PITTINI

ENVIRONMENTAL PRODUCT DECLARATION

In compliance with ISO 14025 and EN15804+A2:2019

STEEL FOR BUILDING

ELECTROWELDED MESH AND LATTICE GIRDERS

Program operator: EPDITALY
Published by: EPDITALY
Declaration n.: EPDrete&traliccio_2020

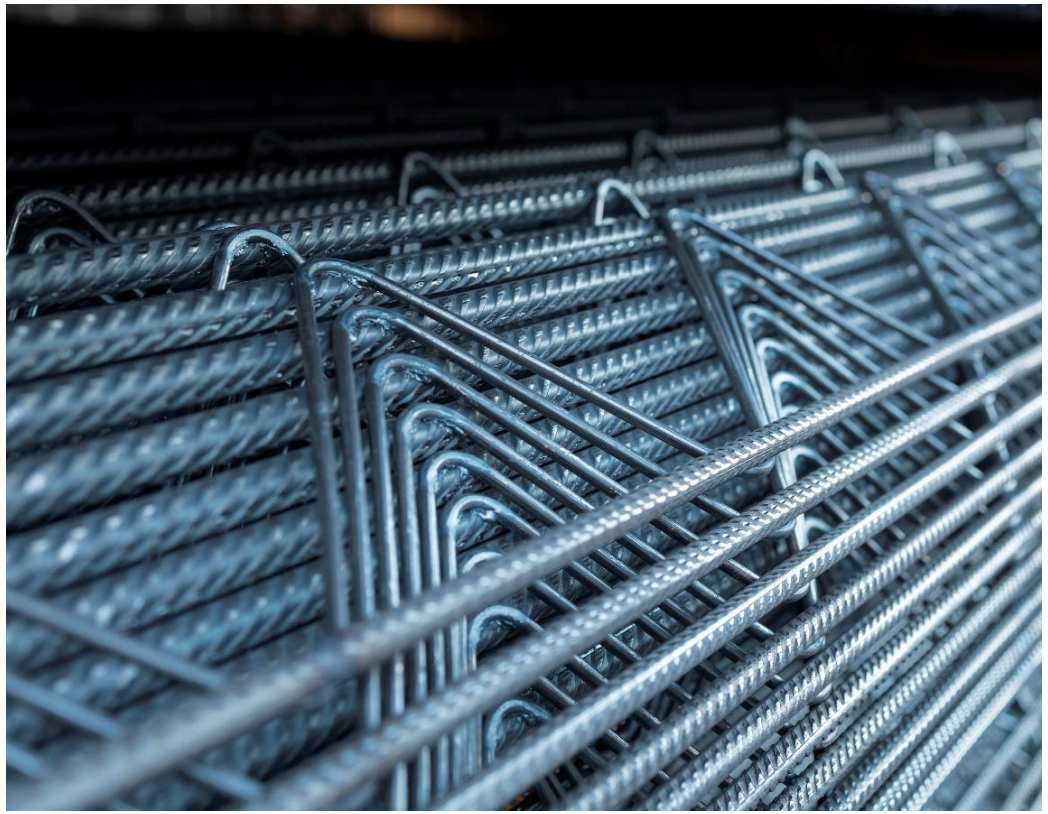
EPDITALY registration code : EPDITALY0130

Published: 21/12/2020
Updated: 23/12/2022
Valid until: 21/12/2025
Production site: Osoppo (UD) - Italy

EPD ITALY

ECO PLATFORM EPD VERIFIED

General Information



EPD DECLARATION OWNER:
FERRIERE NORD S.p.A.
Zona industriale Rivoli di Osoppo
Osoppo (UD), Italy.

PROGRAM OPERATOR:
EPDITALY
Via Gaetano de Castillia 10
Milan (MI), Italy.

INDEPENDENT EVALUATION BY:
ICMQ S.p.A.
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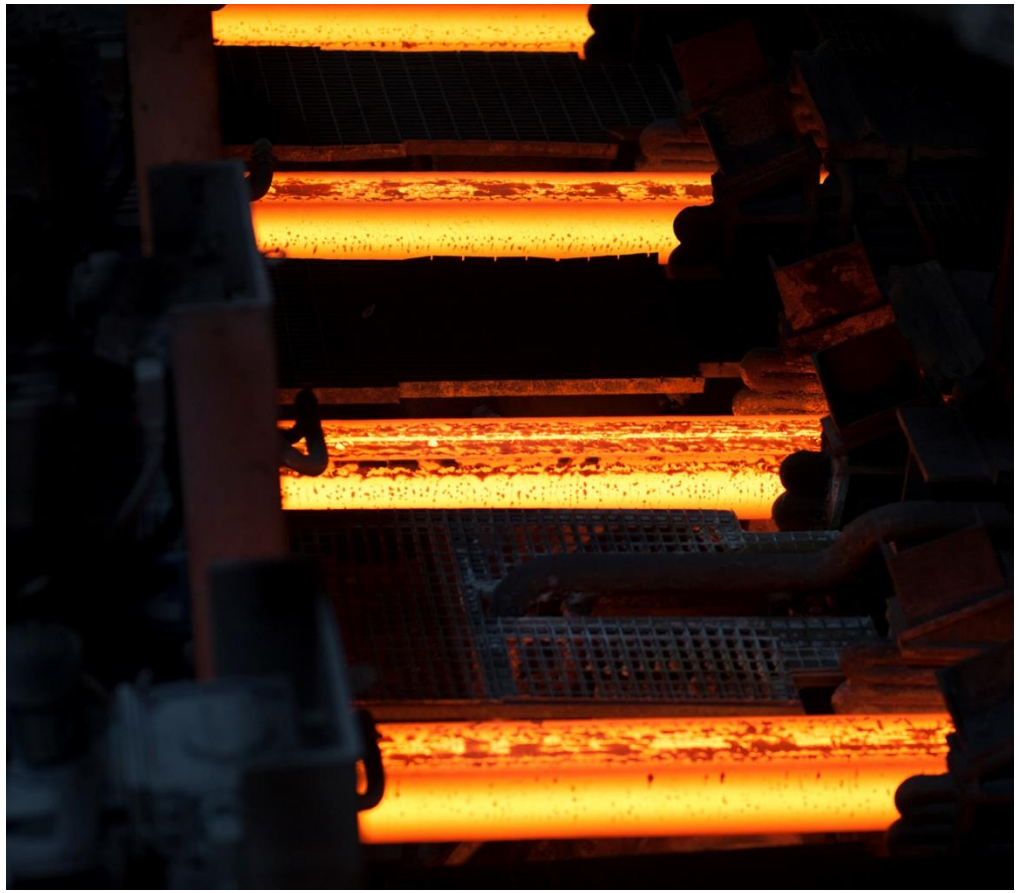
PLANT LOCATION:
FERRIERE NORD S.p.A.
Zona industriale Rivoli di Osoppo
Osoppo (UD), Italy.

Company Profile



Pittini Group, with more than 60 years of experience in the steel sector, is an international reference in the production of **long steel products** for **mechanical industry** and **building sector**.

With a production of almost 3 million tons per year, 18 manufacturing and logistics facilities and 1,800 workers, Pittini Group is a strong company, focused on constant growth, guided by hi-tech investments, product innovation and a strict environmental sustainability policy (**Environmental Management System**, ISO 14001-certified since 2009).

Pittini Group **covers the whole production cycle**: from raw material (recycled ferrous materials) to the finished product, producing billets, wire rod, hot-rolled reinforcing steel bars and coils.

Field of application and EPD type

✓	A1	Raw material supply	PRODUCTION STAGE
✓	A2	Transport	
✓	A3	Manufacturing	
MND	A4	Transport	CONSTRUCTION PROCESS
MND	A5	Construction/installation	
MND	B1	Use	USE
MND	B2	Maintenance	
MND	B3	Repair	
MND	B4	Replacement	
MND	B5	Refurbishment	
MND	B6	Operational energy use	
MND	B7	Operational water use	
✓	C1	De-commissioning \ Demolition	END OF LIFE
✓	C2	Transport	
✓	C3	Waste processing	
✓	C4	Disposal	
✓	D	Reuse \ Recovery \ Recycling potential	BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY

MND = Module Not Declared (Modulo non incluso)

MODULES: The system modules include the compulsory modules A1, A2, A3, C1, C2, C3, C4 and D as per EN 15804 standard, following a "from cradle to gate with modules C1-C4 and D" approach.

EPD TYPE: Specific for the electrowelded mesh and lattice girder produced in Osoppo (UD).

GEOGRAPHICAL LOCATION: Performances were calculated considering the plant of Osoppo with reference to the national market.

DATABASE: Ecoinvent 3.6

SOFTWARE: SimaPro 9.1

The product: electrowelded mesh

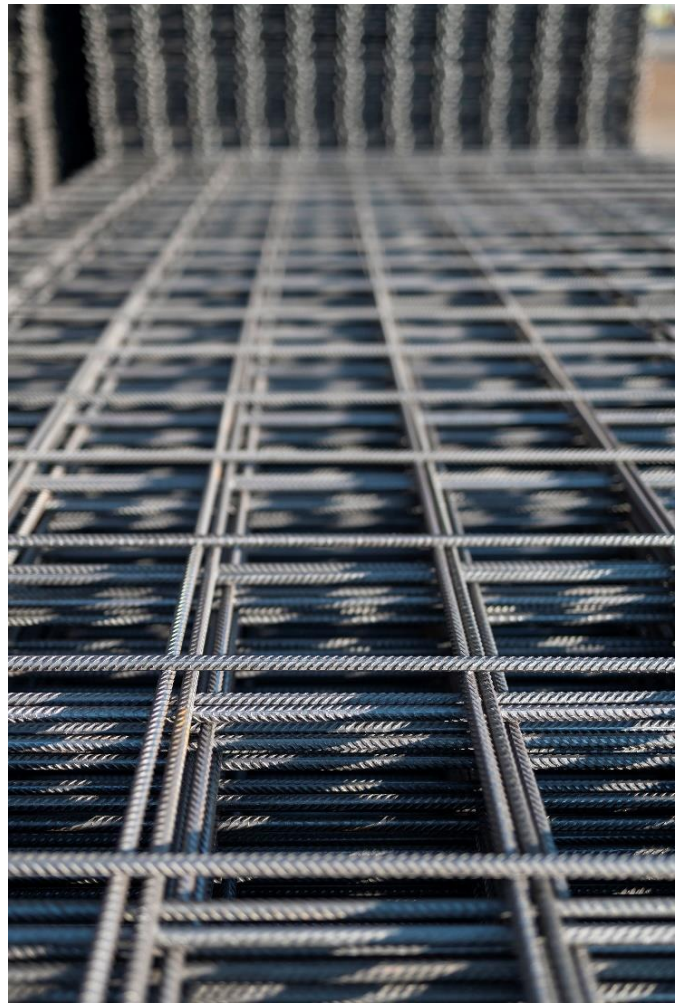
DECLARED UNIT: 1,000 kg of mesh

The process of industrialisation of reinforcement has led to the development of electrowelded mesh with consequent speed, ease of execution and cost containment during the construction phase.

The Pittini Group is the leading Italian manufacturer of electrowelded mesh and thanks to its 3 factories in Italy, combined with over 60 years of experience, ensures a high quality product thanks to continuous investments aimed at achieving the highest technological level of the plants.

The Pittini Group produces a wide range of electrowelded mesh, made from **HD** - **High Ductility** - **steel**, with high quality characteristics guaranteed by the strict controls carried out throughout the entire supply chain, starting from the careful examination of the scrap, the raw material. Thanks to its ramified sales network, it ensures widespread commercial and technical assistance.

*Electrowelded mesh produced in Osoppo **does not contain** substances included in the **"Candidate list of substances of very high concern (SVHC)"***



The product: lattice girder

DECLARED UNIT: 1000 kg of lattice girder

The Pittini Group was the first to introduce the electrowelded lattice girder into the construction market, a product that has contributed significantly to the industrialisation of modern construction.

The Pittini Group's electrowelded lattice girders are characterised by their wide range, high quality and competent technical assistance. These are used to make floor lattice girder beams (for clay-cement mix or concrete floors), lattice girder slabs (bridge decks, large monolithic or lightened floors) and double slabs (reinforced concrete cross walls in seismic zones, retaining walls, curtain walls, etc.)

Their widespread use in the infrastructure sector is due not only to the safe and fast on-site laying for their installation on the construction site, but also to the suppression of props when grouting, which is the main reason why they are widely used in the construction of bridge decks.

*Lattice girders produced in Osoppo **do not contain** substances included in the **"Candidate list of substances of very high concern (SVHC)"***

Main raw materials

Main raw materials used to produce electrowelded meshes and lattice girders are:

FERROUS METAL SCRAP

The main material used

PIG IRON

REDUCED IRON

FERRO-ALLOYS

LIME

COAL

REFRACTORY MATERIALS

Field of application and EPD type

DESCRIPTION OF THE PROCESSES INCLUDED

Transport of material from production sites to Ferriere Nord S.p.a. in Osoppo has been included.

All **transports of scrap and raw material from suppliers** to the plant in Osoppo are included in the primary-information model. **INVENTORY QUANTITY**, expressed in kgkm, is defined as the product between the mass of the material and the distance covered.

Transport of waste from the plants in Osoppo to the processing plants is included in the model relying on primary data.

Processing of materials entering Ferriere Nord, **melting and manufacturing processes** to obtain meshes and lattice girders are included.

A1 **ENERGY AND RAW MATERIAL SUPPLY**

A2 **TRANSPORT**

A3 **MANUFACTURING (WASTE PROCESSING, ANCILLARY MATERIALS, EMISSIONS)**

Field of application and EPD type

Following the review of the EN 15804 standard, groups C1, C2, C3, C4 and D have been included.
The groups C1-C4 include the impacts associated with the removal of the material from the building in which it is installed, the transport of the waste to the treatment center and the related activities (recycling, treatment ecc.), including the disposal in landfill.
The group D, includes the benefits coming from the outputs of recycling (intended as avoided products) and energy recovery operations.

- **C1** DE-CONSTRUCTION/DEMOLITION
- **C2** TRANSPORT
- **C3** WASTE PROCESSING
- **C4** DISPOSAL
- **D** REUSE-RECOVERY-RECYCLING POTENTIAL

Field of application and EPD type

SCRAP
PREPARATION
PROCESSES FOR
FURNACE MELTING
AND RAW MATERIALS
EXTRACTION

Ferrous scrap, pig iron and HBI processing: mechanical treatment of scrap, weighing, storage, basket preparation, handling with overhead cranes and sending to furnace;

Coal and lime processing:
weighing, insufflation and sending to furnace;

Processing of electrodes and refractories:
weighing and sending to furnace;

Processing ladle slag with iron:
cooling, iron removal, screening, pneumatic transport and injection into furnace.

Field of application and EPD type

IN-HOUSE TRANSPORT
AND OPERATING MACHINES USED AT FERRIERE NORD

Inbound transport of materials by train and truck

In-house transport with wheel loader and truck

Handling the finished product with forklift

Waste transport to destination facilities

Field of application and EPD type

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MELTING AND CASTING
PROCESSES

Melting process:
oxygen production,
cooling water recirculation, electric arc furnace melting;

Secondary metallurgy process:
refining and additives addition,
ferro-alloys processing (weighing and sending to secondary furnace), ladle preparation and maintenance;

Casitng process:
steel casting and billet production,
preparation and maintenance of tundishes.

Field of application and EPD type

HOT ROLLING
PROCESSES

- Billet pre-heating in furnace
- Removal of surface layers of scale
- Rolling
- Wire rod production

Field of application and EPD type

COLD ROLLING
PROCESSES

- Bundle preparation
- Welding/Mechanical treatment
- Production of finished product

Field of application and EPD type

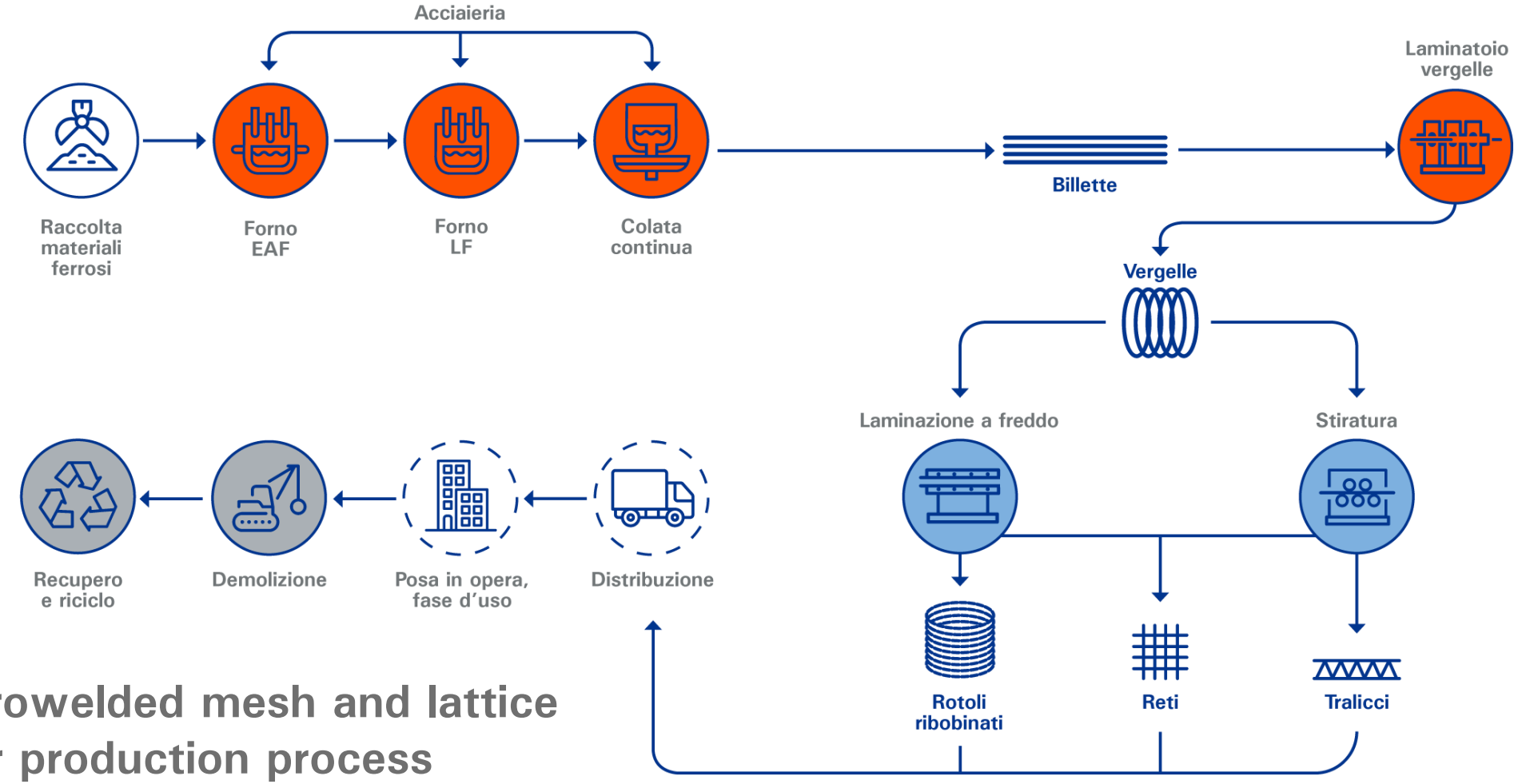
END OF LIFE MANAGEMENT

Demolition of the structure, including the use of machinery

Transport to separation centers and separation process.

Recovery, recycle, disposal

Field of application and EPD type



Electrowelded mesh and lattice girder production process

Environmental performance: electrowelded mesh

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Data referring to 1000 kg of electrowelded mesh

ENVIRONMENTAL IMPACT PARAMETERS	UNIT	A1	A2	A3	A4, A5, B1 ÷ B7	C1	C2	C3	C4	D	TOTAL A1÷C4
Climate Change	kg CO2 eq	566,9	41,9	107,7	MND	6,4	16,7	1,7	0,9	-716,5	742,3
Climate Change - Fossil	kg CO2 eq	557,8	41,8	107,6	MND	6,4	16,7	1,6	0,9	-719,7	732,9
Climate Change - Biogenic	kg CO2 eq	8,9339	0,0651	0,0612	MND	0,0018	0,0090	0,0485	0,0009	3,3769	9,1203
Climate Change – LU&T	kg CO2 eq	0,2055	0,0252	0,0015	MND	0,0005	0,0058	0,0036	0,0003	-0,1286	0,2424
Ozone Depletion	kg CFC11 eq	0,0000989	0,0000085	0,0000008	MND	0,0000014	0,0000038	0,0000001	0,0000003	-0,0000287	0,0001138
Acidification	mol H+ eq	2,766	0,613	0,025	MND	0,067	0,114	0,010	0,007	-3,048	3,602
Eutrophication Aquatic Freshwater	kg P eq	0,15245	0,00569	0,00087	MND	0,00023	0,00122	0,00154	0,00007	-0,26522	0,16207
Eutrophication Aquatic Marine	kg N eq	0,508	0,179	0,026	MND	0,030	0,044	0,002	0,003	-0,641	0,792
Eutrophication Terrestrial	mol N eq	5,64	1,97	0,15	MND	0,32	0,49	0,02	0,03	-6,35	8,63
Photochemical Ozone Formation	kg NMVOC eq	1,656	0,528	0,073	MND	0,089	0,134	0,005	0,008	-3,756	2,493
ADP - Mineral And Metals *	kg Sb eq	0,00266	0,00047	0,00016	MND	0,00001	0,00045	0,00001	0,00002	-0,00096	0,00378
ADP – Fossil *	MJ	10074	607	60	MND	88	254	33	17	-7088	11133
Water Use *	m3 depriv.	154,0	2,4	20,0	MND	0,1	0,7	0,4	0,4	14,5	177,9

MND = Module Not Declared

** The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*

Environmental performance: electrowelded mesh

Data referring to 1000 kg of electrowelded mesh

RENEWABLE RESOURCES	UNIT	A1	A2	A3	A4, A5, B1 ÷ B7	C1	C2	C3	C4	D	TOTAL A1÷C4
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE)	MJ	303,40	11,94	1,77	MND	0,36	2,43	4,25	0,14	-57,83	324,29
Use of renewable primary energy resources used as raw materials (PERM)	MJ	108,72	4,93	-0,26	MND	0,12	1,12	1,23	0,06	-55,67	115,93
Total use of renewable primary energy resources (PERT)	MJ	412,12	16,88	1,51	MND	0,48	3,56	5,48	0,20	-113,50	440,22

MND = Module Not Declared

Environmental performance: electrowelded mesh

Data referring to 1000 kg of electrowelded mesh

NON-RENEWABLE RESOURCES	UNIT	A1	A2	A3	A4, A5, B1 ÷ B7	C1	C2	C3	C4	D	TOTAL A1÷C4
Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials (PENRE)	MJ	9822,053	606,889	54,301	MND	88,220	253,716	33,289	17,307	-7088,411	10875,775
Use of non renewable primary energy resources used as raw materials (PENRM)	MJ	251,918	0,000	5,503	MND	0	0	0	0	0	257,421
Total use of non renewable primary energy resources (PENRT)	MJ	10073,925	606,868	59,803	MND	88,220	253,710	33,289	17,307	-7088,340	11133,122

MND = Module Not Declared

Environmental performance: electrowelded mesh

Data referring to 1000 kg of electrowelded mesh

USE OF SECONDARY RAW MATERIALS	UNIT	A1	A2	A3	A4, A5, B1 ÷ B7	C1	C2	C3	C4	D	TOTAL A1÷C4
Use of secondary materials (SM)	kg	792	0	0	MND	0	0	0	0	0	792
Use of renewable secondary fuels (RSF)	MJ	0	0	0	MND	0	0	0	0	0	0
Use of non renewable secondary fuels (NRSF)	MJ	0	0	0	MND	0	0	0	0	0	0
USE OF FRESH WATER											
Net use of fresh water (FW)	m3	4,605	0,107	0,425	MND	0,005	0,027	0,027	0,009	-0,013	5,205

MND = Module Not Declared

Environmental performance: electrowelded mesh

Indicators relating to outflows and waste, referring to 1,000 kg of electrowelded mesh

WASTE DISPOSAL	UNIT	A1	A2	A3	A4, A5, B1 ÷ B7	C1	C2	C3	C4	D	TOTAL A1÷C4
Hazardous waste disposed (HWD)	kg	0,05094	0,00118	0,00014	MND	0,00024	0,00067	0,00002	0,00004	-0,07475	0,05321
Non-hazardous waste disposed (NHWD)	kg	68,38	26,46	10,05	MND	0,11	12,04	0,12	51,77	-50,46	168,91
Radioactive waste disposed (RWD)	kg	0,0297	0,0041	0,0004	MND	0,0006	0,0017	0,0002	0,0001	-0,0064	0,0368
Components for re-use (CRU)	kg	0	0	0	MND	0	0	0	0	0	0
Materials for Recycling (MFR)	kg	0,18	0	20,03	MND	0	0	950,00	0	0	970,21
Materials for Energy Recovery (MER)	kg	0	0	0	MND	0	0	0	0	0	0
Exported Energy (EE)	MJ	0	0	0	MND	0	0	0	0	0	0

MND = Module Not Declared

Environmental performance: lattice girder

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Data referring to 1000 kg of lattice girder

ENVIRONMENTAL IMPACT PARAMETERS	UNIT	A1	A2	A3	A4, A5, B1 ÷ B7	C1	C2	C3	C4	D	TOTAL A1÷C4
Climate Change	kg CO2 eq	621,8	42,4	110,4	MND	6,4	16,7	1,7	0,9	-716,5	800,4
Climate Change - Fossil	kg CO2 eq	611,7	42,3	110,3	MND	6,4	16,7	1,6	0,9	-719,7	790,0
Climate Change - Biogenic	kg CO2 eq	9,9138	0,0658	0,0792	MND	0,0018	0,0090	0,0485	0,0009	3,3769	10,1190
Climate Change – LU&T	kg CO2 eq	0,2112	0,0255	0,0017	MND	0,0005	0,0059	0,0036	0,0003	-0,1286	0,2487
Ozone Depletion	kg CFC11 eq	0,0001074	0,0000086	0,0000009	MND	0,0000014	0,0000038	0,0000001	0,0000003	-0,0000287	########
Acidification	mol H+ eq	2,987	0,620	0,027	MND	0,067	0,114	0,010	0,007	-3,048	3,831
Eutrophication Aquatic Freshwater	kg P eq	0,16262	0,00576	0,00094	MND	0,00023	0,00123	0,00154	0,00008	-0,26522	0,17240
Eutrophication Aquatic Marine	kg N eq	0,546	0,181	0,027	MND	0,030	0,045	0,002	0,003	-0,641	0,833
Eutrophication Terrestrial	mol N eq	6,07	2,00	0,16	MND	0,32	0,49	0,02	0,03	-6,35	9,08
Photochemical Ozone Formation	kg NMVOC eq	1,774	0,534	0,075	MND	0,089	0,134	0,005	0,008	-3,756	2,619
ADP - Mineral And Metals *	kg Sb eq	0,00265	0,00048	0,00016	MND	0,00001	0,00045	0,00001	0,00002	-0,00096	0,00378
ADP – Fossil *	MJ	10978	614	63	MND	88	254	33	18	-7088	12048
Water Use *	m3 depriv.	167,9	2,4	20,3	MND	0,1	0,7	0,4	0,4	14,5	192,2

MND = Module Not Declared

** The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*

Environmental performance: lattice girder

Data referring to 1000 kg of lattice girder

RENEWABLE RESOURCES	UNIT	A1	A2	A3	A4, A5, B1 ÷ B7	C1	C2	C3	C4	D	TOTAL A1÷C4
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE)	MJ	320,39	12,08	2,04	MND	0,36	2,44	4,25	0,14	-57,83	341,69
Use of renewable primary energy resources used as raw materials (PERM)	MJ	117,42	4,99	-0,07	MND	0,12	1,12	1,23	0,06	-55,67	124,88
Total use of renewable primary energy resources (PERT)	MJ	437,80	17,07	1,97	MND	0,48	3,56	5,48	0,20	-113,50	466,57

MND = Module Not Declared

Environmental performance: lattice girder

Data referring to 1000 kg of lattice girder

NON-RENEWABLE RESOURCES	UNIT	A1	A2	A3	A4, A5, B1 ÷ B7	C1	C2	C3	C4	D	TOTAL A1÷C4
Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials (PENRE)	MJ	10722,511	613,820	57,497	MND	88,220	254,158	33,289	17,897	-7088,411	11787,392
Use of non renewable primary energy resources used as raw materials (PENRM)	MJ	254,889	0,000	5,623	MND	0	0	0	0	0	260,512
Total use of non renewable primary energy resources (PENRT)	MJ	10977,351	613,800	63,119	MND	88,220	254,153	33,289	17,896	-7088,340	12047,827

MND = Module Not Declared

Environmental performance: lattice girder

Data referring to 1000 kg of lattice girder

USE OF SECONDARY RAW MATERIALS	UNIT	A1	A2	A3	A4, A5, B1 ÷ B7	C1	C2	C3	C4	D	TOTAL A1÷C4
Use of secondary materials (SM)	kg	802	0	0	MND	0	0	0	0	0	802
Use of renewable secondary fuels (RSF)	MJ	0	0	0	MND	0	0	0	0	0	0
Use of non renewable secondary fuels (NRSF)	MJ	0	0	0	MND	0	0	0	0	0	0
USE OF FRESH WATER											
Net use of fresh water (FW)	m3	4,965	0,109	0,434	MND	0,005	0,027	0,027	0,009	-0,013	5,575

MND = Module Not Declared

Environmental performance: lattice girder

Data referring to 1000 kg of lattice girder

WASTE DISPOSAL	UNIT	A1	A2	A3	A4, A5, B1 ÷ B7	C1	C2	C3	C4	D	TOTAL A1÷C4
Hazardous waste disposed (HWD)	kg	0,05229	0,00119	0,00014	MND	0,00024	0,00067	0,00002	0,00004	-0,07475	0,05459
Non-hazardous waste disposed (NHWD)	kg	70,42	26,77	10,22	MND	0,11	12,06	0,12	53,53	-50,46	173,22
Radioactive waste disposed (RWD)	kg	0,0323	0,0041	0,0004	MND	0,0006	0,0017	0,0002	0,0001	-0,0064	0,0395
Components for re-use (CRU)	kg	0	0	0	MND	0	0	0	0	0	0
Materials for Recycling (MFR)	kg	0,18	0	20,23	MND	0	0	950,00	0	0	970,41
Materials for Energy Recovery (MER)	kg	0	0	0	MND	0	0	0	0	0	0
Exported Energy (EE)	MJ	0	0	0	MND	0	0	0	0	0	0

MND = Module Not Declared

Calculation rules

DECLARED UNIT: 1,000 kg of electrowelded mesh/lattice girder

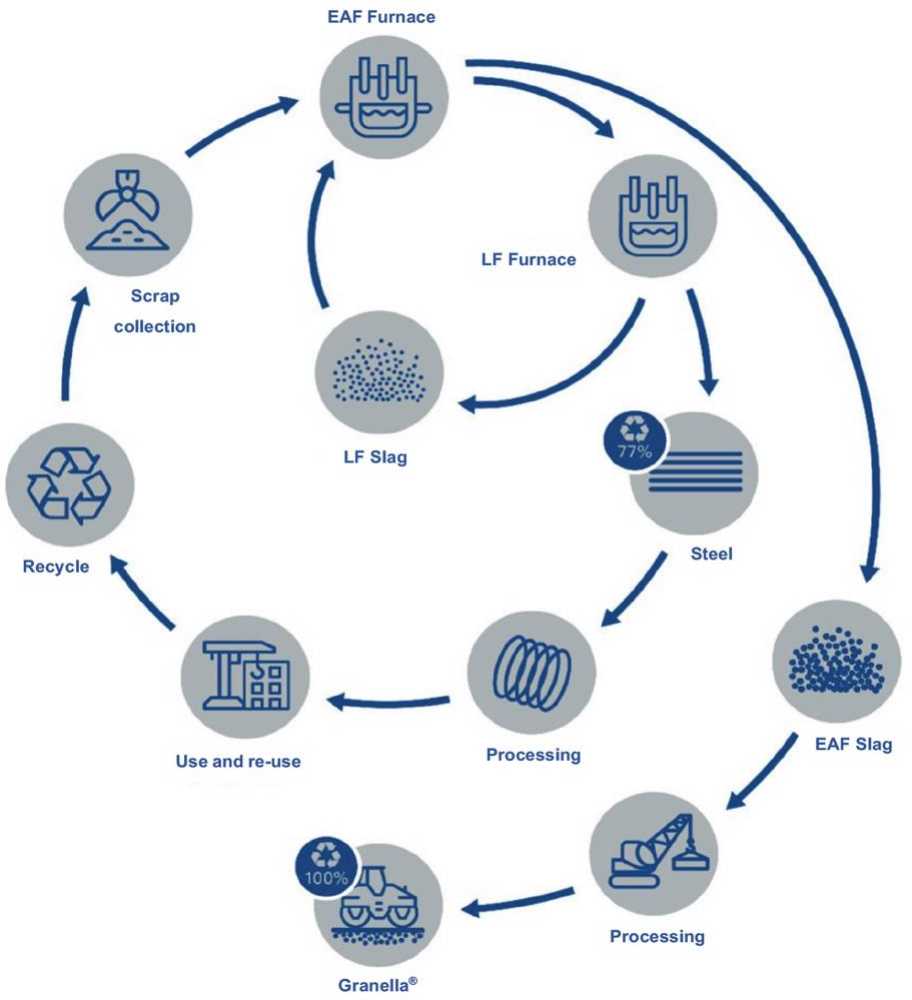
ASSUMPTIONS: System boundaries include the compulsory modules A1, A2, A3, C1, C2, C3, C4 and D as required by EN 15804 Standard, according to a "from cradle to gate with modules C1-C4 and D" approach. It should be noted that **building, maintenance and decommissioning of the infrastructures - intended as buildings - and use of industrial ground, were not taken into consideration**, because their contribution to environmental impact relating to the declared unit is deemed negligible. **Consumption of oils, detergents and other technical materials for machine maintenance, energy consumption for plant lighting, energy consumption for office activities related to the management of the steel mill are included. Moreover, it should be noted that product distribution, use and disposal phases are not included in this study.**

CUT-OFF RULES: The criterion chosen for the initial inclusion of the inbound and outbound elements, takes into account a 1% cut-off level, both in terms of mass, energy and environmental relevance. This means that a process was neglected if responsible of less than 1% of the total amount of mass, primary energy and total impact. However, all processes for which data are available were taken into account, even though with a contribution less than 1%. As a consequence, this threshold value was used in order to avoid collecting unknown data, not with the purpose of neglecting available data.

DATA QUALITY: in the LCA study, **particular relevance was given to primary data collected at Ferriere Nord S.p.A. and Demolizioni Industriali S.r.l.** through extensive measurements carried out at the plants.

ALLOCATIONS: allocation was avoided, whenever possible, by dividing the system into sub-systems. Otherwise, economic allocation was applied. As for waste modeling, the "Polluter pays principle" was applied.

Additional information



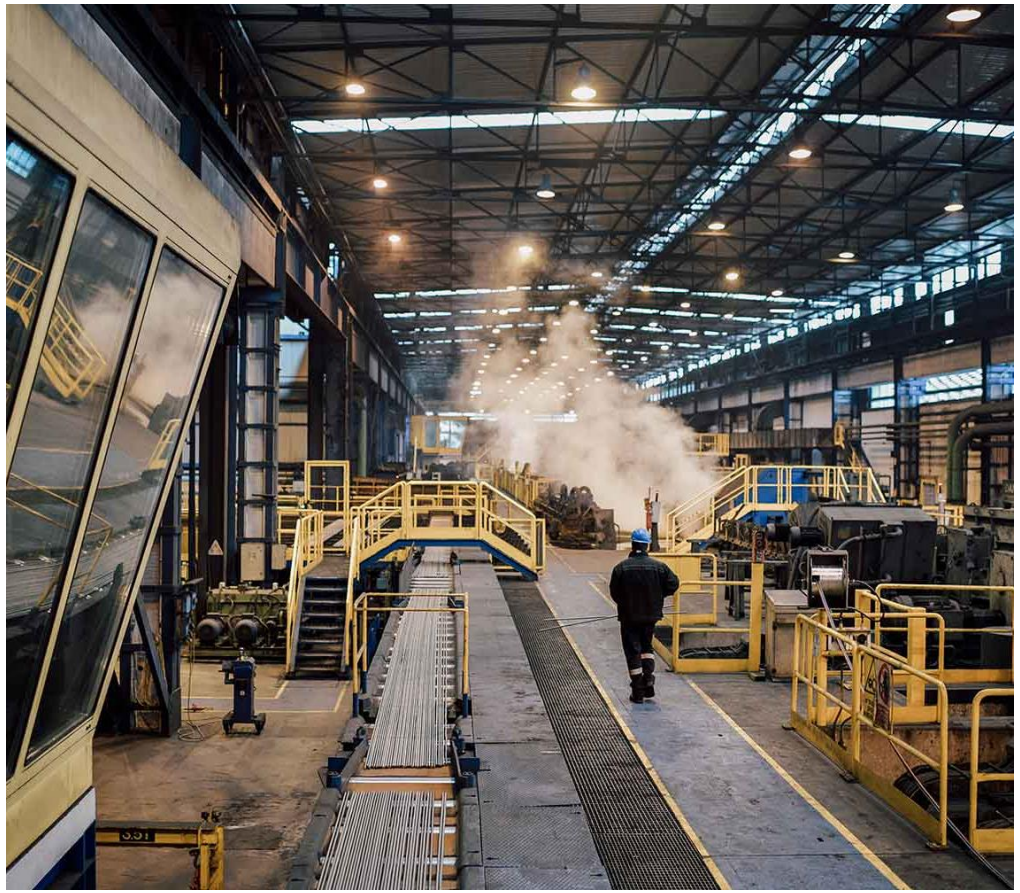
Fin Since 1995, the Pittini Group has chosen a "**Zero Waste**", production approach - a virtuous example of **circular economy.**
Zero Waste means that, at Pittini Group, **steel production must not create waste**. Instead, waste material is transformed in order to cut on unnecessary consumption and create opportunities of new uses.

Some great examples of circular economy are: **Granella®,** product obtained from EAF slag, residue with highest amount, that is used for the production of asphalt pavements and concrete conglomerates as an alternative to natural aggregates; Ladle furnace slag, which is later re-introduced in the production process as a substitute for lime; Dust coming from fume filtering, from which zinc and other metals are extracted; and Rolling mill scale, which is used in the production of concrete and counterweights in the household appliance industry.

References

- **ISO 14040:2006/Amd 1:2020** Environmental management - Life cycle assessment - Principles and framework
- **ISO 14044:2006/Amd 2:2020** Environmental management — Life cycle assessment — Requirements and guidelines — Amendment 1
- **ISO 14020:2000** Environmental labels and declarations -- General principles
- **EN 15804:2012+A2:2019** Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction works
- **PD CEN/TR 16970:2016** Sustainability of construction works – Guidance for the implementation of EN 15804
- **PD CEN/TR 15941:2010** Sustainability of construction works – Environmental Product Declarations – Methodology for selection and use of generic data.
- **ICMQ-001/15 PCR for construction products rev.3**
- **EPDItaly Regulation v.5**

General informations



Environmental declarations published within the same product category, but belonging to different programs, might not be comparable.

Specifically, EPDs regarding products for the building sector may not be comparable if not compliant with the EN 15804 standard.

REFERENCE DOCUMENTS: This declaration was drafted following EDPItaly's General Programme Instruction, available on www.epditaly.it.

ICMQ-001/15 PCR for construction products rev.3

CPC CODE : 4124

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INDEPENDENT VERIFICATION OF DECLARATION AND DATA CARRIED OUT ACCORDING TO ISO 14025	
☐ EPD Process certification (Internal)	☒ EPD Verification (External)