

ENVIRONMENTAL PRODUCT DECLARATION STEEL BEAMS AND ANGLES PROFILES



BASED ON

PCR 2019:14 v.1.3

PROGRAMME

The International EPD System
www.environdec.com

In accordance with

ISO 14025 and
EN 15804-2012+A2:2019

REGISTRATION NUMBER

S-P-11367

CPC CODE

412

REGISTRATION DATE

(first issue)
09-11-2023

VALID UNTIL

09-11-2028

MANUFACTURING SITE

TRAVI E PROFILATI DI
PALLANZEN SPA
Via Sempione, 7 28884
Pallanzeno (VB) - ITALY



GENERAL INFORMATION

EPD REFERENCES

EPD OWNER: Travi E Profilati Di Pallanzeno SpA Via Sempione, 7 28884 Pallanzeno (VB) - ITALY
Part of Duferco Travi e Profilati SpA Via Armando Diaz, 248 25010 San Zeno Naviglio (BS) ITALY

PROGRAM OPERATOR: EPD international ab, box 21060, Se-100 31 Stockholm, Sweden; info@environdec.com

INDEPENDENT VERIFICATION

The declaration has been developed referring to the International EPD® System, following the General Programme Instructions v4.0. Further information and the document itself are available at: www.environdec.com.

EPD document valid within the following geographical area: Europe according to sales market conditions

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

Product Category Rules (PCR): PCR 2019:14 Construction products, Version 1.3.1 – CPC CODE 4219: Other structures (except prefabricated buildings) and part of structures, of iron, steel or aluminum PCR review was conducted by: ILV Swedish Environmental Research Institute – Secretariat of the International EPD® System

Product-related or management system-related certifications:

[e.g. ISO 14024 Type I environmental labels, ISO 9001- and 14001-certificates, EMAS-registrations, SA 8000, supply chain management and social responsibility]

Name and location of production sites: San Zeno Naviglio (BS) and Pallanzeno (VB)

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

☒ EPD verification by accredited certification body

THIRD PARTY VERIFIER: RINA Services S.p.A. (Via Corsica 12, I-16128 Genova (Italy))
Is an approved certification body accountable for the third-party verification.

The certification body is accredited by: ACCREDIA Accreditamento n.: 001H

Approved by: The Technical Committee of the International EPD® System

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

☐ YES

☒ NO

CONTACTS

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Technical support to Duferco was provided by Life Cycle Engineering, Italy
(info@studiolce.it, www.lceengineering.eu).



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.

THE COMPANY

Description of the organisation

Duferco Travi e Profilati S.p.A. (DTP) is a leading steel group that specializes in the production of beams, special quality steels, special profiles, and long products.

The Company's history

The Company's history originates with the former Ferdofin Siderurgica, a renowned Italian steel manufacturer, which was acquired by the Duferco Group in 1996.

Leveraging its extensive industry expertise, Duferco took control of operations in all Company's sites and renamed the Company as Duferdofin. In 2008, Duferco Group established a strategic alliance with Nucor, a global player in the steel sector. This partnership created a real benchmark in Italy, Europe, and North Africa.

In December 2020, the partnership concluded, and the Company is now entirely owned by Duferco and operates as Duferco Travi e Profilati. DTP now boasts an extensive customer portfolio, serving approximately 800 customers across 60 countries worldwide. Through a skillful combination of know-how, advanced technologies, and a dedicated workforce, a strong and interconnected system of companies has been established within Duferco Travi e Profilati. Together, these companies form an integrated group that leverages synergies in the production of rolled products. This integration allows for competitive costs and minimal environmental impact.

The Group has **four plants** for the different stages of production of steel products.

San Zeno Naviglio, near Brescia, is where the steel mill is located, the melting of ferrous scrap takes place for the production of semi-finished products intended to be processed in the rolling mills of **Pallanzeno** (Verbania, North Italy) and **Giammoro** (Messina, South Italy). The first one specialized in small and medium range and the second is specialized in medium and large sized range.

San Giovanni Valdarno (Tuscany) is the mechanical division of the Group, the rolled products of the other plants become track shoes for earth moving machines.

Numbers



675,000
ton of sold steel in 2022



771
million euros revenue



800
clients



+760
employees



4
plants



750 k
tons of scrap used in 2022



74
million euros income



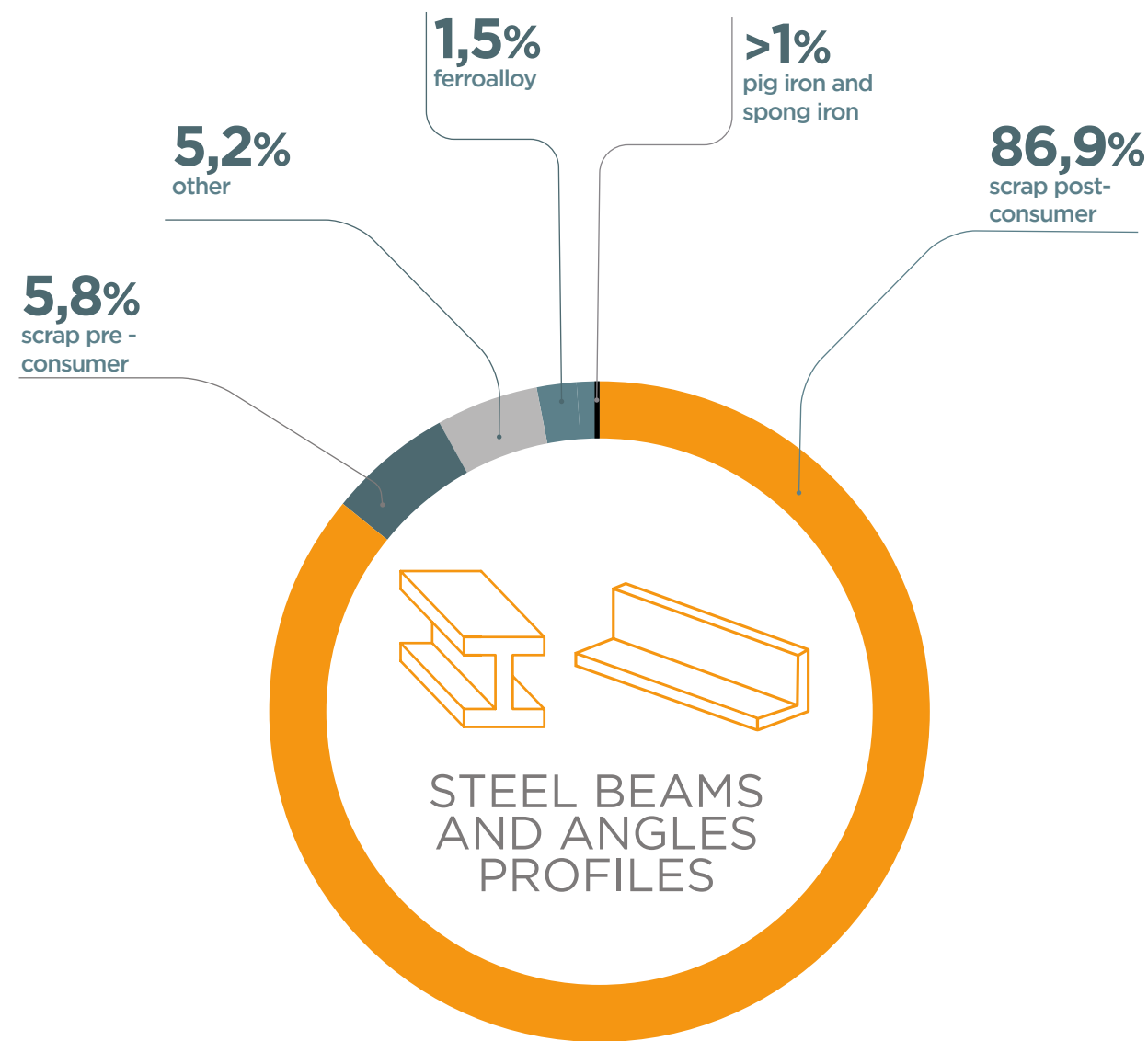
92%
of consumed material renewable



PRODUCT INFORMATION

UN CPC CODE: 4219: Other structures (except prefabricated buildings) and part of structures, of iron, steel or aluminum

GEOGRAPHICAL SCOPE: Europe



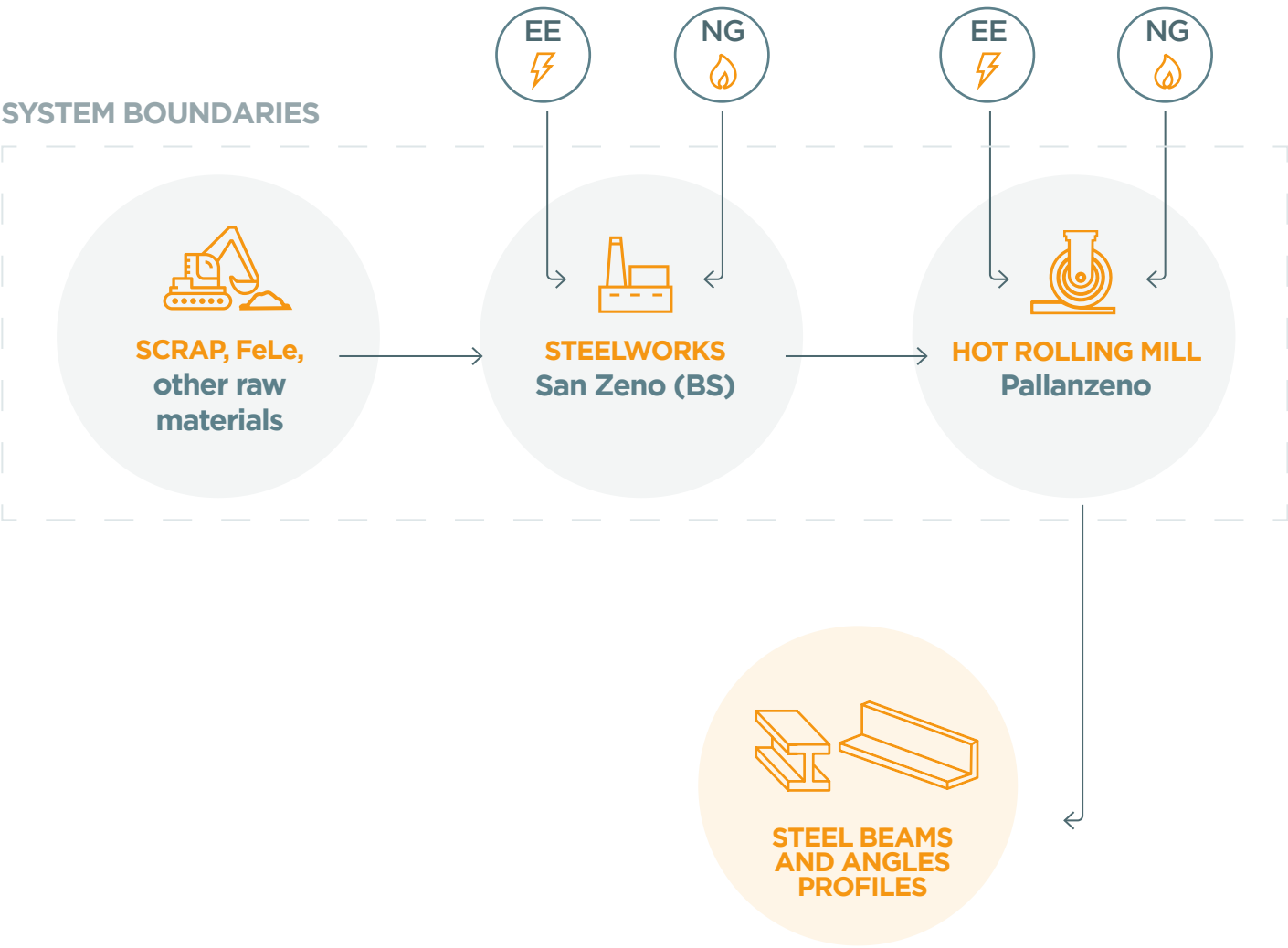
The product does not contain substances dangerous to the senses of REACH*.

Minimum content of 92% of post-consumer recycled material, ISO 14021 method, IGQ cert. n. C090, 2022-05-12

*Regulation (EC) n.1907/2006 of the European Parliament and of Council of 18 December 2006 on registration, evaluation, Authorization and restriction of chemicals.

INFORMATION	DESCRIPTION
PRODUCT IDENTIFICATION	Steel beams and angles profiles
PRODUCT FEATURES	<p>Steel in different quality: S235 JR, S235 JO, S235 J2, S275 JR, S275 JO, S275 J2, S355 JR, S355 JO, S355 J2, S355 K2, S355 JOW, S355 J2W, S355 JOWP</p> <p>The products in this study are beams and angles with various profiles produced from scrap from recycling.</p> <p>The semi-products supplied by the San Zeno Naviglio steel mill, are rolled in the rolling mill of Pallanzeno, where beams of different shapes, sizes and qualities are produced.</p> <p>The breadth of the qualitative and dimensional range of long products is able to satisfy the needs of various sectors including construction, infrastructure and carpentry.</p>
PRODUCT PROPERTIES (UNDER UNI EN 10025-1:2005; UNI EN 10025-2:2019; 10025-5:2019)	<p>Range of products: HE from 100 to 200, IPN from 160 to 240, IPE from 80 to 300, UPN from 80 to 300</p> <p>The main destinations of the angles are constructions and infrastructures such as electrical power towers.</p> <p>The range of production goes from Equal Angles from 120x120x10 mm to 250x250x35 mm and Unequal angles from 150x90x10 mm to 200x100x16 mm.</p> <p>Constructions, Infrastructures and electrical power towers are the main industries these products are destined to.</p>
PLANT FEATURES	<p>Pallanzeno plant (TPP) has a production capacity of 500 K t/ year; it's equipped with a rolling mill, a finishing centre, warehouses for storing and a finished products shipping through arailway connection.</p> <p>This production unit is specialized in the hot rolling process of the small and medium range of HE and IPE beams, UPN, equal and unequal angles, IPN and earth moving special profiles.</p>

PRODUCTION PROCESS



The process begins in **San Zeno** with the **pre-processing of the external scrap**, which is purified from impurities and loaded into the melting furnace; ferroalloys give the metal bath the desired characteristics, after which the liquid metal is cooled in the form of a steel billet.

The billets are then **hot rolled in the rolling mill** at **Pallanzeno**. The products covered by this study are beams and angles with various profiles produced from recycling waste: the semi-finished products supplied by the San Zeno Naviglio steelworks are rolled in the Pallanzeno mill, where beams of different shapes, sizes and qualities are produced.

The Pallanzeno plant is equipped with a rolling mill and a finishing center for small and medium-sized and here angular profiles of various sizes and qualities are produced. The main purpose of beams and angles is the construction of infrastructure, such as electrical power towers. The breadth of the qualitative and dimensional range of long products is able to meet the needs of various sectors, including construction, infrastructure and carpentry.

SCOPE & TYPE OF EPD

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

	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE	USE STAGE								END OF LIFE STAGE				RESOURCE RECOVERY STAGE
	Raw material supply	Transport	Manufacturing	Transport to the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De- construction demolition	Transport	Waste processing	Disposal	Reuse - Recovery - Recycling
module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
modules declared	✓	✓	✓	✓	ND	ND	ND	ND	ND	ND	ND	ND	✓	✓	✓	✓	✓
geography	GLO	GLO	IT	EU													
specific data used	>90%			>90%	-	-	-	-	-	-	-	-	-	-	-	-	-
variations - products	<10%			<10%	-	-	-	-	-	-	-	-	-	-	-	-	-
variations - sites	0%			0%	-	-	-	-	-	-	-	-	-	-	-	-	-



ENVIRONMENTAL RESULTS

It is not recommended to use the results of modules A1-A3 without considering the results of module C.

Mandatory impact category indicators according to EN 15804

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks

ENVIRONMENTAL IMPACTS		A1:A3	DOWNSTREAM					
			A4	C1	C2	C3	C4	D
GWP	kg CO ₂ eq	8,54E+02	3,28E+01	5,85E+00	7,57E+00	1,61E-01	2,65E-01	-1,11E+02
GWP, f	kg CO ₂ eq	8,53E+02	3,28E+01	5,84E+00	7,57E+00	1,52E-01	2,65E-01	-1,11E+02
GWP, b	kg CO ₂ eq	1,49E+00	1,70E-02	3,48E-04	4,51E-04	8,98E-03	5,44E-05	-8,62E-03
GWP, luluc	kg CO ₂ eq	2,17E-01	7,85E-03	2,40E-04	1,49E-04	1,09E-04	2,30E-05	-1,07E-02
GWP, GHG ¹	kg CO ₂ eq	8,54E+02	3,28E+01	5,85E+00	7,57E+00	1,61E-01	2,65E-01	-1,11E+02
ODP	kg CFC-11 eq	2,00E-05	6,88E-07	9,22E-08	1,65E-07	3,55E-09	4,78E-09	-2,09E-06
AP	mol H ⁺ eq	2,58E+00	1,28E-01	5,60E-02	2,79E-02	1,03E-03	1,89E-03	-4,33E-01
EP,f	kg P eq	1,31E-01	2,88E-03	4,41E-05	5,21E-05	2,95E-05	1,33E-05	-5,18E-02
EP,m	kg N eq	7,14E-01	5,05E-02	2,63E-02	1,20E-02	4,26E-04	8,50E-04	-9,26E-02
EP,t	mol N eq	7,53E+00	5,35E-01	2,86E-01	1,28E-01	4,61E-03	9,20E-03	-9,86E-01
POCP	kg NMVOC eq	2,84E+00	1,78E-01	8,41E-02	4,29E-02	1,29E-03	2,80E-03	-5,29E-01
ADPe*	kg Sb eq	3,85E-04	1,19E-06	2,46E-07	2,62E-07	3,86E-08	9,97E-09	-9,84E-04
ADPF*	MJ	1,19E+04	4,62E+02	7,69E+01	1,01E+02	1,28E+01	3,51E+00	-9,47E+02
WDP*	m ³	3,38E+02	1,04E+00	9,85E-02	9,29E-02	7,84E-02	-7,67E-04	-9,36E-00

- GWP** Global warming potential, total

GWP,f Global warming potential, fossil

GWP,b Global warming potential, biogenic

GWP,luluc Global warming potential, land use & land use change
- GWP,ghg** Global warming potential, excluding biogenic uptake, emission and storage

ODP Ozone depletion potential

AP Acidification potential

EP,f Eutrophication potential, freshwater
- EP,m** Eutrophication potential, marine

EP,t Eutrophication potential, terrestrial

POCP Photochemical ozone creation potential

ADPE Abiotic depletion potential minerals & metals*
- ADPF** Abiotic depletion potential fossil fuels*

WDP Water use deprivation potential*

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

ENVIRONMENTAL RESULTS

RESOURCE USE INDICATORS		A1:A3	DOWNSTREAM					
			A4	C1	C2	C3	C4	D
PERE	[MJ]	6,26E+02	1,37E+01	1,50E-01	2,67E-01	1,19E+01	3,59E-02	-8,01E+01
PERM	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	6,26E+02	1,37E+01	1,50E-01	2,67E-01	1,19E+01	3,59E-02	-8,01E+01
PENRE	[MJ]	1,37E+04	4,78E+02	7,78E+01	1,03E+02	1,30E+01	3,61E+00	-1,43E+03
PENRM	[MJ]	7,71E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	[MJ]	1,38E+04	4,78E+02	7,78E+01	1,03E+02	1,30E+01	3,61E+00	-1,43E+03
SM	[kg]	1,00E+03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m³]	9,43E+00	6,77E-02	3,82E-03	4,24E-03	3,91E-02	1,18E-04	-2,72E-01

PERE Use of renewable primary energy excluding renewable primary energy resources used as raw materials
PERM Use of renewable primary energy resources used as raw materials
PERT Total use of renewable primary energy resources
PENRE Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials

PENRM Use of non-renewable primary energy resources used as raw materials
PENRT Total use of non-renewable primary energy resources
SM Use of secondary raw materials
RSF Use of renewable secondary fuels
NRSF Use of non-renewable secondary fuels
FW Use of net fresh water

ENVIRONMENTAL RESULTS

WASTE INDICATORS		A1:A3	DOWNSTREAM					
			A4	C1	C2	C3	C4	D
HWD	kg	4,62E-02	2,68E-03	5,14E-04	6,70E-04	9,97E-06	2,22E-05	-1,10E-02
NHWD	kg	5,37E+01	9,97E-02	5,71E-03	5,00E-03	3,89E-03	4,98E+01	-4,13E+01
RWD	kg	1,86E-02	5,28E-04	3,75E-06	8,70E-06	1,63E-04	1,18E-06	7,70E-04

OUTPUT FLOW		A1:A3	DOWNSTREAM					
			A4	C1	C2	C3	C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	5,91E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

HWD Hazardous waste disposed
NHWD Non-hazardous waste disposed
RWD Radioactive waste disposed
CRU Components for re-use

MFR Materials for recycling
MER Materials for energy recovery
EE Exported energy
EET Exported energy,thermal

LCA METHODOLOGY

The site-specific data of the billet and profile production phase were provided by **TRAVI E PROFILATI DI PALLANZENO SPA**.

The **upstream** and **downstream** processes were modeled based on data from the **Ecoinvent 3.9 database**. The contribution of proxy data on the final results is less than 10% for each impact category. Packaging of raw materials and auxiliaries, infrastructure and business travels are excluded.

The impact on the GHG-GWP indicator of the electricity in Italy used by Duferco Travi e Profilati S.p.A. is 605 g CO₂eq./kWh (residual mix from Ecoinvent 3.9).

The weighted average of the distribution distance of steel beams and angles profiles was calculated for the A4 module.

Modules **C1** to **C4** and **D** were modeled according to a reference scenario representative of the products studied. Module **C1** includes consumption for the demolition of buildings and structures.

An average distance is used to estimate the impact of transporting the products to the disposal site, quantified in module **C2**. The recycling preparation operations are counted in module **C3**: in the LCA model, a pre-processing operation of ferrous scrap for remelting was used. Module **C4** contains the impacts relating to landfill disposal of the non-recyclable product. In module **D**, the net impact between the remelting of ferrous scrap (positive value) and the production of steel from iron ore (negative value) is calculated, taking into account the efficiency of the process and removing the share of post-consumer scrap incoming for the production of billets.

For pre-consumer scrap originating from modules **A1-A3** in another product system and used in **San Zeno Naviglio steel plant**, an economic allocation was made, based on estimated data; for post-consumer scrap, impacts of collection, transport to scrap-yard, sorting and pressing to blocks were included.



SYSTEM BOUNDARIES

UPSTREAM PROCESS



Scrap pretreatment

Shearing

Shredding

Sorting

Raw material and
Energy production

A1

CORE PROCESS



Supplying transport

Billets production

Hot rolling process

Packaging

Internal handling

Ancillary materials and activities

Air emission

Water emission

Waste management

A2+A3

DOWNSTREAM PROCESS



Distribution

De-construction
demolition

Transport

Waste processing

Disposal

Reuse - Recovery
Recycling potential

A4

C1

C2

C3

C4

D

DECLARED UNIT:
1 ton of steel beams and angles profiles

DATABASE AND LCA SOFTWARE USED:
SimaPro 9.5.0.0 and Ecoinvent 3.9, method compliant EF3.1

TIME REPRESENTATIVENESS:
2022

DESCRIPTION OF SYSTEM BOUNDARIES:
Cradle to gate with options, modules C1-C4, module D (A1 A3 + A4 + C + D).

CALCULATION RULES

UPSTREAM PROCESS



CORE PROCESS



DOWNSTREAM PROCESS



A1

RAW MATERIAL SUPPLY

- Extraction and refining of raw materials
- Scrap collection
- Electricity generation from the national network
- Extraction, processing and dispatching of process fuels



CALCULATION RULES

UPSTREAM PROCESS



CORE PROCESS



DOWNSTREAM PROCESS



A2

TRANSPORTATION

- Transport of raw materials to the production site
- Transport and handling of semi-finished products

A3

MANUFACTURING

- Production of the product
- Ancillary consumption (canteens, offices...)
- Packaging and auxiliary materials (water)
- Waste production and disposal

CALCULATION RULES

UPSTREAM PROCESS



CORE PROCESS



DOWNSTREAM PROCESS



A4

TRANSPORT - DISTRIBUTION

- Transport of steel products to the end customer

C1

DE-CONSTRUCTION DEMOLITION

- Dismantling or demolition of the product
- Initial sorting materials on site

C2

TRANSPORT TO WASTE PROCESSING

- Transport of waste products to recycling sites
- Waste transportation to final disposal

C3

WASTE PROCESSING

- Waste treatment intended for reuse and recycling
- Treatment for the waste intended to energy recovery

C4

DISPOSAL

- Physical pretreatment
- Waste disposal
- Site management of disposal

D

REUSE - RECOVERY - RECYCLING POTENTIAL

SUPPLEMENTARY INFORMATIONS

A new rolling mill will start production in fall 2023 and it will be fully powered by renewable energy coming from Solar and Wind Power Plants located in Italy through a long-term Power Purchase Agreement (PPA). That will be ensuring a minimal environmental impact and a huge energy savings. Those plants produced in 2022 a total of 51.644 MWh. This investment shows that DTP's objective is to exploit the best technologies and innovations to promote the excellence and profitability of the Group with respect for the environment.

In addition to the foregoing, 150.000 MWh Guarantee of Origins have been purchased in 2023 to ensure that all electricity consumption will be covered next year. Due to these facts, it is possible to estimate that the Global Warming Potential total will be dropped down of about 50% for modules A1:A3 switching to approx. 410 kgCO₂e/t of product.

REFERENCES

- General Programme Instructions of the International EPD® System. Version 4.0.
- PCR 2019:14. Construction products. Version 1.3.1
- ISO 14040:2006/Amd 1:2020
- ISO 14044:2006/Amd 1:2017/Amd 2:2020
- ISO 14025:2010
- EN 15804:2012+A2:2019
- Bo P. Weidema & Gregory A. Norris, "Avoiding co-product allocation in the metals sector", 2002
- AA. VV., A methodology to determine LCI of steel industry co-products, 2014
- www.ecoinvent.org
- Studio LCA rev.1 del 10.10.2023



www.dufercotp.com