E-02	2.46E-02	9.02E-03	-3.03E+00
AP	mol H+ eq	2.38E+01	3.85E-02	3.14E-02	3.85E-02	5.96E-03	-5.08E+00
EP - freshwater	kg P eq	3.03E+00	2.56E-03	6.69E-04	2.56E-03	7.45E-05	-9.01E-01
EP - marine	kg N eq	4.30E+00	6.64E-03	1.07E-02	6.64E-03	2.29E-03	-9.29E-01
EP - terrestrial	mol N eq	4.50E+01	6.88E-02	1.16E-01	6.88E-02	2.50E-02	-9.71E+00
WDP	m3 depriv.	1.13E+03	1.01E+00	7.89E-01	1.01E+00	9.25E-01	-2.60E+02
ADP - F	MJ	4.88E+04	1.23E+02	1.39E+02	1.23E+02	2.08E+01	-1.01E+04
ADP - MM	kg Sb eq	8.09E-01	1.26E-05	2.66E-05	1.26E-05	1.24E-06	-2.47E-02
PERE	MJ	2.05E+03	5.84E+00	2.14E+00	5.84E+00	1.95E-01	-2.67E+03
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	2.05E+03	5.84E+00	2.14E+00	5.84E+00	1.95E-01	-2.67E+03
PENRE	MJ	4.88E+04	1.23E+02	1.39E+02	1.23E+02	2.08E+01	-1.01E+04
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	4.88E+04	1.23E+02	1.39E+02	1.23E+02	2.08E+01	-1.01E+04
SM	kg	6.15E+01	1.55E-02	5.86E-02	1.55E-02	5.18E-03	-1.01E+02
RSF	MJ	1.60E-01	1.08E-04	7.73E-04	1.08E-04	1.08E-04	-2.57E-01
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m3	1.11E+03	2.40E-02	1.94E-02	2.40E-02	2.16E-02	-8.10E+00
HW	kg	5.78E+02	4.21E-01	2.02E-01	4.21E-01	2.37E-02	-9.06E+02
NHW	kg	3.65E+03	1.29E+01	4.13E+00	1.29E+01	5.48E-01	-4.90E+03
RW	kg	1.77E-02	1.48E-04	3.82E-05	1.48E-04	3.04E-06	-1.47E-02
REUSE	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RECYCLE	kg	1.07E+00	9.60E-03	1.68E-03	9.60E-03	2.26E-04	-4.48E-01
EN-REC	kg	7.80E-03	1.88E-06	6.13E-06	1.88E-06	4.01E-07	-1.33E-02
EE-E	MJ	1.59E+01	4.88E-01	2.34E-02	4.88E-01	1.35E-03	-3.48E+00
EE-T	MJ	9.73E+00	6.91E-03	2.49E-02	6.91E-03	7.18E-04	-1.62E+01

ADDITIONAL ENVIRONMENTAL INFORMATION

The steel used has an average recycled content of 73%. This percentage is calculated as average of the value associated with the incoming raw material and derived from both Type III environmental declarations as well as self-declarations in accordance with ISO 14021.

The differences between the various indicators for stainless steel tubes, welded using either laser or HF technology, are less than 10%, regardless of the processing carried out on the tube during welding (annealing and/or pickling). Since the raw material is the same for all products, what differentiates the various products is the type of welding used (laser or HF technology) and any processing carried out after welding (pickling and/or annealing).

It should be noted that at the end of its useful life, the product is destined for recycling and that stainless steel products are, ideally, completely recyclable an unlimited number of times. Due to their structural use and the potential presence of other materials that may complicate recovery and recycling, it is recommended, as a precautionary approach, to consult ISPRA's 'Special Waste Report' No. 402/2024, which states that 87.9% of steel is destined for recycling.

The products do not contain hazardous substances from the SVHC Candidate List for Authorization in quantities greater than 0.1%. All emissions generated by processing are conveyed into the atmosphere and, where necessary, are equipped with adequate abatement systems before being released into the environment.

DIFFERENCES FROM THE PREVIOUS VERSION

Compared to the previous version of the EPD Declaration (revision on 2024-09-19), the main changes made to the data analyzed are listed below:

- Site-specific data were collected and used (for modules A1, A2 and A3) in relation to all environmental matrices in reference to the year 2024, above all a part of electric energy supply from renewable sources and the subsequent Guarantees of Origin (GO) cancellation;
- The reference database updated to the latest available version was used as well as the new version of the software (all processes refer to EcoInvent 3.11 – April 2025 and the software SimaPro is in version 10.2.0.2)
- Italian updated energy residual mix has been considered (ref.: "European Residual Mixes Results of the calculation of Residual Mixes for the calendar year 2024")

REFERENCES

- 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.3.11 - April 2025;
- UNSD - Search <https://unstats.un.org/unsd/classifications/Econ/search>;
- ISO 14025: 2010 "Environmental labels and declarations - Type III environmental declarations - Principles and procedures";
- ISO 14040: 2021 "Environmental management - Life cycle assessment - Principles and framework";
- ISO 14044:2021 "Environmental management - Life cycle assessment - Requirements and guidelines";
- ISO 15804:2021 "Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products";
- European Residual Mixes 2024 Association of Issuing Bodies "European Residual Mixes Results of the calculation of Residual Mixes for the calendar year 2024" - 2025-05-30;
- ISPRA "Rapporto rifiuti speciali" - n° 402/2024;
- Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR).



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