



THE INTERNATIONAL EPD® SYSTEM

ENVIRONMENTAL PRODUCT DECLARATION FOR STEEL BEAMS AND ANGLES

CPC CODE

4219 - OTHER STRUCTURES (EXCEPT PREFABRICATED BUILDINGS) AND PARTS OF STRUCTURES,
OF IRON, STEEL OR ALUMINIUM

AREA OF GEOGRAPHICAL APPLICATION: EUROPE

ENVIRONMENTAL PRODUCT DECLARATION VALIDATED

N° REG: S-P-01342

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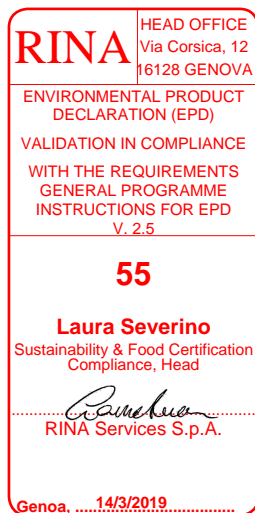
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THE GROUP



The origin of the company dates back to 1996, when the Duferco Group took over all the assets of the then Ferdofin Siderurgica, giving life to the renamed Duferdofin. From the strategic alliance with Nucor, a world player in the steel sector, Duferdofin-Nucor, an equal joint venture, was born in 2008.

Duferdofin - Nucor then returns totally Italian in 2020 and becomes Duferco Travi e Profilati S.p.A., today a point of reference in Italy, Europe and North Africa for the production of beams, special quality steels, special profiles and long laminates. Duferco Beams and Profiles sells in 60 countries around the world, meeting the expectations of 800 customers.

Overall, the Group has four factories for the different stages of production of steel products with an area of approximately 1,500,000 m2 and a production capacity of over 1,000,000 tons per year.

The group has **four production units** that cover the entire production range from liquid steel up to the finished product: San Zeno Naviglio located in Brescia, Giammoro in Messina, Pallanzeno in Verbania and San Giovanni Valdarno in Arezzo.



The plants involved in the study in question are **San Zeno Naviglio (BS)**, **Pallanzeno (VB)** and **Giammoro (ME)**.



San Zeno Naviglio

At the San Zeno Naviglio plant, semi-products are produced by rolling or direct hot pressing (bloom and billets).

The main equipment of the steel plant consist of a 100 t/h electric furnace with a 100 MVA transformer, a ladle furnace, a degassing system and two continuous castings.

The San Zeno Naviglio plant is the semi-product supplier for the Pallanzeno plant, and in part, for the Giammoro plant.



Pallanzeno

The production unit in Pallanzeno (VB) is equipped with a rolling train, a finishing center, warehouses for the storage and shipping of finished products and a railway connection. The plant specializes in rolling the small and medium range of beams (HE and IPE), UPN, IPN, angle profiles and special profiles for earthmoving machines also intended for supplying the mechanical division of San Giovanni Valdarno. The production capacity is approximately 500,000 tons/year.



Giammoro

Giammoro (ME) plant has a DEMAG rolling mill specialized in rolling medium and high range of beams (HE and IPE) special profiles for earth moving machines, purchased by the mechanical division in San Giovanni Valdarno, and special profiles for roll track. The production capacity of the plant is about 450,000 t/year. The production unit in Giammoro, has an internal railway, connected to the nation railway, and is under construction a pier of the reception of semi – finished and the shipment of finished by sea.



THE PRODUCT

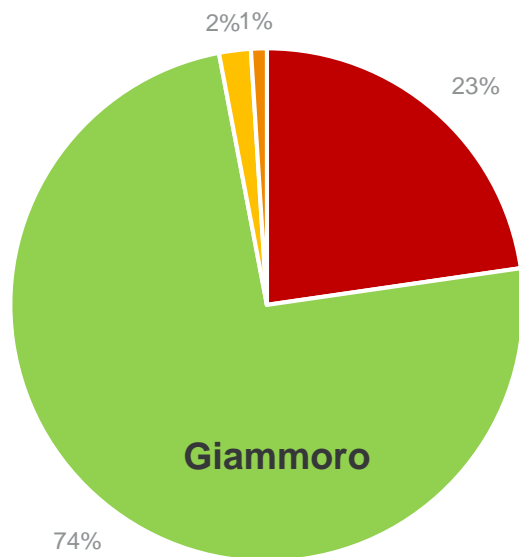
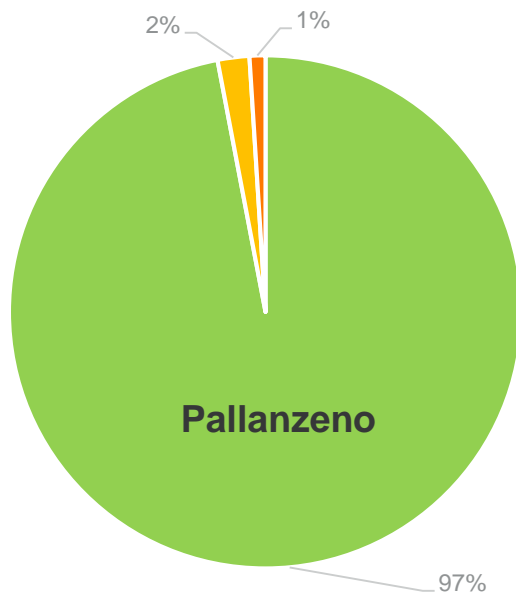
The products in this study are beams and angles with various profiles produced from scrap from recycling. Due to the fact the products has different dimensional properties, in the Environmental Product Declaration an average value is considered.

The product characteristics are described below.

Steel grade: from S235 to S355

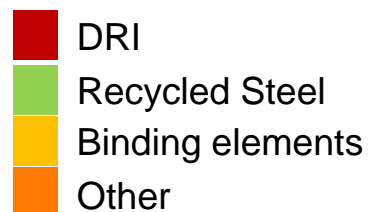
Reference standards: commercial steel grade according to EN 10025

PRODUCTS	REFERENCE STANDARD (dimension and shape tolerances)	DIMENSIONS (mm)		THICKNESSES (mm)	
		da	a	da	a
Travi HE	EN 10034	96	500	8	40
HE Beams	EN 10034	100	550	5,7	17,2
IPE Beams	EN 10024	100	400	6,8	21,6
IPN Beams	EN 10034	127	544,5	7	21,3
UB Beams	EN 10034	152,4	327,1	6,8	31,7
UC Beams	ASTM A6/A 6M	106	549	5,7	31,8
«W» shapes	EN 10279	140	300	10	16
UPN Beams	EN 10056 - 2	120	200	10	28
Equal leg angles	EN 10056 - 2	150	200	10	18



Declaration of contents

The product considered is made of the components listed below:



Products are fabricated only with recycled material.

The product doesn't contain any hazardous substances against REACH* rule.

* Regulation (EC) No 1907/2006 of the European parliament and of the council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals

An aerial photograph of a dense, dark green forest. A narrow, winding road or path is visible, curving through the trees from the top right towards the bottom center. The lighting is somewhat dim, giving the forest a mysterious and natural feel.

ENVIRONMENTAL PERFORMANCE DECLARATION



The environmental performance of the products has been calculated in compliance with the requirements of the International EPD® System, the PCR 2012:01 Version 2.2 Construction Products and the CPC 54 Construction Services (Cradle to gate with options).

The methodology used to quantify environmental performance is the Life Cycle Assessment (LCA), regulated by the standard ISO 14040-14044.

The objective of the LCA study is to assess the environmental load in relation to the production of beams and angles in structural steel used in construction industry.

Specific data were collected on the mills involved in the process and these refer to the year 2016 for San Zeno steel mill and Pallanzeno Rolling mill and refer to 2017 for Giammoro rolling mill. The contribution of the proxy was less than 10%. The electrical mix used to model the electrical consumption in the A3 module is the Italian electrical mix (Source: Ecoinvent v.3 - Electricity, medium voltage {IT}| market for | Alloc Def, U 512 g CO₂ eq/ kWh).

This document uses the French style of the international measurement system (comma as a decimal separator).

The unit declared is 1 ton of steel beams/angles.

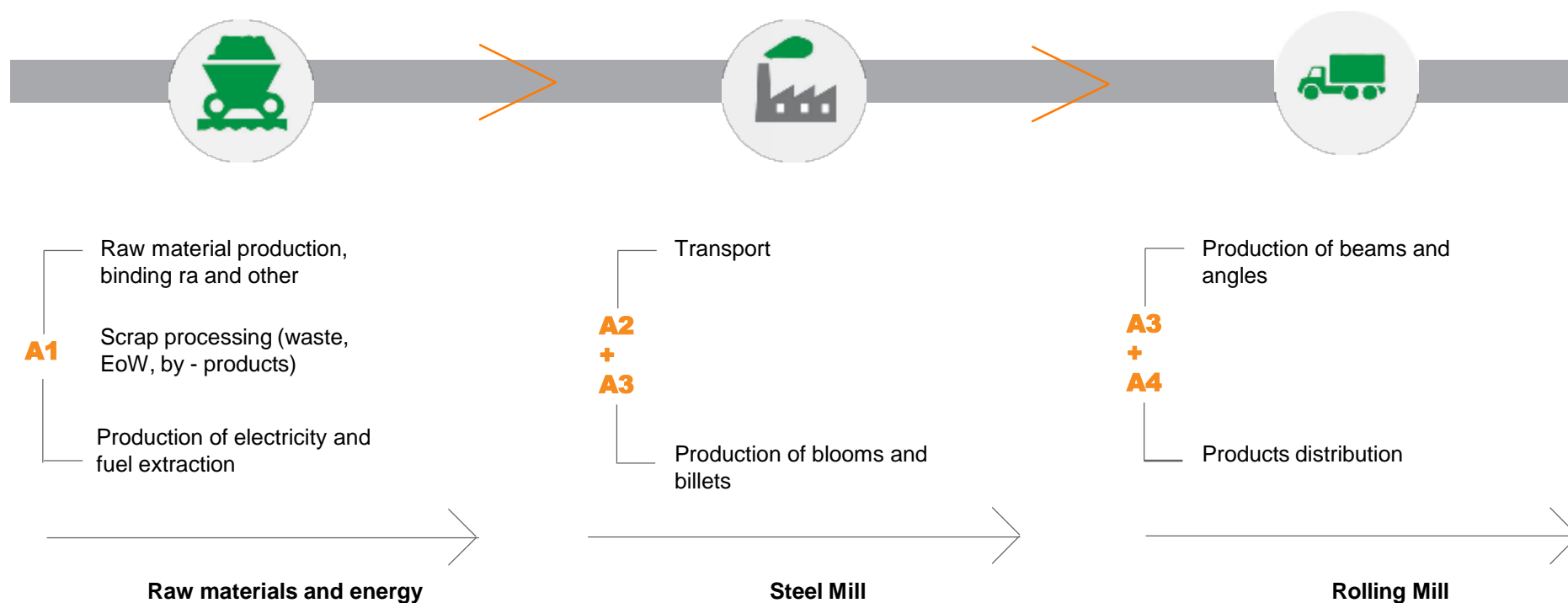


SYSTEM BOUNDARIES

In compliance with the PCR reference and EN 15804 standard, the system boundaries are divided into the following three life cycle phase:

- Upstream processes (A1 – Raw Materials Supply)
- Core processes (A2 – Transportation; A3 – Manufacturing)
- Downstream processes (A4 – Distribution)

The life cycle phases included in the system boundaries are shown in the following figure:



With respect to EN 15804 standard, the study conducted is classified as “cradle-to-gate with options” EPD (declared unit): modules from A1 to A3 are included, along with the optional module A4.

Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
Raw Materials	Transport	Manufacturing	Transport	Construction Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse - Recovery - Recycling - Potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Use of resources

Pallanzeno rolling mill

The data refers to a specific unit.

Use of resources	Unit	A1	A2	A3	A4	Total
Use of primary renewable energy (excluding primary renewable energy sources used as raw materials)	MJ	478,05	6,63	0,14	3,08	487,89
Use of primary renewable energy sources used as raw materials	MJ	0,00	0,00	0,00	0,00	0,00
Total Consumption of primary renewable energy sources (primary energy and primary renewable energy resources used as raw material)	MJ	478,05	6,63	0,14	3,08	487,89
Use of primary non-renewable energy (excluding primary non-renewable energy sources used as raw materials)	MJ	25.004,89	987,73	121,91	805,88	26.920,40
Use of primary non-renewable energy used as raw materials	MJ	604,58	0,12	0,09	0,06	604,85
Total Consumption of primary non-renewable energy sources (primary energy and primary non-renewable energy resources used as raw material)	MJ	25.609,47	987,84	122,00	805,94	27.525,25
Consumption of secondary raw materials (scrap iron)	kg	1.188,81	0,00	0,00	0,00	1.188,81
Consumption of secondary renewable fuels	MJ	0,00	0,00	0,00	0,00	0,00
Consumption of secondary non-renewable fuels	MJ	0,00	0,00	0,00	0,00	0,00
Net water consumption	m ³	28,16	0,14	3,44	0,10	31,84
of which in the Core		-	-	3,43	-	3,43

Environmental impacts

The data refers to a specific unit.

Impact categories	Unit	A1	A2	A3	A4	Total
Global warming (GWP100)	kg CO ₂ eq	735,49	62,66	183,33	51,61	1.033,10
Ozone Depletion Potential (ODP)	kg CFC -11 eq	0,00	0,00	0,00	0,00	0,00
Acidification (AP)	kg SO ₂ eq	3,99	0,38	0,82	0,32	5,51
Eutrophication (EP)	kg PO ₄ eq	0,36	0,06	0,09	0,05	0,56
Photochemical ozone creation potential (POCP)	kg C ₂ H ₄ eq	0,25	0,01	0,03	0,01	0,30
Abiotic depletion (elements)	kg Sb equivalent	0,00	0,00	0,00	0,00	0,00
Abiotic depletion (fossil fuels)	MJ	23.658,34	952,93	121,36	790,85	25.523,48

Waste production and other indicators

The data refers to a specific unit.

Parametri	Unit	A1	A2	A3 ¹	A4	Total
Hazardous waste	kg	-	-	22,46	-	22,46
Non-hazardous waste	kg	-	-	174,55	-	174,55
Radioactive waste	kg	-	-	-	-	-

¹ Direct in the core

The data refers to a specific unit.

Use of resources	Unit	A1	A2	A3	A4	Total
Use of primary renewable energy (excluding primary renewable energy sources used as raw materials)	MJ	337,28	32,26	0,28	22,17	391,99
Use of primary renewable energy sources used as raw materials	MJ	0,00	0,00	0,00	0,00	0,00
Total Consumption of primary renewable energy sources (primary energy and primary renewable energy resources used as raw material)	MJ	337,28	32,26	0,28	22,17	391,99
Use of primary non-renewable energy (excluding primary non-renewable energy sources used as raw materials)	MJ	13.512,80	1.361,86	250,77	632,42	15.757,85
Use of primary non-renewable energy used as raw materials	MJ	1.147,50	0,82	0,28	0,36	1.148,96
Total Consumption of primary non-renewable energy sources (primary energy and primary non-renewable energy resources used as raw material)	MJ	14.660,30	1.362,68	251,05	632,78	16.906,81
Consumption of secondary raw materials (scrap iron)	kg	881,63	0,00	0,00	0,00	881,63
Consumption of secondary renewable fuels	MJ	0,00	0,00	0,00	0,00	0,00
Consumption of secondary non-renewable fuels	MJ	0,00	0,00	0,00	0,00	0,00
Net water consumption	m³	19,25	0,43	1,79	0,21	21,67
of which in the Core		-	-	1,76	-	1,76

Environmental impacts

Giammoro rolling mill

The data refers to a specific unit.

Impact categories	Unit	A1	A2	A3	A4	Total
Global warming (GWP100)	kg CO ₂ eq	745,06	83,61	208,31	36,36	1.073,33
Ozone Depletion Potential (ODP)	kg CFC -11 eq	0,00	0,00	0,00	0,00	0,00
Acidification (AP)	kg SO ₂ eq	3,87	0,70	0,71	0,21	5,49
Eutrophication (EP)	kg PO ₄ eq	0,33	0,08	0,07	0,03	0,51
Photochemical ozone creation potential (POCP)	kg C ₂ H ₄ eq	0,21	0,02	0,03	0,01	0,27
Abiotic depletion (elements)	kg Sb equivalenti	0,00	0,00	0,00	0,00	0,00
Abiotic depletion (fossil fuels)	MJ	11.812,58	1.187,40	249,72	507,30	13.756,99

Waste production and other indicators

The data refers to a specific unit

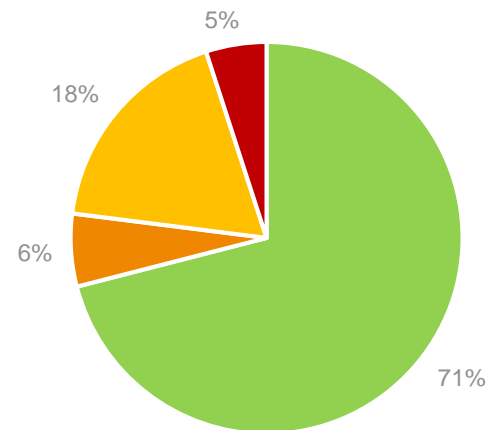
Parameters	Unit	A1	A2	A3 ¹	A4	Total
Hazardous waste	kg	-	-	22,63	-	22,63
Non-hazardous waste	kg	-	-	191,78	-	191,78
Radioactive waste	kg	-	-	-	-	-

¹ Diretti nel Core

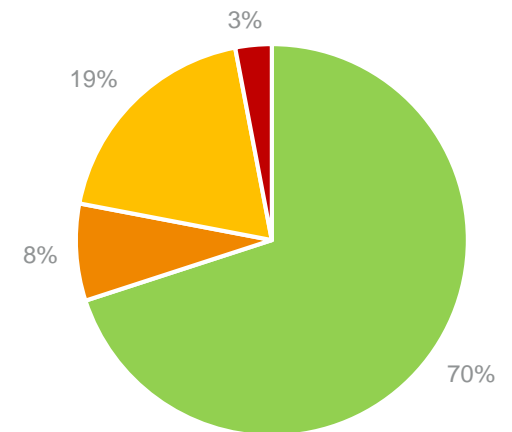


As an example, the contribution of the various life cycle phases to the global warming potential is shown in the following figure:

Global Warming (GWP100)



Pallanzeno



Giammoro



INFORMATION

Certification body

This EPD was approved by the accredited Certification Body RINA Services S.p.A. (Gruppo Registro Italiano Navale) to validate in agreement with reference standards published by The International EPD® System (General Programme instructions for the International EPD® System) e con il PCR 2012:01 Version 2.2 Construction Products e CPC 54 Construction Services (Cradle to gate with options).

Standard En 15804 utilizzato come core PCR

PCR	PCR 2012:01 Construction products and construction services, Version 2.2
PCR review condotta da:	Comitato Tecnico International EPD® System. info@environdec.com .
Verifica indipendente della dichiarazione e dei dati condotta in accordo alla ISO 14025:	RINA Services S.p.A. Via Corsica 12, I-16128 Genova (Italy) Tel: +39 010 53851 Fax: +39 010 5351000 www.rina.org
Verificatore di terza parte	ACCREDIA Accreditamento n.: 001H

Valid until : June 2023

Note: EPD developed using different programs cannot be compared.

EPD of construction products may not be comparable if they are not compliant with EN 15804 standard.

All life cycle phase were analyzed and accounted for this study.

This EPD and other pertinent information are available on the website of the International EPD® System: www.environdec.com

References

General Programme instructions for the International EPD® System, v.2.5.

PCR 2012:01 Version 2.2 Construction Products e CPC 54 Construction Services (Cradle to gate with options).

EN 15804:2012+A1:2013 (Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products).

ISO 21930 Environmental declaration of building products. Database Ecoinvent v.3
(www.ecoinvent.org).

Studio LCA “Travi e Angolari in acciaio” Rev.04.

Studio LCA “Travi in acciaio - Giammoro” Rev.03.

Glossary

LIFE CYCLE ASSESSMENT (LCA): a methodology regulated by ISO 14040-44 standards designed to quantify the energy and environmental load of the life cycle of a product or activity, by quantifying the energy and materials used and the emissions (solid, liquid and gaseous) released into the environment, from the extraction of raw materials to the disposal of final waste products.

GLOBAL WARMING (GWP100): the phenomenon of the global warming of the atmosphere, calculated for the next 100 years, due to release into the atmosphere of greenhouse gases such as carbon dioxide (CO₂), methane (CH₄), dinitrogen monoxide (N₂O), etc.

OZONE DEPLETION POTENTIAL (ODP): degradation and reduction, caused by chlorofluorocarbons (CFC) or chlorofluoromethanes (CFM), of the ozone layer present in the stratosphere to filter ultraviolet light from sunlight with its particularly reactive compounds.

ACIDIFICATION (AP): lowering of the pH of soil, lakes, forests, etc. due to the release into the atmosphere of acids, with harmful consequences for living organisms (eg. “acid rain”).

EUTROPHICATION (EP): reduction of the oxygen present in water bodies and necessary for the ecosystems due to the excessive richness of nutrients such as nitrogen and phosphorous.

PHOTOCHEMICAL OZONE CREATION POTENTIAL (POCP): formation of ozone on the earth's surface due to the release into the atmosphere of unburned hydrocarbons and nitrogen oxides in the presence of sunlight. This phenomenon is hazardous for living organisms, and often present in large urban centres.

People of reference for the Environmental Product Declaration

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