Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

STEEL DEFORMED BARS FOR CONCRETE REINFORCEMENT

from

Ferriera Valsabbia

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-00253
Publication date:	2024-04-24
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EPD of multiple products (bars with different diameters), based on the average results of the product group

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

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

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): *CONSTRUCTION PRODUCTS - PCR 2019:14 - VERSION 1.3.3*
PCR review was conducted by: *Martin Erlandsson, IVL Swedish Environmental Research Institute, martin.erlandsson@ivl.se*
Life Cycle Assessment (LCA)
LCA accountability: *e3 – studio associato di consulenza. www.ecubo.it*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by accredited certification body Third-party verification: *ICMQ Spa* is an approved certification body accountable for the third-party verification The certification body is accredited by: *Accredia, n. 0004VV*
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: Ferriera Valsabbia Spa, Via Guglielmo Marconi, 13, 25076 Odolo (BS).

Contact: Quality manager: Andrea Brunori
Environmental manager: Andrea Laffranchi
Phone: +39 0365 8270 Fax: +39 0365 826150 E-mail: ufficiosq@ferriera-valsabbia.com

Product-related or management system-related certifications: Environmental Management System certified according to ISO 14001. ISO 45001 ISO 9001

Name and location of production site: Via Guglielmo Marconi, 13, 25076 Odolo (BS) - Italy

Knot with cold-drawn steel deformed bars for concrete reinforcement, diameter Ø 28 mm

Half a Century of Steel

1954 - The Laminatoio Valsabbia is founded at Odolo.

1963 - The Laminatoio becomes Ferriera Valsabbia. The company produces reinforcing bars from ingots acquired from other metallurgy companies.

1968 - The first smelting furnace is inaugurated. Ferriera Valsabbia is now a continuous cycle integrated company. The production cycle starts from scrap.

1971 - The second smelting furnace comes into operation. The plant at Odolo employs 150 workers and produces 70,000 tons of steel a year.

1977 - Ferriera Valsabbia becomes a joint-stock company.

The 1980s - Subsequent investments enable further rationalisation of the production plants. The Company exports to Germany, France, Switzerland, Austria, the United States and various Eastern countries.

The 1990s - The company's development continues on all fronts. Ferriera Valsabbia start operating under the ISO 29002, (today ISO 9001) Quality Management System.

1992 - Ferriera Valsabbia opens a new market in Italy with the introduction of the galvanized reinforcing bar (Galva Rebar).

1993 - The production of electro welded wire mesh is launched at the new production site at Sabbio Chiese.

1996 - The Company opens a new plant in the Czech Republic.

2003 - Ferriera Valsabbia equips itself with a new and more efficient water treatment plant.

2004 - Ferriera Valsabbia inaugurates another plant in the Slovak Republic. Our on-line certification service is launched providing customers with EN 10204 3.1 test certifications via the corporate Web site.
2005 - Revamp of our fume treatment plant. Ferriera Valsabbia begins operating under the ISO 14001 Environmental Management Systems.

2008 - The brand-new bar rolling and confectioning plant begins operation.

Today - The Company's monthly production reaches the quantities that used to be produced in a year and operates in contact with leading international research institutes. Ferriera Valsabbia becomes a solid reference point for the entire sector.

2012 – New EAF

2015 – New CCM

2016 – New LF

2023 - Statcom

Technology

Reinforcing bars are not glamorous products that spark people's imagination, yet they are the soul of every new form in architecture. They are not sophisticated products, yet they sustain our world. They are never on show in the foreground, but their quality is seen over time.

A quality which must be able to meet increasingly difficult tasks.

This is exactly the purpose of our work. This is exactly why we have invested in ever new plants and in the most advanced technologies able to provide total control over each and every production parameter.

Steel scrap loading into the smelting furnace

Product information

Information	Description
Product identification	Hot-drawn reinforcing steel for concrete in bars
Product features	Bars: Diameter from Ø 8 mm to Ø 40 mm Length up to 16 m
UN CPC code	41.24.1 Bars and rods, hot-rolled, in irregularly wound
Product properties (under EN10080:2005)	Steel coming from post and pre consumer steel scraps produced in electric arc furnace route (EAF) and further hot rolling process.
	Adherence and surface geometry f_R or f_P : - for Ø≤8mm f_R or f_P≥0.045 - for 8<Ø<12mm f_R or f_P≥0.052 - for Ø≥12mm f_R or f_P≥0.056
	Weldability: C_{eq} ≤0,52
	Typical yield stress C_v: 500 ≤ C_v ≤ 570 MPa
	Elongation Agt: ≥ 7,5%
	Successful in bend and rebend test
	Content of recycled materials ≥97% (Certificate IGQ n. C060 following ISO 14021)
	Successful in fatigue test
Plant features	Total production, for selling purpose, year 2022: 595.435 t
	On-site air emission control system
	On-site dumping water control system
	On-site system to recycle water used in process
	In/out materials/products and casting process undergone radiometric controls to prevent nuclear radiation
	Plant air emissions accounted under ETS (Emission Trading System)
Geographical scope	A1, A2: GLO A3: Italy A4, C1-C4, D: EU 27

LCA information

This EPD is an EPD of multiple products (bars with different diameters), based on the average results of the product group. The differences between all products are less than 10% for all impact categories.

Declared unit
The declared unit is 1 ton of bar.

Time representativeness: the reference year for the data collection is 2022.

Database and LCA software used: Ecoinvent 3.9.1 cut-off, ELCD; software: Sima Pro 9.5
The reference package used for impact indicator is based on EF 3.1.
Characterization factors for GWP-GHG refer to IPCC 2021.

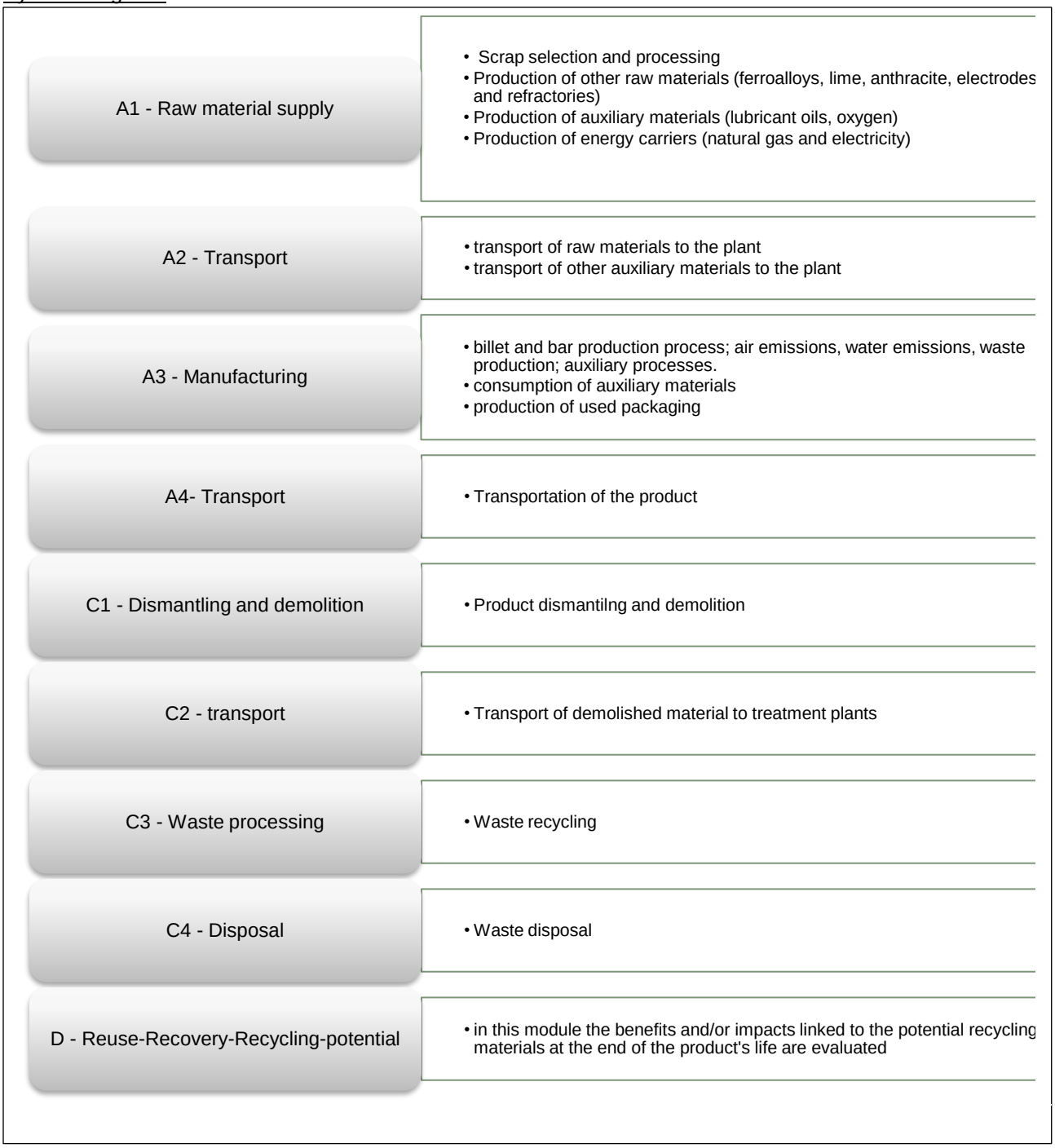
Modules declared

Cradle to gate with options: from Raw Materials supply (A1) to Transport (A2) of raw materials and Manufacturing (A3). Transport to final destination has been taken into account (A4) and end of life modules (C1-C4 + D).

Geographical scope
Modules A1, A2: Global
Module A3: Italy
Modules C1, C2, C3, C4, D: EU 27.

Fume suction and filtering system realized in 2010

System diagram:



In the LCA model the infrastructures and the equipment production aren't considered.

LCA model - More information

The following specific data were collected for the objectives of the study:

- consumption of raw materials of the product
- incoming logistics
- energy consumption

• maintenance and general consumption
• emissions into air and water
• waste production

Data quality was assessed and validated during data collection process.

For electricity consumption it was considered the Italian residual mix, available in Ecoinvent 3.9, except for the percentage of electricity covered by Guarantee of Origin (8%).
For the scrap that enters the plant as a by-product, according to PCR, an allocation was made on its average economic value, compared to the economic value of steel.

The plant produces only one type of product, steel bars in various diameters, so no allocation between multiple products was necessary,

A cut-off of 1% in terms of environmental significance was used.

Scenario:

A4 - Transport
According to 2022 data, the average transport distance of the outgoing product is 27 km by ship and 288 km by road
C1 – De-construction demolition
It is assumed a diesel consumptions for the dismantling operations of 239 MJ/t.
C2 – Tranport
An average distance of 50 km has been assumed for the transport to recycling facility.
C3 – Waste processing
A recycling percentage of 94% was used, deriving from the average recycling percentages weighted on the sales of the various countries - Eurostat data for demolition waste in Europe in 2020.
C4 – Disposal
A landfill percentage of 6% was assumed
D – Benefits and loads beyond the system boundary
Module D considers the potential environmental benefit of recycling steel on the market. The advantage is considered as the difference between the impacts of a blast furnace, in which virgin ores are used, and an EAF steel mill, using scraps. In calculating the environmental advantage, the melting yield is considered, so the content of recycled material used in the production.

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

	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	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	IT	EU27	ND	ND	ND	ND	ND	ND	ND	ND	EU27	EU27	EU27	EU27	EU27
Specific data used	67%*																
Variation – products	<10%																
Variation – sites	NA																

*According to the PCR, production data of the raw materials used are not considered specific data if they derive from the Ecoinvent database and not from primary data of the suppliers.

Content information

Product components	Weight %	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Iron	>96%	95,7%*	0% 0% 0%
Alloy elements (Manganese, Silicon, Carbon)	2%		
Other elements (Copper, Nickel, Chromium)	<2%		
Packaging materials	**Weight, kg**		**Weight biogenic carbon, kg C/kg**
Steel rod	1,5 kg/t		0%

* The data derives from the VALIDATION OF SELF-DECLARED ENVIRONMENTAL ASSERTION C060 released by IGQ, current revision 14/09/2023

In the product there are no substances contained in the product that are listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorisation” exceeding 0.1 % of the weight of the product.

Results of the environmental performance indicators

Mandatory impact category indicators according to EN 15804

Indicator	Unit	Tot.A1-A3	A4	C1	C2	C3	C4	D
GWP-fossil	kg CO_2 eq.	6,77E+02	3,02E+01	4,29E+00	5,19E+00	2,44E+01	3,65E-01	1,70E+01
GWP-biogenic	kg CO_2 eq.	4,97E+00	2,29E-02	3,35E-02	3,99E-03	1,35E-09	2,09E-04	-1,63E-01
GWP-luluc	kg CO_2 eq.	2,17E-01	1,43E-02	4,14E-03	2,44E-03	3,57E-02	2,20E-04	-2,57E-03
GWP-total	kg CO_2 eq.	6,82E+02	3,02E+01	4,33E+00	5,20E+00	2,44E+01	3,65E-01	1,68E+01
ODP	kg CFC 11 eq.	1,42E-05	6,58E-07	8,91E-08	1,14E-07	3,87E-07	1,06E-08	4,43E-07
AP	mol H^+ eq.	2,33E+00	1,09E-01	2,28E-02	1,75E-02	2,73E-01	2,75E-03	5,49E-02
EP-freshwater	kg P eq.	1,35E-01	2,14E-03	1,15E-03	3,69E-04	1,44E-02	3,04E-05	8,08E-03
EP-marine	kg N eq.	5,75E-01	3,69E-02	7,92E-03	6,05E-03	6,37E-02	1,05E-03	1,42E-02
EP-terrestrial	mol N eq.	5,65E+00	3,91E-01	8,37E-02	6,39E-02	7,11E-01	1,13E-02	1,54E-01
POCP	kg NMVOC eq.	2,38E+00	1,63E-01	2,81E-02	2,72E-02	2,13E-01	3,93E-03	9,96E-02
ADP-minerals& metals*	kg Sb eq.	2,58E-03	8,09E-05	2,05E-05	1,40E-05	1,50E-03	5,06E-07	-2,32E-05
ADP-fossil*	MJ	8,47E+03	4,41E+02	6,83E+01	7,59E+01	3,30E+02	9,09E+00	1,41E+02
WDP*	m^3	2,04E+02	2,10E+00	4,54E-01	3,63E-01	4,01E+00	4,01E-01	9,66E-01
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption							

** 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.*

A negative value in module D indicates an environmental benefit.

Additional mandatory and voluntary impact category indicators

Indicator	Unit	Tot.A1-A3	A4	C1	C2	C3	C4	D
GWP-GHG[1]	kg CO_2 eq.	6,79E+02	3,02E+01	4,30E+00	5,20E+00	2,45E+01	3,65E-01	1,70E+01
GWP-GHG of the electricity purchased	kg CO_2 eq / kWh	0,575						

The other additional environmental indicators are reported in the LCA study cited in the references.

Resource use indicators

Indicator	Unit	Tot.A1-A3	A4	C1	C2	C3	C4	D
PERE	MJ	6,67E+02	6,43E+00	5,30E+00	1,11E+00	5,12E+01	7,69E-02	-7,88E+00
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	6,67E+02	6,43E+00	5,30E+00	1,11E+00	5,12E+01	7,69E-02	-7,88E+00
PENRE	MJ	8,47E+03	4,41E+02	6,83E+01	7,59E+01	3,30E+02	9,09E+00	1,41E+02
PENRM	MJ.	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	8,47E+03	4,41E+02	6,83E+01	7,59E+01	3,30E+02	9,09E+00	1,41E+02
SM	kg	9,57E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	9,12E+01	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	m^3	5,54E+00	6,89E-02	2,40E-02	1,19E-02	1,64E-01	9,65E-03	3,92E-04
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water							

[1] Calculated according to IPCC 2021

Waste indicators

Indicator	Unit	Tot.A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste disposed	kg	3,25E+00	2,73E-03	3,34E-04	4,72E-04	1,83E-03	4,81E-05	2,37E-03
Non-hazardous waste disposed	kg	4,56E+02	3,84E+01	2,81E+00	6,66E+00	9,50E+02	6,00E+01	-2,43E+00
Radioactive waste disposed	kg	1,03E-02	1,34E-04	1,65E-04	2,32E-05	6,69E-04	1,34E-06	-3,70E-04

Output flow indicators

Indicator	Unit	Tot.A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	1,73E+02	0,00E+00	0,00E+00	0,00E+00	9,40E+02	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Differences versus previous versions

Compared to 2017, all primary data have been updated; in general, energy consumption has dropped and milling speed has improved. However, data are not comparable because:

- Use of the residual mix for electricity instead of the national average data
- Ecoinvent database update;
- update of the method used (from the EPD 2018 method to EF 3.1).

References

- General Programme Instructions of the International EPD® System. Version 4.0.
- PCR CONSTRUCTION PRODUCTS - PCR 2019:14 - VERSION 1.3.3
- Ecoinvent Allocation cut-off, v.3.9.1, January 2023
- ELCD, 2018
- Studio LCA della barra in acciaio per cemento armato secondo la ISO 14040, ISO 14044, EN 15804:2012+A2:2019, ISO 14067:2018, Rev 1 del 07/03/2024

Sheet ingot casting

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