

ENVIRONMENTAL PRODUCT DECLARATION

EN

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

**PROFILED TUBES
FROM HOT AND COLD ROLLED STRIP,
HEAT TREATED AND DRAWN**

From:
Marcegaglia Carbon Steel S.p.A.

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 5

programme information	5	diagram of the production process of production of tube	10
company information	6	block diagram of the production process for the production and drawing of pipes	11
product information	6		
LCA information	7		

Other informations 12

Description of the main activities	12	allocation rules	12
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Additional information 13

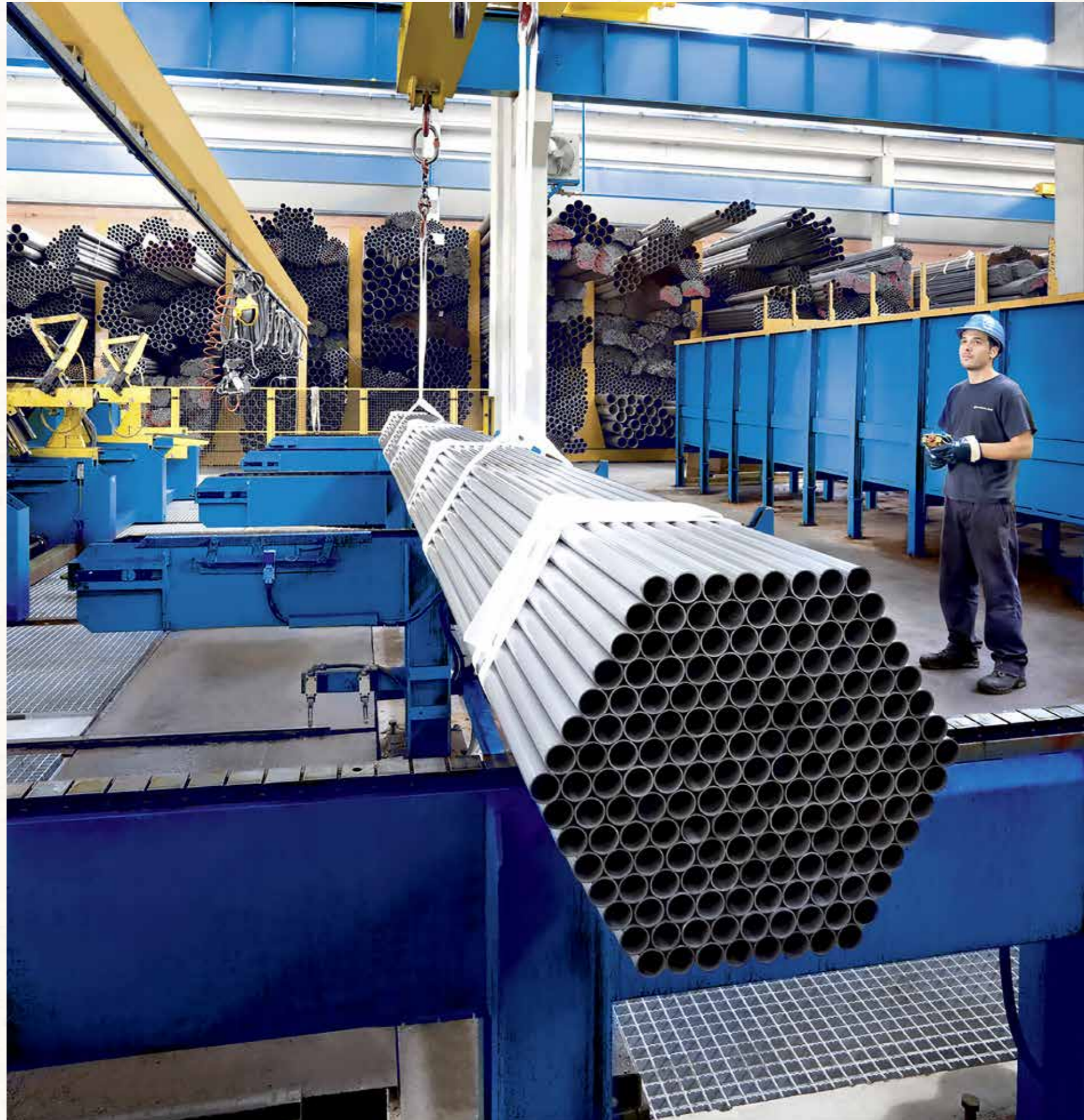
Environmental information 14

potential environmental impacts	14	profiled tube, heat treated, straightened and cut from hot rolled and pickled strip	27
resource use	14	profiled tube and heat treated by galvanized strip	29
waste production	15	profiled tube, heat treated and straightened by galvanized strip	30
output flows	15	profiled tube, heat treated, straightened and cut from galvanized strip	31
hot rolled profiled tube	16	profile tube and heat treated from cold strip (strip subjected to cold rolling, annealing and skinpassing)	32
hot rolled and pickled profiled tube	17	profile tube, heat treated and straightened from cold strip	33
cold rolled profiled tube (full hard)	18	profile tube, heat treated, straightened and cut from cold strip	34
profiled tube from galvanized strip	19	drawn tube	35
profile tube from cold strip (cold rolled, annealed and skinpassed strip)	20	heat treated drawn tube	36
profiled and heat treated tube from hot rolled strip	22		
profile tube, heat treated and straightened by hot rolled strip	23		
profile tube, heat treated, straightened and cut from hot rolled strip	24		
profiled and heat treated tube from hot rolled and pickled strip	25		
profiled tube, heat treated and straightened by hot rolled and pickled strip	26		

Additional information 37

sustainability	37	management system	37
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References 38



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 54, valid until 20-12-2024

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:

Yes 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 Carbon Steel S.p.A.
info.carbonsteel@marcegaglia.com

Contact:

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

Mail: info@marcegaglia.com

Phone: +39 0376 6851

Description of the organisation:

Marcegaglia Carbon Steel S.p.A. is the company of the Marcegaglia Group that transforms and markets flat products (coils, strips, and sheets) in carbon and pre-painted steel (PPGI) and carbon steel pipes. The company, thanks to advanced production technology and the most modern automation systems, enters the market for the creation of any type of finish on components and accessories, allowing it to satisfy the most demanding and customized requests.

Product-related or management system-related certifications:

- Quality management system compliant with the requirements of the standard UNI EN ISO 9001:2015 (certificate n° 10233/04/S – valid until 14/01/2025);
- Environmental management system compliant with the requirements of the standard UNI EN ISO

14001:2015 (certificato 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-137 – valid until 14/12/2023);
- Social responsibility management system compliant with the requirements of the standard SA 8000:2014 (certificate n° SA-2040 – valid until 04/04/2025).

Name and location of production site(s):

- Boltiere plant: Marcegaglia street, 2 – 24040 -Boltiere (BG) ;
- Casalmaggiore plant: VVanoni street, 25 – 26041 Casalmaggiore (CR);
- Dusino San Michele plant: Corso Industria street, 20 – 14010 - Dusino San Michele (AT);
- Gazoldo degli Ippoliti plant: Bresciani street, 16 – 46040 - Gazoldo Degli Ippoliti (MN);
- Lomagna plant: Milano street, 41 – 23871 – Lomagna (LC);
- Rivoli plant: Acqui street, 68 – 10098 - Rivoli (TO).

PRODUCT INFORMATION

Product name:

Profiled tubes from hot and cold rolled strip, heat treated and drawn

Product identification:

Profiled tubes from hot and cold rolled strip, heat treated and drawn

Product description:

From the first transformation, as part of its controlled production chain, Marcegaglia Carbon Steel obtains the widest range of carbon steel welded tubes in the world. The Marcegaglia Carbon Steel production of tubes obtained from hot rolled, cold and galvanized strip covers a wide range of uses, guaranteeing specific suitability for subsequent reworking.

With great versatility and flexibility, Marcegaglia precision tubes allow you to interpret and respond to the needs of specific uses such as radiators, roller systems, greenhouses, doors and windows, fences, furniture, sports equipment, automotive, mechanical industry and many others. arcegaglia is able to provide the widest range in the world of welded and cold-calibrated steel tubes for precision uses, to meet the needs of each market segment.

The range is divided into round, square, rectangular, oval, elliptical, triangular and semi-oval tubes and is completed by a very wide range of special shapes, with the possibility of customization on customer needs.

Marcegaglia supplies a wide range of cold-formed welded tubes for structural uses (CE approval) and hollow sections of unalloyed and fine-grain steels, hot finished or cold formed with heat treatments for special structural uses.

Finally, Marcegaglia Carbon Steel boasts a wide range of precision cold drawn tubes, welded and seamless, in all varieties of carbon and low alloy steels, for automotive, hydraulic and mechanical applications.

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 4128 Tubes, pipes and hollow profiles, of steel

Geographical scope:

worldwide

LCA INFORMATION

Functional unit:

The functional unit of the system considered is 1 tonne of tube 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 31-12-2022).

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

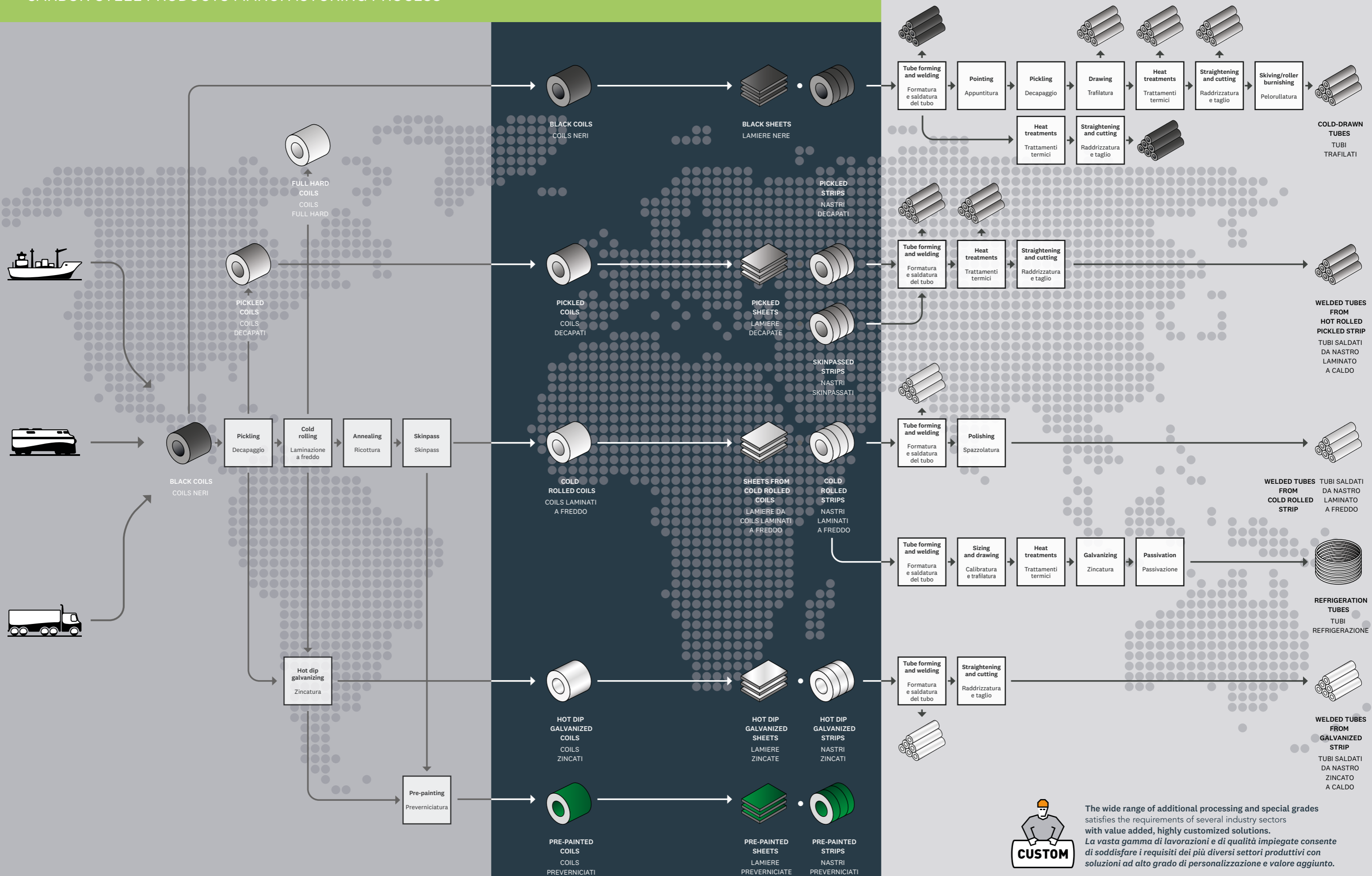
Modules C1-C4 consider the uninstallation, transport, sorting and disposal of components deriving from the end-of-life operations of road barriers. These operations are not directly controllable by the company: in this regard, literature data relating to the construction sector are therefore used. It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

- an average consumption of diesel fuel equivalent to 143.2 MJ as well as 0.013 MWh 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".

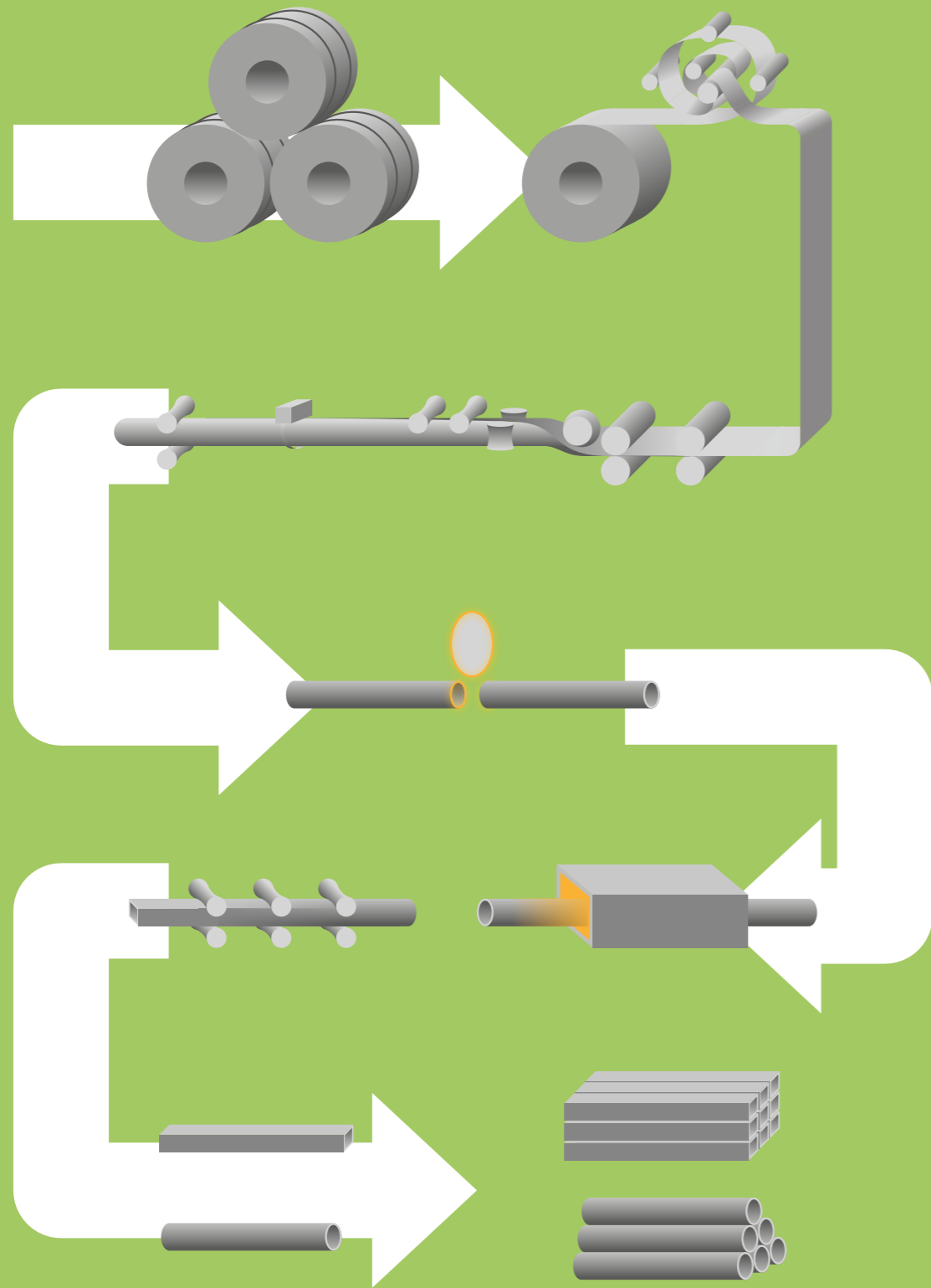
DIAGRAM OF THE PRODUCTION PROCESS OF PRODUCTION OF TUBE

CARBON STEEL PRODUCTS MANUFACTURING PROCESS

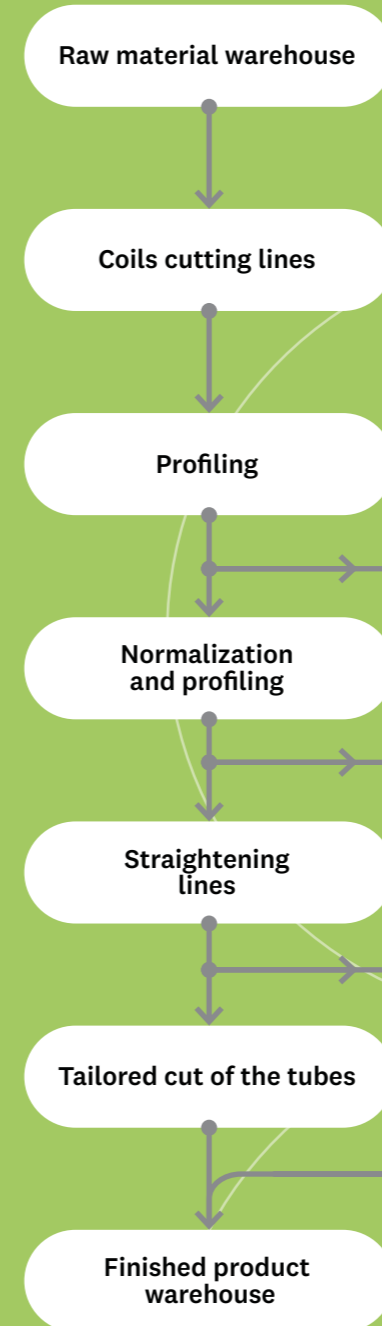


The wide range of additional processing and special grades satisfies the requirements of several industry sectors with value added, highly customized solutions. La vasta gamma di lavorazioni e di qualità impiegate consente di soddisfare i requisiti dei più diversi settori produttivi con soluzioni ad alto grado di personalizzazione e valore aggiunto.

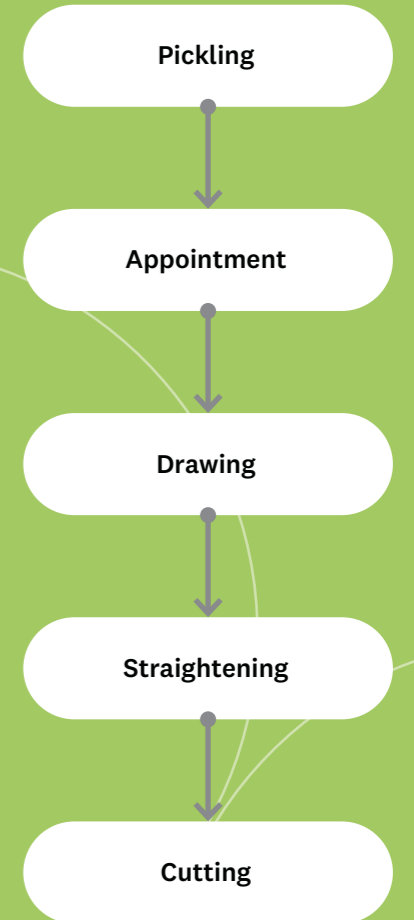
DIAGRAM OF THE PRODUCTION PROCESS OF PRODUCTION OF TUBE



BLOCK DIAGRAM OF THE PRODUCTION PROCESS FOR THE PRODUCTION OF PIPES



BLOCK DIAGRAM OF THE PIPE DRAWING PRODUCTION PROCESS



Other informations

DESCRIPTION OF THE MAIN ACTIVITIES

Starting from the raw material represented by carbon steel strips coming mainly from the factories of Marcegaglia Carbon Steel S.p.A. of Ravenna (RA), Gazoldo degli Ippoliti (MN) and Corsico (MI), the pipes are produced at the plants of Gazoldo degli Ippoliti (MN), Casalmaggiore (CR), Lomagna (LC) and Dusino (AT) by means of special plants called "pipe factories", aimed at the production of induction welded profiles. These systems can be schematized in three sections (entrance, central, exit). In particular, the belts, suitably sheared, are processed by profiling machines consisting of operating heads equipped with steel rollers to obtain tubes welded in line. Operationally, there are the following steps:

INPUT SECTION: consists of a feeding area and a belt accumulation area;

CENTRAL SECTION: this is the portion of the system dedicated to making the profile. It consists of:

- Forming - Finishing;
- Welding;
- Calibration;
- Cutting;

OUTPUT SECTION: is the portion of the system dedicated to the evacuation and unloading of the profile.

The production cycle of hot and cold tube mills is substantially the same: the difference consists in the type of rolling of the incoming strip, which may have been hot or cold rolled.

The factories in Boltiere (BG) and Rivoli (TO) are specialized in the drawing of steel tubes, in which the tubes represent the raw material. In order to be machined, carbon steel pipes must be previously treated on the surface. The surface cleaning operation is carried out chemically, through a degreasing and acid pickling process. In order for the subsequent drawing of the tubes to be carried out, they must be pointed. The pinning can take place before or after pickling.

The drawing process consists in the cold elongation of the tubes and the consequent reduction of their thickness by traction. Drawn tubes can then follow two paths:

- be destined in succession for straightening, cutting and dispatch;
- be destined for heat treatment and then undergo a second pickling treatment and subsequently the steps referred to in the previous point.

To recondition the raw material, restore the metal structure (modified following the drawing action) and to obtain a perfect cleaning of the pipes, the artifacts can be subjected to a heat treatment process.

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:

Module	A1-A3 Product stage			A4-A5 Construction process stage		B1-B7 Use stage						C1-C4 End of life stage				D Beneficiarie carichi oltre i limiti di sistema	
	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
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			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-site	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-

X = Module considered

ND = Module not declared

GLO = Global

IT = Italy

Additional information

The raw material (black coil) purchased by Marcegaglia Carbon Steel S.p.A. it is characterized by a recycled content ranging from 24 to 29%.

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.

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
	EP - marine	kg N eq
Eutrophication	EP - terrestrial	mol N eq
	WDP	m ³ depriv.
Water use	WDP	m ³ depriv.
Resource use, fossils	ADP - F	MJ
Resource use, minerals and metals	ADP - MM	kg Sb eq

RESOURCE USE

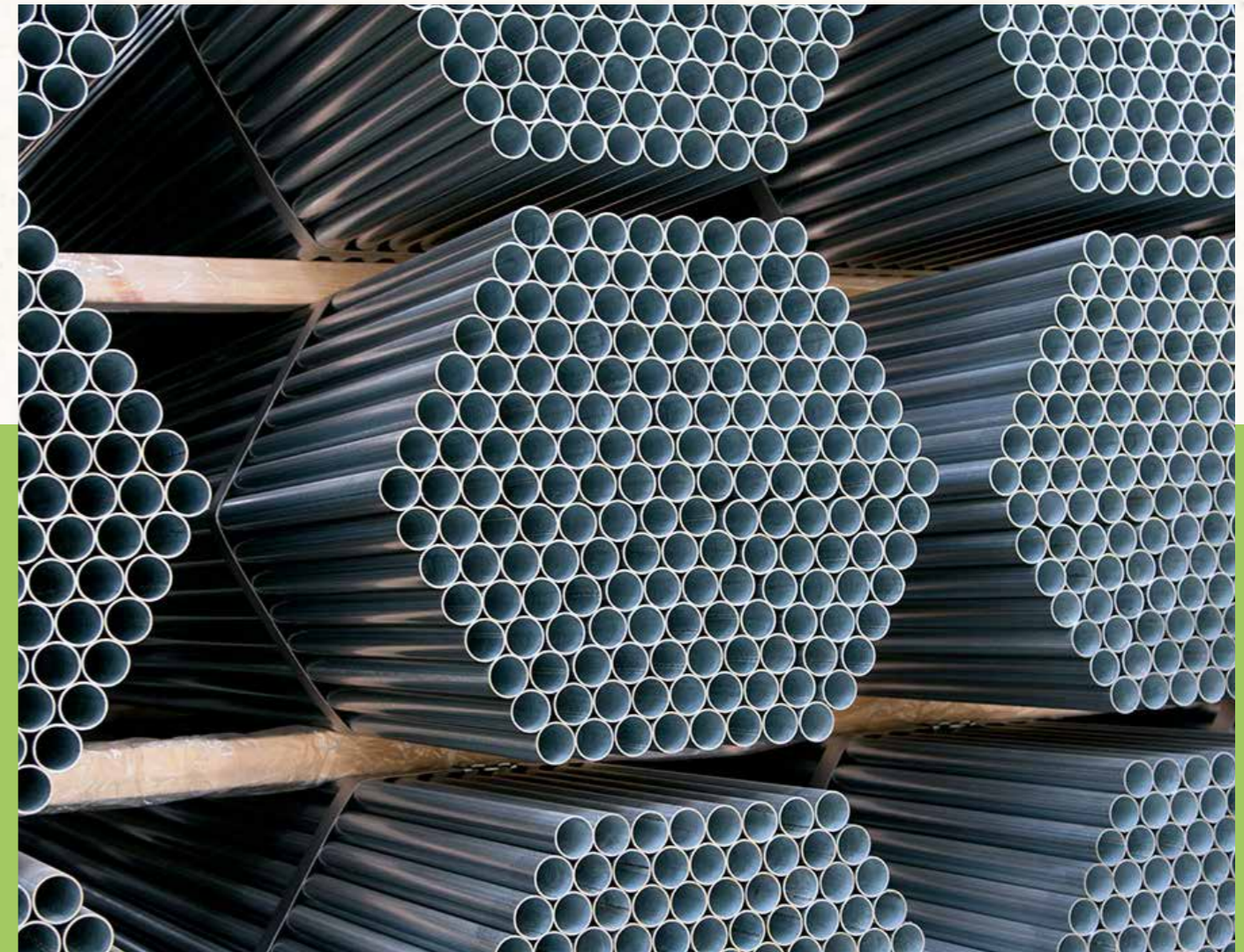
Impact category	Abb.	Unit
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ
Use of renewable primary energy resources used as raw materials	PERM	MJ
Total use of renewable primary energy resources (primary energy and primary energy resources used 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



HOT ROLLED PROFILED TUBE

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	2,394E+03	4,870E+01	-9,215E+02
GWP - fossil	kg CO ₂ eq	2,474E+03	4,867E+01	-9,189E+02
GWP - biogenic	kg CO ₂ eq	-8,275E+01	1,744E-02	-1,702E+00
GWP - luluc	kg CO ₂ eq	1,493E+00	8,423E-03	-7,228E-01
GWP - GHG	kg CO ₂ eq	2,389E+03	4,814E+01	-8,877E+02
ODP	kg CFC-11 eq	1,020E-04	9,952E-06	-4,460E-05
POCP	kg NMVOC eq	9,204E+00	4,366E-01	-4,084E+00
AP	mol H+ eq	1,032E+01	3,645E-01	-4,129E+00
EP - freshwater	kg P eq	8,093E-01	3,274E-03	-4,300E-01
EP - marine	kg N eq	2,377E+00	1,429E-01	-9,883E-01
EP - terrestrial	mol N eq	2,543E+01	1,564E+00	-9,381E+00
WDP	m ³ depriv.	-5,197E+02	2,508E+00	-2,271E+02
ADP - F	MJ	2,476E+04	7,012E+02	-9,566E+03
ADP - MM	kg Sb eq	1,823E-02	6,342E-05	-1,173E-02
PERE	MJ	5,814E+03	2,584E+01	-1,083E+03
PERM	MJ	0,000E+00	0,000E+00	0,000E+00
PERT	MJ	5,814E+03	2,584E+01	-1,083E+03
PENRE	MJ	3,010E+04	6,871E+02	-1,166E+04
PENRM	MJ	0,000E+00	0,000E+00	0,000E+00
PENRT	MJ	3,010E+04	6,871E+02	-1,166E+04
SM	kg	3,065E+02	3,821E-02	-1,690E+02
RSF	MJ	0,000E+00	0,000E+00	0,000E+00
NRSF	MJ	0,000E+00	0,000E+00	0,000E+00
FW	m ³	1,909E+01	1,075E-01	-1,059E+01
HW	kg	1,312E+02	9,879E-02	-5,290E+01
NHW	kg	8,209E+02	4,688E-01	-3,719E+02
RW	kg	6,466E-01	1,060E-02	-2,918E-01
REUSE	kg	0,000E+00	0,000E+00	0,000E+00
RECYCLE	kg	5,529E+00	6,126E-02	-4,638E+02
EN-REC	kg	0,000E+00	0,000E+00	0,000E+00
EE-E	MJ	0,000E+00	0,000E+00	0,000E+00
EE-T	MJ	0,000E+00	0,000E+00	0,000E+00

HOT ROLLED AND PICKLED PROFILED TUBE

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	2,283E+03	4,406E+01	-9,318E+02
GWP - fossil	kg CO ₂ eq	2,314E+03	4,403E+01	-9,291E+02
GWP - biogenic	kg CO ₂ eq	-3,277E+01	1,776E-02	-1,721E+00
GWP - luluc	kg CO ₂ eq	1,413E+00	7,671E-03	-7,309E-01
GWP - GHG	kg CO ₂ eq	2,233E+03	4,357E+01	-8,976E+02
ODP	kg CFC-11 eq	8,803E-05	9,207E-06	-4,500E-05
POCP	kg NMVOC eq	8,081E+00	4,257E-01	-4,130E+00
AP	mol H+ eq	9,552E+00	3,458E-01	-4,175E+00
EP - freshwater	kg P eq	6,730E-01	2,592E-03	-4,348E-01
EP - marine	kg N eq	2,217E+00	1,394E-01	-9,993E-01
EP - terrestrial	mol N eq	2,387E+01	1,526E+00	-9,485E+00
WDP	m ³ depriv.	-1,508E+03	1,965E+00	-2,297E+02
ADP - F	MJ	2,248E+04	6,309E+02	-9,673E+03
ADP - MM	kg Sb eq	1,363E-02	5,610E-05	-1,186E-02
PERE	MJ	3,583E+03	1,827E+01	-1,095E+03
PERM	MJ	0,000E+00	0,000E+00	0,000E+00
PERT	MJ	3,583E+03	1,827E+01	-1,095E+03
PENRE	MJ	2,752E+04	6,191E+02	-1,179E+04
PENRM	MJ	0,000E+00	0,000E+00	0,000E+00
PENRT	MJ	2,752E+04	6,191E+02	-1,179E+04
SM	kg	3,822E+02	5,322E-02	-1,708E+02
RSF	MJ	0,000E+00	0,000E+00	0,000E+00
NRSF	MJ	0,000E+00	0,000E+00	0,000E+00
FW	m ³	2,349E+01	1,075E-01	-1,221E+01
HW	kg	1,290E+02	1,070E-01	-5,349E+01
NHW	kg	8,485E+02	5,136E-01	-3,760E+02
RW	kg	6,266E-01	1,577E-02	-2,950E-01
REUSE	kg	0,000E+00	0,000E+00	0,000E+00
RECYCLE	kg	5,266E+00	8,778E-02	-4,689E+02
EN-REC	kg	0,000E+00	0,000E+00	0,000E+00
EE-E	MJ	0,000E+00	0,000E+00	0,000E+00
EE-T	MJ	0,000E+00	0,000E+00	0,000E+00

COLD ROLLED PROFILED TUBE (full hard)

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	2,651E+03	4,604E+01	-9,318E+02
GWP - fossil	kg CO ₂ eq	2,650E+03	4,601E+01	-9,291E+02
GWP - biogenic	kg CO ₂ eq	-4,791E-01	1,922E-02	-1,721E+00
GWP - luluc	kg CO ₂ eq	1,601E+00	8,549E-03	-7,309E-01
GWP - GHG	kg CO ₂ eq	2,558E+03	4,553E+01	-8,976E+02
ODP	kg CFC-11 eq	1,020E-04	9,660E-06	-4,500E-05
POCP	kg NMVOC eq	9,233E+00	4,329E-01	-4,130E+00
AP	mol H+ eq	1,104E+01	3,535E-01	-4,175E+00
EP - freshwater	kg P eq	7,341E-01	2,723E-03	-4,348E-01
EP - marine	kg N eq	2,601E+00	1,417E-01	-9,993E-01
EP - terrestrial	mol N eq	2,768E+01	1,551E+00	-9,485E+00
WDP	m ³ depriv.	7,727E+02	2,036E+00	-2,296E+02
ADP - F	MJ	2,595E+04	6,596E+02	-9,673E+03
ADP - MM	kg Sb eq	1,388E-02	6,630E-05	-1,186E-02
PERE	MJ	2,363E+03	1,915E+01	-1,095E+03
PERM	MJ	0,000E+00	0,000E+00	0,000E+00
PERT	MJ	2,363E+03	1,915E+01	-1,095E+03
PENRE	MJ	3,170E+04	6,473E+02	-1,179E+04
PENRM	MJ	0,000E+00	0,000E+00	0,000E+00
PENRT	MJ	3,170E+04	6,473E+02	-1,179E+04
SM	kg	3,013E+02	6,252E-03	-1,708E+02
RSF	MJ	0,000E+00	0,000E+00	0,000E+00
NRSF	MJ	0,000E+00	0,000E+00	0,000E+00
FW	m ³	2,503E+01	9,695E-02	-1,070E+01
HW	kg	1,474E+02	3,442E-02	-5,349E+01
NHW	kg	8,696E+02	1,598E-01	-3,760E+02
RW	kg	7,097E-01	1,137E-03	-2,950E-01
REUSE	kg	0,000E+00	0,000E+00	0,000E+00
RECYCLE	kg	5,862E+00	8,545E-03	-4,689E+02
EN-REC	kg	0,000E+00	0,000E+00	0,000E+00
EE-E	MJ	0,000E+00	0,000E+00	0,000E+00
EE-T	MJ	0,000E+00	0,000E+00	0,000E+00

PROFILED TUBE FROM GALVANIZED STRIP

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	2,841E+03	4,825E+01	-9,071E+02
GWP - fossil	kg CO ₂ eq	2,961E+03	4,823E+01	-9,045E+02
GWP - biogenic	kg CO ₂ eq	-1,222E+02	1,774E-02	-1,675E+00
GWP - luluc	kg CO ₂ eq	2,125E+00	8,444E-03	-7,115E-01
GWP - GHG	kg CO ₂ eq	2,863E+03	4,770E+01	-8,738E+02
ODP	kg CFC-11 eq	1,265E-04	9,903E-06	-4,383E-05
POCP	kg NMVOC eq	1,048E+01	4,360E-01	-4,020E+00
AP	mol H+ eq	1,266E+01	3,627E-01	-4,065E+00
EP - freshwater	kg P eq	8,875E-01	3,182E-03	-4,233E-01
EP - marine	kg N eq	3,008E+00	1,427E-01	-9,729E-01
EP - terrestrial	mol N eq	3,168E+01	1,562E+00	-9,234E+00
WDP	m ³ depriv.	-2,492E+02	2,429E+00	-2,235E+02
ADP - F	MJ	3,019E+04	6,943E+02	-9,417E+03
ADP - MM	kg Sb eq	6,046E-02	6,390E-05	-1,155E-02
PERE	MJ	7,684E+03	2,472E+01	-1,066E+03
PERM	MJ	0,000E+00	0,000E+00	0,000E+00
PERT	MJ	7,684E+03	2,472E+01	-1,066E+03
PENRE	MJ	3,198E+04	6,679E+02	-1,013E+04
PENRM	MJ	0,000E+00	0,000E+00	0,000E+00
PENRT	MJ	3,198E+04	6,679E+02	-1,013E+04
SM	kg	3,141E+02	3,289E-02	-1,663E+02
RSF	MJ	0,000E+00	0,000E+00	0,000E+00
NRSF	MJ	0,000E+00	0,000E+00	0,000E+00
FW	m ³	3,771E+01	1,133E-01	-1,122E+01
HW	kg	1,529E+02	8,806E-02	-5,207E+01
NHW	kg	9,083E+02	4,173E-01	-3,661E+02
RW	kg	7,395E-01	9,025E-03	-2,872E-01
REUSE	kg	0,000E+00	0,000E+00	0,000E+00
RECYCLE	kg	6,207E+00	5,247E-02	-4,565E+02
EN-REC	kg	0,000E+00	0,000E+00	0,000E+00
EE-E	MJ	0,000E+00	0,000E+00	0,000E+00
EE-T	MJ	0,000E+00	0,000E+00	0,000E+00

PROFILE TUBE FROM COLD STRIP (cold rolled, annealed and skinpassed strip)

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	2,808E+03	4,614E+01	-8,948E+02
GWP - fossil	kg CO ₂ eq	2,886E+03	4,611E+01	-8,922E+02
GWP - biogenic	kg CO ₂ eq	-8,045E+01	1,775E-02	-1,653E+00
GWP - luluc	kg CO ₂ eq	1,837E+00	8,056E-03	-7,018E-01
GWP - GHG	kg CO ₂ eq	2,787E+03	4,562E+01	-8,619E+02
ODP	kg CFC-11 eq	1,163E-04	9,555E-06	-4,325E-05
POCP	kg NMVOC eq	9,983E+00	4,308E-01	-3,966E+00
AP	mol H+ eq	1,193E+01	3,542E-01	-4,010E+00
EP - freshwater	kg P eq	8,002E-01	2,884E-03	-4,175E-01
EP - marine	kg N eq	2,808E+00	1,410E-01	-9,596E-01
EP - terrestrial	mol N eq	2,982E+01	1,544E+00	-9,109E+00
WDP	m ³ depriv.	-9,509E+02	2,195E+00	-2,205E+02
ADP - F	MJ	2,880E+04	6,624E+02	-9,289E+03
ADP - MM	kg Sb eq	1,487E-02	5,998E-05	-1,139E-02
PERE	MJ	5,758E+03	2,147E+01	-1,052E+03
PERM	MJ	0,000E+00	0,000E+00	0,000E+00
PERT	MJ	5,758E+03	2,147E+01	-1,052E+03
PENRE	MJ	3,491E+04	6,495E+02	-1,132E+04
PENRM	MJ	0,000E+00	0,000E+00	0,000E+00
PENRT	MJ	3,491E+04	6,495E+02	-1,132E+04
SM	kg	3,205E+02	7,844E-03	-1,641E+02
RSF	MJ	0,000E+00	0,000E+00	0,000E+00
NRSF	MJ	0,000E+00	0,000E+00	0,000E+00
FW	m ³	2,603E+01	9,939E-02	-1,047E+01
HW	kg	1,562E+02	4,318E-02	-5,136E+01
NHW	kg	9,260E+02	2,005E-01	-3,611E+02
RW	kg	7,467E-01	1,426E-03	-2,833E-01
REUSE	kg	0,000E+00	0,000E+00	0,000E+00
RECYCLE	kg	6,272E+00	1,072E-02	-4,503E+02
EN-REC	kg	0,000E+00	0,000E+00	0,000E+00
EE-E	MJ	0,000E+00	0,000E+00	0,000E+00
EE-T	MJ	0,000E+00	0,000E+00	0,000E+00



PROFILED AND HEAT TREATED TUBE FROM HOT ROLLED STRIP

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	2,574E+03	3,363E+01	-9,545E+02
GWP - fossil	kg CO ₂ eq	2,622E+03	3,360E+01	-9,518E+02
GWP - biogenic	kg CO ₂ eq	-5,055E+01	1,635E-02	-1,763E+00
GWP - luluc	kg CO ₂ eq	1,419E+00	5,239E-03	-7,487E-01
GWP - GHG	kg CO ₂ eq	2,534E+03	3,329E+01	-9,195E+02
ODP	kg CFC-11 eq	1,250E-04	7,360E-06	-4,600E-05
POCP	kg NMVOC eq	9,810E+00	3,977E-01	-4,231E+00
AP	mol H+ eq	1,074E+01	3,040E-01	-4,277E+00
EP - freshwater	kg P eq	8,003E-01	1,270E-03	-4,454E-01
EP - marine	kg N eq	2,559E+00	1,305E-01	-1,024E+00
EP - terrestrial	mol N eq	2,790E+01	1,429E+00	-9,717E+00
WDP	m ³ depriv.	-5,458E+03	9,565E-01	-2,354E+02
ADP - F	MJ	2,703E+04	4,746E+02	-9,909E+03
ADP - MM	kg Sb eq	1,930E-02	3,020E-05	-1,215E-02
PERE	MJ	4,591E+03	4,368E+00	-1,122E+03
PERM	MJ	0,000E+00	0,000E+00	0,000E+00
PERT	MJ	4,591E+03	4,368E+00	-1,122E+03
PENRE	MJ	3,244E+04	4,673E+02	-1,207E+04
PENRM	MJ	0,000E+00	0,000E+00	0,000E+00
PENRT	MJ	3,244E+04	4,673E+02	-1,207E+04
SM	kg	2,886E+02	1,256E-05	-1,750E+02
RSF	MJ	0,000E+00	0,000E+00	0,000E+00
NRSF	MJ	0,000E+00	0,000E+00	0,000E+00
FW	m ³	1,804E+01	6,380E-02	-1,096E+01
HW	kg	1,324E+02	6,912E-05	-5,480E+01
NHW	kg	7,924E+02	3,209E-04	-3,852E+02
RW	kg	6,543E-01	2,282E-06	-3,022E-01
REUSE	kg	0,000E+00	0,000E+00	0,000E+00
RECYCLE	kg	5,616E+00	1,716E-05	-4,804E+02
EN-REC	kg	0,000E+00	0,000E+00	0,000E+00
EE-E	MJ	0,000E+00	0,000E+00	0,000E+00
EE-T	MJ	0,000E+00	0,000E+00	0,000E+00

PROFILE TUBE, HEAT TREATED AND STRAIGHTENED BY HOT ROLLED STRIP

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	2,637E+03	3,363E+01	-9,431E+02
GWP - fossil	kg CO ₂ eq	2,686E+03	3,360E+01	-9,405E+02
GWP - biogenic	kg CO ₂ eq	-5,046E+01	1,635E-02	-1,742E+00
GWP - luluc	kg CO ₂ eq	1,449E+00	5,239E-03	-7,398E-01
GWP - GHG	kg CO ₂ eq	2,595E+03	3,329E+01	-9,086E+02
ODP	kg CFC-11 eq	1,290E-04	7,360E-06	-4,600E-05
POCP	kg NMVOC eq	1,003E+01	3,977E-01	-4,180E+00
AP	mol H+ eq	1,100E+01	3,040E-01	-4,226E+00
EP - freshwater	kg P eq	8,182E-01	1,270E-03	-4,401E-01
EP - marine	kg N eq	2,618E+00	1,305E-01	-1,012E+00
EP - terrestrial	mol N eq	2,854E+01	1,429E+00	-9,601E+00
WDP	m ³ depriv.	-5,572E+03	9,565E-01	-2,326E+02
ADP - F	MJ	2,771E+04	4,746E+02	-9,791E+03
ADP - MM	kg Sb eq	1,971E-02	3,020E-05	-1,201E-02
PERE	MJ	4,662E+03	4,368E+00	-1,109E+03
PERM	MJ	0,000E+00	0,000E+00	0,000E+00
PERT	MJ	4,662E+03	4,368E+00	-1,109E+03
PENRE	MJ	3,323E+04	4,673E+02	-1,193E+04
PENRM	MJ	0,000E+00	0,000E+00	0,000E+00
PENRT	MJ	3,323E+04	4,673E+02	-1,193E+04
SM	kg	2,947E+02	1,256E-05	-1,729E+02
RSF	MJ	0,000E+00	0,000E+00	0,000E+00
NRSF	MJ	0,000E+00	0,000E+00	0,000E+00
FW	m ³	1,844E+01	6,380E-02	-1,083E+01
HW	kg	1,353E+02	6,912E-05	-5,414E+01
NHW	kg	8,094E+02	3,209E-04	-3,806E+02
RW	kg	6,695E-01	2,282E-06	-2,986E-01
REUSE	kg	0,000E+00	0,000E+00	0,000E+00
RECYCLE	kg	5,745E+00	1,716E-05	-4,747E+02
EN-REC	kg	0,000E+00	0,000E+00	0,000E+00
EE-E	MJ	0,000E+00	0,000E+00	0,000E+00
EE-T	MJ	0,000E+00	0,000E+00	0,000E+00

PROFILE TUBE, HEAT TREATED, STRAIGHTENED AND CUT FROM HOT ROLLED STRIP

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	2,730E+03	3,363E+01	-9,318E+02
GWP - fossil	kg CO ₂ eq	2,779E+03	3,360E+01	-9,291E+02
GWP - biogenic	kg CO ₂ eq	-5,037E+01	1,635E-02	-1,721E+00
GWP - luluc	kg CO ₂ eq	1,483E+00	5,239E-03	-7,309E-01
GWP - GHG	kg CO ₂ eq	2,686E+03	3,329E+01	-8,976E+02
ODP	kg CFC-11 eq	1,370E-04	7,360E-06	-4,500E-05
POCP	kg NMVOC eq	1,033E+01	3,977E-01	-4,130E+00
AP	mol H+ eq	1,138E+01	3,040E-01	-4,175E+00
EP - freshwater	kg P eq	8,413E-01	1,270E-03	-4,348E-01
EP - marine	kg N eq	2,697E+00	1,305E-01	-9,993E-01
EP - terrestrial	mol N eq	2,939E+01	1,429E+00	-9,485E+00
WDP	m ³ depriv.	-5,683E+03	9,565E-01	-2,298E+02
ADP - F	MJ	2,886E+04	4,746E+02	-9,673E+03
ADP - MM	kg Sb eq	2,017E-02	3,020E-05	-1,186E-02
PERE	MJ	4,798E+03	4,368E+00	-1,095E+03
PERM	MJ	0,000E+00	0,000E+00	0,000E+00
PERT	MJ	4,798E+03	4,368E+00	-1,095E+03
PENRE	MJ	3,447E+04	4,673E+02	-1,179E+04
PENRM	MJ	0,000E+00	0,000E+00	0,000E+00
PENRT	MJ	3,447E+04	4,673E+02	-1,179E+04
SM	kg	3,008E+02	1,256E-05	-1,708E+02
RSF	MJ	0,000E+00	0,000E+00	0,000E+00
NRSF	MJ	0,000E+00	0,000E+00	0,000E+00
FW	m ³	1,896E+01	6,380E-02	-1,070E+01
HW	kg	1,383E+02	6,912E-05	-5,349E+01
NHW	kg	8,275E+02	3,209E-04	-3,760E+02
RW	kg	6,898E-01	2,282E-06	-2,950E-01
REUSE	kg	0,000E+00	0,000E+00	0,000E+00
RECYCLE	kg	5,913E+00	1,716E-05	-4,689E+02
EN-REC	kg	0,000E+00	0,000E+00	0,000E+00
EE-E	MJ	0,000E+00	0,000E+00	0,000E+00
EE-T	MJ	0,000E+00	0,000E+00	0,000E+00

PROFILED AND HEAT TREATED TUBE FROM HOT ROLLED AND PICKLED STRIP

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	2,098E+03	3,363E+01	-9,754E+02
GWP - fossil	kg CO ₂ eq	2,143E+03	3,360E+01	-9,726E+02
GWP - biogenic	kg CO ₂ eq	-4,644E+01	1,635E-02	-1,802E+00
GWP - luluc	kg CO ₂ eq	1,224E+00	5,239E-03	-7,651E-01
GWP - GHG	kg CO ₂ eq	2,073E+03	3,329E+01	-9,396E+02
ODP	kg CFC-11 eq	9,910E-05	7,360E-06	-4,700E-05
POCP	kg NMVOC eq	7,190E+00	3,977E-01	-4,323E+00
AP	mol H+ eq	8,648E+00	3,040E-01	-4,371E+00
EP - freshwater	kg P eq	5,408E-01	1,270E-03	-4,552E-01
EP - marine	kg N eq	2,073E+00	1,305E-01	-1,046E+00
EP - terrestrial	mol N eq	2,302E+01	1,429E+00	-9,930E+00
WDP	m ³ depriv.	-5,959E+03	9,565E-01	-2,406E+02
ADP - F	MJ	2,132E+04	4,746E+02	-1,013E+04
ADP - MM	kg Sb eq	1,080E-02	3,020E-05	-1,242E-02
PERE	MJ	4,064E+03	4,368E+00	-1,147E+03
PERM	MJ	0,000E+00	0,000E+00	0,000E+00
PERT	MJ	4,064E+03	4,368E+00	-1,147E+03
PENRE	MJ	2,555E+04	4,673E+02	-1,234E+04
PENRM	MJ	0,000E+00	0,000E+00	0,000E+00
PENRT	MJ	2,555E+04	4,673E+02	-1,234E+04
SM	kg	5,219E+02	1,256E-05	-1,788E+02
RSF	MJ	0,000E+00	0,000E+00	0,000E+00
NRSF	MJ	0,000E+00	0,000E+00	0,000E+00
FW	m ³	1,780E+01	6,380E-02	-1,120E+01
HW	kg	1,146E+02	6,912E-05	-5,599E+01
NHW	kg	8,604E+02	3,209E-04	-3,936E+02
RW	kg	5,760E-01	2,282E-06	-3,088E-01
REUSE	kg	0,000E+00	0,000E+00	0,000E+00
RECYCLE	kg	4,753E+00	1,716E-05	-4,909E+02
EN-REC	kg	0,000E+00	0,000E+00	0,000E+00
EE-E	MJ	0,000E+00	0,000E+00	0,000E+00
EE-T	MJ	0,000E+00	0,000E+00	0,000E+00

**PROFILED TUBE, HEAT TREATED AND STRAIGHTENED
BY HOT ROLLED AND PICKLED STRIP**

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	2,152E+03	3,363E+01	-9,659E+02
GWP - fossil	kg CO ₂ eq	2,196E+03	3,360E+01	-9,632E+02
GWP - biogenic	kg CO ₂ eq	-4,627E+01	1,635E-02	-1,784E+00
GWP - luluc	kg CO ₂ eq	1,249E+00	5,239E-03	-7,577E-01
GWP - GHG	kg CO ₂ eq	2,125E+03	3,329E+01	-9,305E+02
ODP	kg CFC-11 eq	1,020E-04	7,360E-06	-4,700E-05
POCP	kg NMVOC eq	7,357E+00	3,977E-01	-4,281E+00
AP	mol H+ eq	8,861E+00	3,040E-01	-4,328E+00
EP - freshwater	kg P eq	5,533E-01	1,270E-03	-4,507E-01
EP - marine	kg N eq	2,121E+00	1,305E-01	-1,036E+00
EP - terrestrial	mol N eq	2,355E+01	1,429E+00	-9,833E+00
WDP	m ³ depriv.	-6,083E+03	9,565E-01	-2,382E+02
ADP - F	MJ	2,189E+04	4,746E+02	-1,003E+04
ADP - MM	kg Sb eq	1,103E-02	3,020E-05	-1,230E-02
PERE	MJ	4,124E+03	4,368E+00	-1,135E+03
PERM	MJ	0,000E+00	0,000E+00	0,000E+00
PERT	MJ	4,124E+03	4,368E+00	-1,135E+03
PENRE	MJ	2,620E+04	4,673E+02	-1,222E+04
PENRM	MJ	0,000E+00	0,000E+00	0,000E+00
PENRT	MJ	2,620E+04	4,673E+02	-1,222E+04
SM	kg	5,328E+02	1,256E-05	-1,771E+02
RSF	MJ	0,000E+00	0,000E+00	0,000E+00
NRSF	MJ	0,000E+00	0,000E+00	0,000E+00
FW	m ³	1,820E+01	6,380E-02	-1,110E+01
HW	kg	1,170E+02	6,912E-05	-5,545E+01
NHW	kg	8,788E+02	3,209E-04	-3,898E+02
RW	kg	5,895E-01	2,282E-06	-3,058E-01
REUSE	kg	0,000E+00	0,000E+00	0,000E+00
RECYCLE	kg	4,864E+00	1,716E-05	-4,861E+02
EN-REC	kg	0,000E+00	0,000E+00	0,000E+00
EE-E	MJ	0,000E+00	0,000E+00	0,000E+00
EE-T	MJ	0,000E+00	0,000E+00	0,000E+00

**PROFILED TUBE, HEAT TREATED, STRAIGHTENED AND CUT
FROM HOT ROLLED AND PICKLED STRIP**

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	2,234E+03	3,363E+01	-9,545E+02
GWP - fossil	kg CO ₂ eq	2,279E+03	3,360E+01	-9,518E+02
GWP - biogenic	kg CO ₂ eq	-4,609E+01	1,635E-02	-1,763E+00
GWP - luluc	kg CO ₂ eq	1,279E+00	5,239E-03	-7,487E-01
GWP - GHG	kg CO ₂ eq	2,205E+03	3,329E+01	-9,195E+02
ODP	kg CFC-11 eq	1,100E-04	7,360E-06	-4,600E-05
POCP	kg NMVOC eq	7,597E+00	3,977E-01	-4,231E+00
AP	mol H+ eq	9,193E+00	3,040E-01	-4,277E+00
EP - freshwater	kg P eq	5,708E-01	1,270E-03	-4,454E-01
EP - marine	kg N eq	2,189E+00	1,305E-01	-1,024E+00
EP - terrestrial	mol N eq	2,431E+01	1,429E+00	-9,717E+00
WDP	m ³ depriv.	-6,205E+03	9,565E-01	-2,354E+02
ADP - F	MJ	2,291E+04	4,746E+02	-9,909E+03
ADP - MM	kg Sb eq	1,131E-02	3,020E-05	-1,215E-02
PERE	MJ	4,248E+03	4,368E+00	-1,122E+03
PERM	MJ	0,000E+00	0,000E+00	0,000E+00
PERT	MJ	4,248E+03	4,368E+00	-1,122E+03
PENRE	MJ	2,729E+04	4,673E+02	-1,207E+04
PENRM	MJ	0,000E+00	0,000E+00	0,000E+00
PENRT	MJ	2,729E+04	4,673E+02	-1,207E+04
SM	kg	5,440E+02	1,256E-05	-1,750E+02
RSF	MJ	0,000E+00	0,000E+00	0,000E+00
NRSF	MJ	0,000E+00	0,000E+00	0,000E+00
FW	m ³	1,870E+01	6,380E-02	-1,096E+01
HW	kg	1,197E+02	6,912E-05	-5,480E+01
NHW	kg	8,984E+02	3,209E-04	-3,852E+02
RW	kg	6,082E-01	2,282E-06	-3,022E-01
REUSE	kg	0,000E+00	0,000E+00	0,000E+00
RECYCLE	kg	5,013E+00	1,716E-05	-4,804E+02
EN-REC	kg	0,000E+00	0,000E+00	0,000E+00
EE-E	MJ	0,000E+00	0,000E+00	0,000E+00
EE-T	MJ	0,000E+00	0,000E+00	0,000E+00



PROFILED TUBE AND HEAT TREATED BY GALVANIZED STRIP

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	2,974E+03	3,363E+01	-9,147E+02
GWP - fossil	kg CO ₂ eq	3,019E+03	3,360E+01	-9,121E+02
GWP - biogenic	kg CO ₂ eq	-4,775E+01	1,635E-02	-1,689E+00
GWP - luluc	kg CO ₂ eq	2,004E+00	5,239E-03	-7,175E-01
GWP - GHG	kg CO ₂ eq	2,921E+03	3,329E+01	-8,811E+02
ODP	kg CFC-11 eq	1,380E-04	7,360E-06	-4,400E-05
POCP	kg NMVOC eq	1,084E+01	3,977E-01	-4,054E+00
AP	mol H+ eq	1,287E+01	3,040E-01	-4,099E+00
EP - freshwater	kg P eq	8,663E-01	1,270E-03	-4,268E-01
EP - marine	kg N eq	3,160E+00	1,305E-01	-9,810E-01
EP - terrestrial	mol N eq	3,339E+01	1,429E+00	-9,312E+00
WDP	m ³ depriv.	-6,219E+03	9,565E-01	-2,256E+02
ADP - F	MJ	3,123E+04	4,746E+02	-9,495E+03
ADP - MM	kg Sb eq	5,963E-02	3,020E-05	-1,164E-02
PERE	MJ	4,748E+03	4,368E+00	-1,075E+03
PERM	MJ	0,000E+00	0,000E+00	0,000E+00
PERT	MJ	4,748E+03	4,368E+00	-1,075E+03
PENRE	MJ	3,728E+04	4,673E+02	-1,157E+04
PENRM	MJ	0,000E+00	0,000E+00	0,000E+00
PENRT	MJ	3,728E+04	4,673E+02	-1,157E+04
SM	kg	3,098E+02	1,256E-05	-1,677E+02
RSF	MJ	0,000E+00	0,000E+00	0,000E+00
NRSF	MJ	0,000E+00	0,000E+00	0,000E+00
FW	m ³	3,557E+01	6,380E-02	-1,051E+01
HW	kg	1,505E+02	6,912E-05	-5,251E+01
NHW	kg	8,971E+02	3,209E-04	-3,691E+02
RW	kg	7,143E-01	2,282E-06	-2,896E-01
REUSE	kg	0,000E+00	0,000E+00	0,000E+00
RECYCLE	kg	6,067E+00	1,716E-05	-4,603E+02
EN-REC	kg	0,000E+00	0,000E+00	0,000E+00
EE-E	MJ	0,000E+00	0,000E+00	0,000E+00
EE-T	MJ	0,000E+00	0,000E+00	0,000E+00

PROFILED TUBE, HEAT TREATED AND STRAIGHTENED BY GALVANIZED STRIP

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	3,046E+03	3,363E+01	-9,033E+02
GWP - fossil	kg CO ₂ eq	3,091E+03	3,360E+01	-9,007E+02
GWP - biogenic	kg CO ₂ eq	-4,761E+01	1,635E-02	-1,668E+00
GWP - luluc	kg CO ₂ eq	2,046E+00	5,239E-03	-7,085E-01
GWP - GHG	kg CO ₂ eq	2,990E+03	3,329E+01	-8,702E+02
ODP	kg CFC-11 eq	1,420E-04	7,360E-06	-4,400E-05
POCP	kg NMVOC eq	1,108E+01	3,977E-01	-4,004E+00
AP	mol H+ eq	1,317E+01	3,040E-01	-4,048E+00
EP - freshwater	kg P eq	8,856E-01	1,270E-03	-4,215E-01
EP - marine	kg N eq	3,231E+00	1,305E-01	-9,688E-01
EP - terrestrial	mol N eq	3,414E+01	1,429E+00	-9,196E+00
WDP	m ³ depriv.	-6,349E+03	9,565E-01	-2,228E+02
ADP - F	MJ	3,200E+04	4,746E+02	-9,377E+03
ADP - MM	kg Sb eq	6,089E-02	3,020E-05	-1,150E-02
PERE	MJ	4,822E+03	4,368E+00	-1,062E+03
PERM	MJ	0,000E+00	0,000E+00	0,000E+00
PERT	MJ	4,822E+03	4,368E+00	-1,062E+03
PENRE	MJ	3,818E+04	4,673E+02	-1,143E+04
PENRM	MJ	0,000E+00	0,000E+00	0,000E+00
PENRT	MJ	3,818E+04	4,673E+02	-1,143E+04
SM	kg	3,162E+02	1,256E-05	-1,656E+02
RSF	MJ	0,000E+00	0,000E+00	0,000E+00
NRSF	MJ	0,000E+00	0,000E+00	0,000E+00
FW	m ³	3,634E+01	6,380E-02	-1,038E+01
HW	kg	1,537E+02	6,912E-05	-5,185E+01
NHW	kg	9,163E+02	3,209E-04	-3,645E+02
RW	kg	7,307E-01	2,282E-06	-2,860E-01
REUSE	kg	0,000E+00	0,000E+00	0,000E+00
RECYCLE	kg	6,206E+00	1,716E-05	-4,546E+02
EN-REC	kg	0,000E+00	0,000E+00	0,000E+00
EE-E	MJ	0,000E+00	0,000E+00	0,000E+00
EE-T	MJ	0,000E+00	0,000E+00	0,000E+00

PROFILED TUBE, HEAT TREATED, STRAIGHTENED AND CUT FROM GALVANIZED STRIP

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	3,148E+03	3,363E+01	-8,900E+02
GWP - fossil	kg CO ₂ eq	3,192E+03	3,360E+01	-8,875E+02
GWP - biogenic	kg CO ₂ eq	-4,746E+01	1,635E-02	-1,644E+00
GWP - luluc	kg CO ₂ eq	2,092E+00	5,239E-03	-6,981E-01
GWP - GHG	kg CO ₂ eq	3,089E+03	3,329E+01	-8,574E+02
ODP	kg CFC-11 eq	1,500E-04	7,360E-06	-4,300E-05
POCP	kg NMVOC eq	1,140E+01	3,977E-01	-3,945E+00
AP	mol H+ eq	1,359E+01	3,040E-01	-3,988E+00
EP - freshwater	kg P eq	9,101E-01	1,270E-03	-4,153E-01
EP - marine	kg N eq	3,323E+00	1,305E-01	-9,546E-01
EP - terrestrial	mol N eq	3,511E+01	1,429E+00	-9,060E+00
WDP	m ³ depriv.	-6,477E+03	9,565E-01	-2,195E+02
ADP - F	MJ	3,324E+04	4,746E+02	-9,239E+03
ADP - MM	kg Sb eq	6,222E-02	3,020E-05	-1,133E-02
PERE	MJ	4,961E+03	4,368E+00	-1,046E+03
PERM	MJ	0,000E+00	0,000E+00	0,000E+00
PERT	MJ	4,961E+03	4,368E+00	-1,046E+03
PENRE	MJ	3,953E+04	4,673E+02	-1,126E+04
PENRM	MJ	0,000E+00	0,000E+00	0,000E+00
PENRT	MJ	3,953E+04	4,673E+02	-1,126E+04
SM	kg	3,229E+02	1,256E-05	-1,632E+02
RSF	MJ	0,000E+00	0,000E+00	0,000E+00
NRSF	MJ	0,000E+00	0,000E+00	0,000E+00
FW	m ³	3,723E+01	6,380E-02	-1,022E+01
HW	kg	1,571E+02	6,912E-05	-5,109E+01
NHW	kg	9,367E+02	3,209E-04	-3,592E+02
RW	kg	7,524E-01	2,282E-06	-2,818E-01
REUSE	kg	0,000E+00	0,000E+00	0,000E+00
RECYCLE	kg	6,383E+00	1,716E-05	-4,479E+02
EN-REC	kg	0,000E+00	0,000E+00	0,000E+00
EE-E	MJ	0,000E+00	0,000E+00	0,000E+00
EE-T	MJ	0,000E+00	0,000E+00	0,000E+00

PROFILE TUBE AND HEAT TREATED FROM COLD STRIP
(strip subjected to cold rolling, annealing and skinpassing)

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	2,922E+03	3,363E+01	-9,014E+02
GWP - fossil	kg CO ₂ eq	2,970E+03	3,360E+01	-8,988E+02
GWP - biogenic	kg CO ₂ eq	-5,040E+01	1,635E-02	-1,665E+00
GWP - luluc	kg CO ₂ eq	1,752E+00	5,239E-03	-7,071E-01
GWP - GHG	kg CO ₂ eq	2,870E+03	3,329E+01	-8,683E+02
ODP	kg CFC-11 eq	1,310E-04	7,360E-06	-4,400E-05
POCP	kg NMVOC eq	1,046E+01	3,977E-01	-3,995E+00
AP	mol H+ eq	1,226E+01	3,040E-01	-4,039E+00
EP - freshwater	kg P eq	7,880E-01	1,270E-03	-4,206E-01
EP - marine	kg N eq	2,995E+00	1,305E-01	-9,668E-01
EP - terrestrial	mol N eq	3,189E+01	1,429E+00	-9,176E+00
WDP	m ³ depriv.	-6,422E+03	9,565E-01	-2,223E+02
ADP - F	MJ	3,026E+04	4,746E+02	-9,358E+03
ADP - MM	kg Sb eq	1,464E-02	3,020E-05	-1,147E-02
PERE	MJ	4,593E+03	4,368E+00	-1,060E+03
PERM	MJ	0,000E+00	0,000E+00	0,000E+00
PERT	MJ	4,593E+03	4,368E+00	-1,060E+03
PENRE	MJ	3,637E+04	4,673E+02	-1,140E+04
PENRM	MJ	0,000E+00	0,000E+00	0,000E+00
PENRT	MJ	3,637E+04	4,673E+02	-1,140E+04
SM	kg	3,170E+02	1,256E-05	-1,653E+02
RSF	MJ	0,000E+00	0,000E+00	0,000E+00
NRSF	MJ	0,000E+00	0,000E+00	0,000E+00
FW	m ³	2,679E+01	6,380E-02	-1,035E+01
HW	kg	1,540E+02	6,912E-05	-5,175E+01
NHW	kg	9,165E+02	3,209E-04	-3,638E+02
RW	kg	7,275E-01	2,282E-06	-2,854E-01
REUSE	kg	0,000E+00	0,000E+00	0,000E+00
RECYCLE	kg	6,172E+00	1,716E-05	-4,537E+02
EN-REC	kg	0,000E+00	0,000E+00	0,000E+00
EE-E	MJ	0,000E+00	0,000E+00	0,000E+00
EE-T	MJ	0,000E+00	0,000E+00	0,000E+00

PROFILE TUBE, HEAT TREATED AND STRAIGHTENED FROM COLD STRIP
(strip subjected to cold rolling, annealing and skinpassing)

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	2,993E+03	3,363E+01	-8,881E+02
GWP - fossil	kg CO ₂ eq	3,041E+03	3,360E+01	-8,856E+02
GWP - biogenic	kg CO ₂ eq	-5,031E+01	1,635E-02	-1,640E+00
GWP - luluc	kg CO ₂ eq	1,789E+00	5,239E-03	-6,966E-01
GWP - GHG	kg CO ₂ eq	2,939E+03	3,329E+01	-8,555E+02
ODP	kg CFC-11 eq	1,350E-04	7,360E-06	-4,300E-05
POCP	kg NMVOC eq	1,070E+01	3,977E-01	-3,936E+00
AP	mol H+ eq	1,255E+01	3,040E-01	-3,980E+00
EP - freshwater	kg P eq	8,058E-01	1,270E-03	-4,144E-01
EP - marine	kg N eq	3,063E+00	1,305E-01	-9,525E-01
EP - terrestrial	mol N eq	3,261E+01	1,429E+00	-9,041E+00
WDP	m ³ depriv.	-6,556E+03	9,565E-01	-2,190E+02
ADP - F	MJ	3,101E+04	4,746E+02	-9,220E+03
ADP - MM	kg Sb eq	1,496E-02	3,020E-05	-1,130E-02
PERE	MJ	4,663E+03	4,368E+00	-1,044E+03
PERM	MJ	0,000E+00	0,000E+00	0,000E+00
PERT	MJ	4,663E+03	4,368E+00	-1,044E+03
PENRE	MJ	3,725E+04	4,673E+02	-1,123E+04
PENRM	MJ	0,000E+00	0,000E+00	0,000E+00
PENRT	MJ	3,725E+04	4,673E+02	-1,123E+04
SM	kg	3,236E+02	1,256E-05	-1,628E+02
RSF	MJ	0,000E+00	0,000E+00	0,000E+00
NRSF	MJ	0,000E+00	0,000E+00	0,000E+00
FW	m ³	2,737E+01	6,380E-02	-1,020E+01
HW	kg	1,573E+02	6,912E-05	-5,098E+01
NHW	kg	9,362E+02	3,209E-04	-3,584E+02
RW	kg	7,443E-01	2,282E-06	-2,812E-01
REUSE	kg	0,000E+00	0,000E+00	0,000E+00
RECYCLE	kg	6,312E+00	1,716E-05	-4,470E+02
EN-REC	kg	0,000E+00	0,000E+00	0,000E+00
EE-E	MJ	0,000E+00	0,000E+00	0,000E+00
EE-T	MJ	0,000E+00	0,000E+00	0,000E+00

PROFILE TUBE, HEAT TREATED, STRAIGHTENED AND CUT FROM COLD STRIP
(strip subjected to cold rolling, annealing and skinpassing)

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	3,094E+03	3,363E+01	-8,767E+02
GWP - fossil	kg CO ₂ eq	3,141E+03	3,360E+01	-8,742E+02
GWP - biogenic	kg CO ₂ eq	-5,022E+01	1,635E-02	-1,619E+00
GWP - luluc	kg CO ₂ eq	1,830E+00	5,239E-03	-6,877E-01
GWP - GHG	kg CO ₂ eq	3,036E+03	3,329E+01	-8,446E+02
ODP	kg CFC-11 eq	1,440E-04	7,360E-06	-4,200E-05
POCP	kg NMVOC eq	1,101E+01	3,977E-01	-3,886E+00
AP	mol H+ eq	1,296E+01	3,040E-01	-3,929E+00
EP - freshwater	kg P eq	8,286E-01	1,270E-03	-4,091E-01
EP - marine	kg N eq	3,151E+00	1,305E-01	-9,403E-01
EP - terrestrial	mol N eq	3,355E+01	1,429E+00	-8,925E+00
WDP	m ³ depriv.	-6,689E+03	9,565E-01	-2,162E+02
ADP - F	MJ	3,223E+04	4,746E+02	-9,101E+03
ADP - MM	kg Sb eq	1,532E-02	3,020E-05	-1,116E-02
PERE	MJ	4,799E+03	4,368E+00	-1,031E+03
PERM	MJ	0,000E+00	0,000E+00	0,000E+00
PERT	MJ	4,799E+03	4,368E+00	-1,031E+03
PENRE	MJ	3,858E+04	4,673E+02	-1,109E+04
PENRM	MJ	0,000E+00	0,000E+00	0,000E+00
PENRT	MJ	3,858E+04	4,673E+02	-1,109E+04
SM	kg	3,304E+02	1,256E-05	-1,608E+02
RSF	MJ	0,000E+00	0,000E+00	0,000E+00
NRSF	MJ	0,000E+00	0,000E+00	0,000E+00
FW	m ³	2,807E+01	6,380E-02	-1,007E+01
HW	kg	1,608E+02	6,912E-05	-5,033E+01
NHW	kg	9,569E+02	3,209E-04	-3,538E+02
RW	kg	7,662E-01	2,282E-06	-2,776E-01
REUSE	kg	0,000E+00	0,000E+00	0,000E+00
RECYCLE	kg	6,492E+00	1,716E-05	-4,412E+02
EN-REC	kg	0,000E+00	0,000E+00	0,000E+00
EE-E	MJ	0,000E+00	0,000E+00	0,000E+00
EE-T	MJ	0,000E+00	0,000E+00	0,000E+00

DRAWN TUBE

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	2,697E+03	4,949E+01	-9,583E+02
GWP - fossil	kg CO ₂ eq	2,754E+03	4,947E+01	-9,556E+02
GWP - biogenic	kg CO ₂ eq	-5,876E+01	1,557E-02	-1,770E+00
GWP - luluc	kg CO ₂ eq	1,492E+00	7,919E-03	-7,517E-01
GWP - GHG	kg CO ₂ eq	2,664E+03	4,890E+01	-9,232E+02
ODP	kg CFC-11 eq	1,515E-04	9,945E-06	-4,650E-05
POCP	kg NMVOC eq	1,001E+01	4,355E-01	-4,248E+00
AP	mol H+ eq	1,116E+01	3,680E-01	-4,294E+00
EP - freshwater	kg P eq	8,271E-01	3,581E-03	-4,472E-01
EP - marine	kg N eq	2,616E+00	1,425E-01	-1,028E+00
EP - terrestrial	mol N eq	2,844E+01	1,559E+00	-9,756E+00
WDP	m ³ depriv.	9,234E+02	2,796E+00	-2,361E+02
ADP - F	MJ	2,904E+04	7,146E+02	-9,948E+03
ADP - MM	kg Sb eq	1,953E-02	5,700E-05	-1,220E-02
PERE	MJ	5,309E+03	3,039E+01	-1,126E+03
PERM	MJ	0,000E+00	0,000E+00	0,000E+00
PERT	MJ	5,309E+03	3,039E+01	-1,126E+03
PENRE	MJ	3,452E+04	6,996E+02	-1,212E+04
PENRM	MJ	0,000E+00	0,000E+00	0,000E+00
PENRT	MJ	3,452E+04	6,996E+02	-1,212E+04
SM	kg	2,871E+02	1,262E-02	-1,757E+02
RSF	MJ	0,000E+00	0,000E+00	0,000E+00
NRSF	MJ	0,000E+00	0,000E+00	0,000E+00
FW	m ³	2,047E+01	1,127E-01	-1,101E+01
HW	kg	1,362E+02	6,947E-02	-5,501E+01
NHW	kg	8,036E+02	3,226E-01	-3,867E+02
RW	kg	6,739E-01	2,294E-03	-3,034E-01
REUSE	kg	0,000E+00	0,000E+00	0,000E+00
RECYCLE	kg	5,684E+00	1,724E-02	-4,823E+02
EN-REC	kg	0,000E+00	0,000E+00	0,000E+00
EE-E	MJ	0,000E+00	0,000E+00	0,000E+00
EE-T	MJ	0,000E+00	0,000E+00	0,000E+00

HEAT TREATED DRAWN TUBE

Abb.	Unit	A1-A3	C1+C4	D
GWP - t	kg CO ₂ eq	2,810E+03	4,949E+01	-9,583E+02
GWP - fossil	kg CO ₂ eq	2,865E+03	4,947E+01	-9,556E+02
GWP - biogenic	kg CO ₂ eq	-5,765E+01	1,557E-02	-1,770E+00
GWP - luluc	kg CO ₂ eq	1,510E+00	7,919E-03	-7,517E-01
GWP - GHG	kg CO ₂ eq	2,775E+03	4,890E+01	-9,232E+02
ODP	kg CFC-11 eq	1,675E-04	9,945E-06	-4,650E-05
POCP	kg NMVOC eq	1,017E+01	4,355E-01	-4,248E+00
AP	mol H+ eq	1,138E+01	3,680E-01	-4,294E+00
EP - freshwater	kg P eq	8,383E-01	3,581E-03	-4,472E-01
EP - marine	kg N eq	2,667E+00	1,425E-01	-1,028E+00
EP - terrestrial	mol N eq	2,897E+01	1,559E+00	-9,756E+00
WDP	m ³ depriv.	9,474E+02	2,796E+00	-2,361E+02
ADP - F	MJ	3,085E+04	7,146E+02	-9,948E+03
ADP - MM	kg Sb eq	1,957E-02	5,700E-05	-1,220E-02
PERE	MJ	4,341E+03	3,117E+01	-1,131E+03
PERM	MJ	0,000E+00	0,000E+00	0,000E+00
PERT	MJ	4,341E+03	3,117E+01	-1,131E+03
PENRE	MJ	3,633E+04	6,996E+02	-1,212E+04
PENRM	MJ	0,000E+00	0,000E+00	0,000E+00
PENRT	MJ	3,633E+04	6,996E+02	-1,212E+04
SM	kg	2,870E+02	1,262E-02	-1,757E+02
RSF	MJ	0,000E+00	0,000E+00	0,000E+00
NRSF	MJ	0,000E+00	0,000E+00	0,000E+00
FW	m ³	2,075E+01	1,127E-01	-1,101E+01
HW	kg	1,363E+02	6,947E-02	-5,501E+01
NHW	kg	8,049E+02	3,226E-01	-3,867E+02
RW	kg	6,781E-01	2,294E-03	-3,034E-01
REUSE	kg	0,000E+00	0,000E+00	0,000E+00
RECYCLE	kg	5,708E+00	1,724E-02	-4,823E+02
EN-REC	kg	0,000E+00	0,000E+00	0,000E+00
EE-E	MJ	0,000E+00	0,000E+00	0,000E+00
EE-T	MJ	0,000E+00	0,000E+00	0,000E+00

Additional information

Regardless of the type of product considered, the element that most affects the final result is the purchased element which represents the entrance to the various company sites, destined for the subsequent production of the semi-finished product. Among the processes carried out by the company, those that have the greatest impact are the heat

treatment of the tube as well as the profiling activity. The impacts of energy consumption determined by the processes carried out within the company are often marginal compared to the impact associated with the procurement of raw materials.

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. 344/2021.

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

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Via Bresciani 16 – 46040
Gazoldo degli Ippoliti (MN) - Italy
Phone +39 0376 6851
info@marcegaglia.com
www.marcegaglia.com



www.evirondec.com