Environmental Product Declaration

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

Steel for concrete reinforcements:

B500S ribbed steel bars and coils, B500T and B500S Welded Mesh and B500T Lattice Girders.

from

G.P. MANUFACTURAS DEL ACERO

G. P. MANUFACTURAS DEL ACERO, S.A.

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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

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
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CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): Construction Products, PCR 2019:14, 2019-12-20 (version 1.0).
PCR review was conducted by: The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification
Third party verifier: Marcel Gómez Ferrer, Marcel Gómez Consultoria Ambiental Email: info@marcelgomez.com *In case of recognised individual verifiers:* Approved by: The International EPD® System
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 EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD:
G.P. Manufacturas del Acero S.A

Contact: Rafael Bueno Maldonado - gptecnica@gpacero.es

Description of the organisation: G.P. Manufacturas del Acero is a company dedicated to the manufacture, production, and sale of reinforced steel for concrete (rebars, welded mesh, lattice girders…), steel tubes and steel sheets. The company has three factories distributed throughout Spain: Dos Hermanas (Sevilla), Alicante and Pinto (Madrid).

Name and location of production site: the declared steel for concrete reinforcements products are produced by G.P. Manufacturas del Acero S.A. in the main production plant located in:

- DOS HERMANAS (SEVILLA)
  Vereda del rayo, s/n
  41700. Dos Hermanas, Sevilla, Spain.

In Addition, the company has two other plants located in:

- ALICANTE
  St. Alisos, 35 (Parcela 60).
  Industrial Park Plá Vallonga. 03006. Alicante, Spain.

- PINTO (MADRID)
  St. Publicistas, 7
  Industrial Park Ampliación Mateu Cromo 28320. Pinto, Madrid, Spain.

Product information

Product name: *Steel for concrete reinforcements: B500S ribbed steel bars and coils, B500T and B500S Welded Mesh and B500T Lattice Girders*

Product identification: *Steel for concrete reinforcements* according to EN-10080, and in the form of Lattice Girders, Welded Mesh and ribbed in Bars and Coils.

Product description: *Steel for concrete reinforcements* from G.P. Manufacturas del Acero S.A. is certified according to EN 10080 and produced in three main formats:

- Lattice girder made of rib wire. Its main use is for construction for reinforcing concrete in floors.
- Welded mesh made of rib wire. Its main use is for construction for reinforcing concrete in floors, walls, and fences.
- Rib wire bars/coils for reinforcing concrete for the realization of formworks.

Characteristic	Lattice Girder	Welded Mesh	Wire in Bars and Coils
Standard size (other sizes may be produced) (Spanish Code on Structural Concrete)	Length: 6 and 13 meters	Length and Width: 600*220 cm Grids: 15*15, 20*20, 15*30 and 20*30 cm	Length (bars): 6 and 12 meters
Diameter (mm) (Spanish Code on Structural Concrete)	6 to 12	4, 5, 6, 7, 8, 10 and 12	6 to 25
Steel quality (Spanish Code on Structural Concrete)	B500T and B500S	B500T and B500S	B500T, B500S and B500SD

Characteristic	B500T	B500S
Yield limit (Re) – N/mm² (Spanish Code on Structural Concrete)	≥500	≥500
Tensile Strength (Rm) - N/mm² (Spanish Code on Structural Concrete)	≥550	≥550
Ratio (Rm/Re) (Spanish Code on Structural Concrete)	≥1.03	≥1.05
Elongation to failure (A_{5d}) - % (Spanish Code on Structural Concrete)	8	12
Elongation at maximum load (Agt) - % (Spanish Code on Structural Concrete)	-	50

UN CPC code: 412 Products of iron or steel.

LCA information

Declared unit: 1 ton of weldable reinforcing steel in the form of lattice girders, welded mesh and ribbed bars and coils for structures according to norms UNE EN 10080 for being used in construction during a minimum period of 50 years.

Reference service life: 50 years

Time representativeness: primary data from manufacturing site refer to year 2018.

Database(s) and LCA software used: Ecoinvent v3.5 (allocation, cut-off by classification) database and SimaPro 9.1 software have been used for the LCA calculations. LCA methods used are EN 15804:A2 compliant.

Description of system boundaries: Cradle to gate with options: the EPD covers modules A1-A3, A4-A5, B1-B7, C1–C4 and Module D. The modularity and the polluter payer principles have been followed. The next processes have been excluded:

- Flows related to human activities such as employee transport
- The construction of plants, production of machines and transportation systems, as well as maintenance activities.

A1. Raw Material Supply

- Extraction and processing of raw materials
- Generation of electricity and heat from primary energy resources
- Processing up to the end-of-waste state or disposal of final residues including any packaging not leaving the factory gate with the product.

A2. Transportation

- External transportation to the core processes and internal transport.

A3. Manufacturing

- Manufacturing of the construction product and co-products.
- Production of ancillary materials or pre-products
- Treatment of waste generated from the manufacturing processes. Processing up to the end-of-waste state or disposal of final residues including any packaging not leaving the factory gate with the product.

A4. Transport

- Transportation from the production gate to the construction site

SCENARIO INFORMATION	VALUE/DESCRIPTION
Vehicle type used for transport	Long distance truck
Vehicle load capacity	24 tones
Fuel type and consumption	51,62 liters of diesel per 100 km
Distance to construction site	215 km
Capacity utilisation (including empty returns)	49.9% as assumed in Ecoinvent
Bulk density of transported products	Mass of the transported product
Volume capacity utilisation factor	< 1

A5. Construction Installation:

- Installation of the product into the building including manufacture and transportation of ancillary materials and any energy or water required for installation.

SCENARIO INFORMATION	VALUE/DESCRIPTION
Ancillary materials for installation	For each ton of product installed, it is necessary: 3,67E-07 ton of drilling emulsion 8,40E-08 ton of anticortit
Water use	4,37E-05 ton per ton of product
Other resource use	Not required
Quantitative description of the energy type and consumption during the preparation and installation process	-
Direct emissions to ambient air, soil and water	No generation
Waste materials on the building site, generated by the product's installation	No generation
Output materials as result of waste processing at the construction site	No generation

C1. Deconstruction/demolition

- The de-construction and/or dismantling of the product take part of the demolition of the entire building. In our case, the environmental impact is assumed to be very small and can be neglected

C2. Transport

- Transportation of the discarded product accounts for part of the waste processing, e.g. to a recycling site and transportation of waste.

C3. Waste processing for reuse, recovery and/or recycling

- The impact is considered negligible.

C4. Disposal

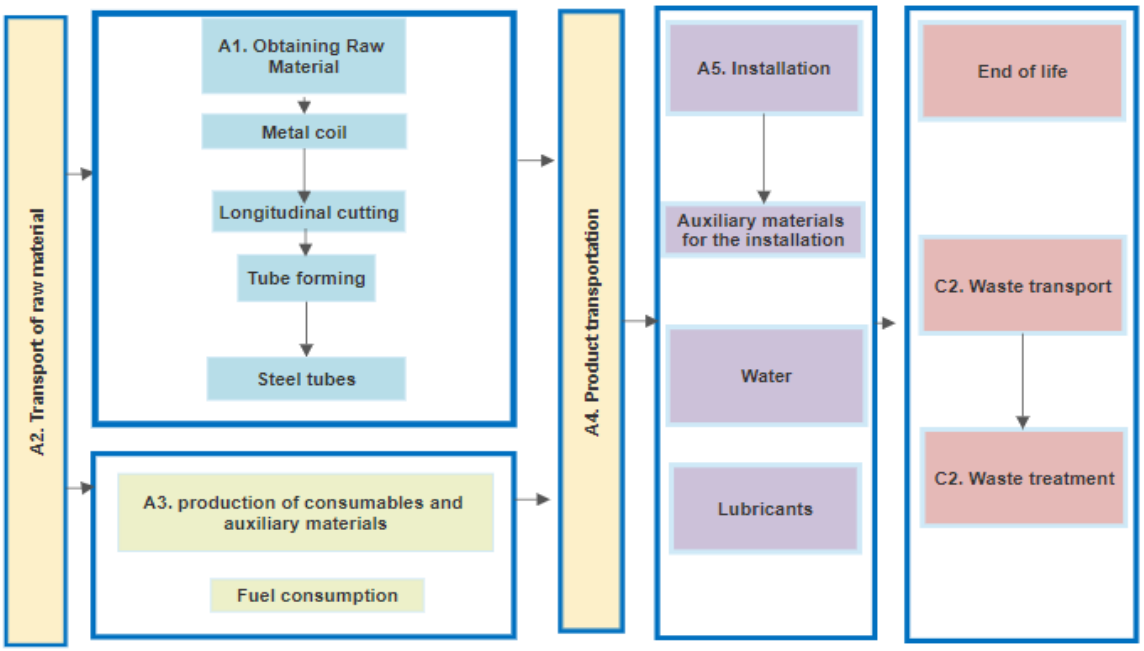
- Waste disposal including physical pre-treatment and management of the disposal site. Emissions from waste disposal are considered part of the product system under study and therefore part of this module, according to the “polluter pays principle”.

SCENARIO INFORMATION	VALUE/DESCRIPTION
Collection process specified by type	1 ton of collected product mixed with construction waste
Recovery system specified by type	95% Steel Recycling
Disposal specified by type	0.95 tonnes of steel for recycling 0.5 tonnes of steel to be landfilled
Assumptions for scenario development (e.g. transport)	Lorry of the size class 16-32 metric tons gross and Euro VI emissions class Average load: 5.79 tones Diesel Fuel consumption: 25.5 l/100 Km Distance: 50 km

D. Reuse-recovery-recycling potential

It is considered that 95% of the product is collected and recycled. As a result of the recycling process the production of steel is avoided.

System diagram:



More information:
The underlying LCA study has been carried out by Juan Felipe Bermeo Losada.
The study covers at least 95% of the materials and energy per module and at least 99% of the total use of materials and energy of each unit process.
More information about the product is available at www.gpacero.es

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

	Product stage					Construction process stage			Use stage							End of life stage				Resource recovery stage
	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	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	ES	ES	ES	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU
Specific data	>90% GWP-GHG					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	Variation of the impact products declared< 10% - for each product group					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Manufactured in sites<10%					-	-	-	-	-	-	-	-	-	-	-	-

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Steel	1.000	100%	0
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
No packaging used	0	0	

During the life cycle of the product no hazardous substance listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorization” has been used in a percentage higher than 0.1% of the weight of the product.

Environmental Information

Since the difference in environmental impact is less than 10% for lattice girders, Welded Mesh and Wire in Bars and Coils, the following information is valid for the EPD results of all elements.

Potential environmental impact – mandatory indicators according to EN 15804

Results per declared unit														
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**A5**	**A1-A5**	**B1 - B7**	**C1**	**C2**	**C3**	**C4**	**Total**	**D**
GWP-fossil	kg CO_2 eq.	3,90E+03	4,19E+01	5,10E-01	4,49E+01	4,90E-04	3,98E+03	0	0	8,14E+00	0	2,16E-01	3,99E+03	-9,49E+02
GWP-biogenic	kg CO_2 eq.	8,06E+00	2,23E-02	1,73E-05	1,42E-02	1,28E-06	8,09E+00	0	0	2,57E-03	0	1,84E-04	8,09E+00	-1,07E-01
GWP-luluc	kg CO_2 eq.	2,92E+00	1,97E-02	9,00E-06	1,33E-02	3,67E-07	2,95E+00	0	0	2,42E-03	0	3,49E-05	2,95E+00	-8,86E-02
GWP-total	kg CO_2 eq.	3,91E+03	4,19E+01	5,10E-01	4,50E+01	4,92E-04	4,00E+03	0	0	8,14E+00	0	2,16E-01	4,01E+03	-9,50E+02
ODP	kg CFC 11 eq.	2,26E-04	8,56E-06	9,27E-09	1,03E-05	3,01E-10	2,45E-04	0	0	1,87E-06	0	1,07E-07	2,47E-04	-3,95E-05
AP	mol H^+ eq.	2,74E+01	8,29E-01	5,25E-03	1,29E-01	3,76E-06	2,84E+01	0	0	2,34E-02	0	2,12E-03	2,84E+01	-4,39E+00
EP-freshwater	kg PO_4^{3-} eq.	2,34E-01	6,85E-04	4,59E-07	6,78E-04	3,35E-08	2,35E-01	0	0	1,23E-04	0	2,80E-06	2,35E-01	-4,34E-02
EP-marine	kg N eq.	4,37E+00	1,62E-01	2,61E-03	2,41E-02	4,54E-07	4,56E+00	0	0	4,37E-03	0	7,71E-04	4,57E+00	-7,25E-01
EP-terrestrial	mol N eq.	5,32E+01	1,83E+00	2,87E-02	2,76E-01	5,93E-06	5,53E+01	0	0	4,99E-02	0	8,60E-03	5,54E+01	-8,48E+00
POCP	kg NMVOC eq.	1,42E+01	4,88E-01	7,69E-03	1,05E-01	9,85E-06	1,48E+01	0	0	1,90E-02	0	2,44E-03	1,48E+01	-5,01E+00
ADP-minerals&metals*	kg Sb eq.	1,23E-01	3,83E-05	7,54E-08	1,36E-04	4,19E-09	1,23E-01	0	0	2,47E-05	0	2,30E-07	1,23E-01	-9,74E-05
ADP-fossil*	MJ	4,60E+04	6,09E+02	6,51E-01	6,87E+02	2,43E-02	4,73E+04	0	0	1,24E+02	0	7,13E+00	4,74E+04	-9,35E+03
WDP	m^3	6,87E+02	3,62E+00	3,73E-03	3,50E+00	1,07E-03	6,94E+02	0	0	6,34E-01	0	2,76E-02	6,95E+02	-6,55E+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.*

Potential environmental impact – additional mandatory and voluntary indicators

Results per declared unit														
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**A5**	**A1-A5**	**B1 - B7**	**C1**	**C2**	**C3**	**C4**	**Total**	**D**
GWP-GHG	kg CO_2 eq.	3,83E+03	4,15E+01	5,06E-01	4,46E+01	4,80E-04	3,91E+03	0	0	8,07E+00	0	2,12E-01	3,92E+03	-8,97E+02

Disclaimers shall be added, if required by EN 15804.

Use of resources

Results per declared unit														
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**A5**	**A1-A5**	**B1 -B7**	**C1**	**C2**	**C3**	**C4**	**Total**	**D**
PERE	MJ	1,29E+04	1,20E+01	7,64E-03	7,31E+00	5,14E-04	1,30E+04	0	0	1,32E+00	0	9,34E-02	1,30E+04	-7,48E+01
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	1,29E+04	1,20E+01	7,64E-03	7,31E+00	5,14E-04	1,30E+04	0	0	1,32E+00	0	9,34E-02	1,30E+04	-7,48E+01
PENRE	MJ	4,60E+04	6,09E+02	6,51E-01	6,87E+02	2,43E-02	4,73E+04	0	0	1,24E+02	0	7,13E+00	4,74E+04	-9,35E+03
PENRM	MJ.	0	0	0	0	0	0	0	0	0	0	0		0
PENRT	MJ	4,60E+04	6,09E+02	6,51E-01	6,87E+02	2,43E-02	4,73E+04	0	0	1,24E+02	0	7,13E+00	4,74E+04	-9,35E+03
SM	kg	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	1,18E+05	6,22E+01	3,52E-02	3,24E+01	1,88E-03	1,18E+05	0	0	5,88E+00	0	4,15E-01	1,18E+05	-4,24E+02
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													

Waste production and output flows

Waste production

Results per declared unit														
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**A5**	**A1-A5**	**B1 -B7**	**C1**	**C2**	**C3**	**C4**	**Total**	**D**
Hazardous waste disposed	kg	4,88E-02	3,66E-04	3,02E-07	4,37E-04	1,10E-08	4,96E-02	0	0	7,93E-05	0	2,44E-06	4,97E-02	-1,01E-01
Non-hazardous waste disposed	kg	5,42E+03	8,29E+00	1,21E+00	3,29E+01	3,79E-05	5,46E+03	0	0	5,95E+00	0	5,00E+01	5,52E+03	-3,84E-04
Radioactive waste disposed	kg	1,31E-01	4,01E-03	4,17E-06	4,64E-03	1,41E-07	1,40E-01	0	0	8,41E-04	0	4,88E-05	1,41E-01	-8,94E-03

Output flows

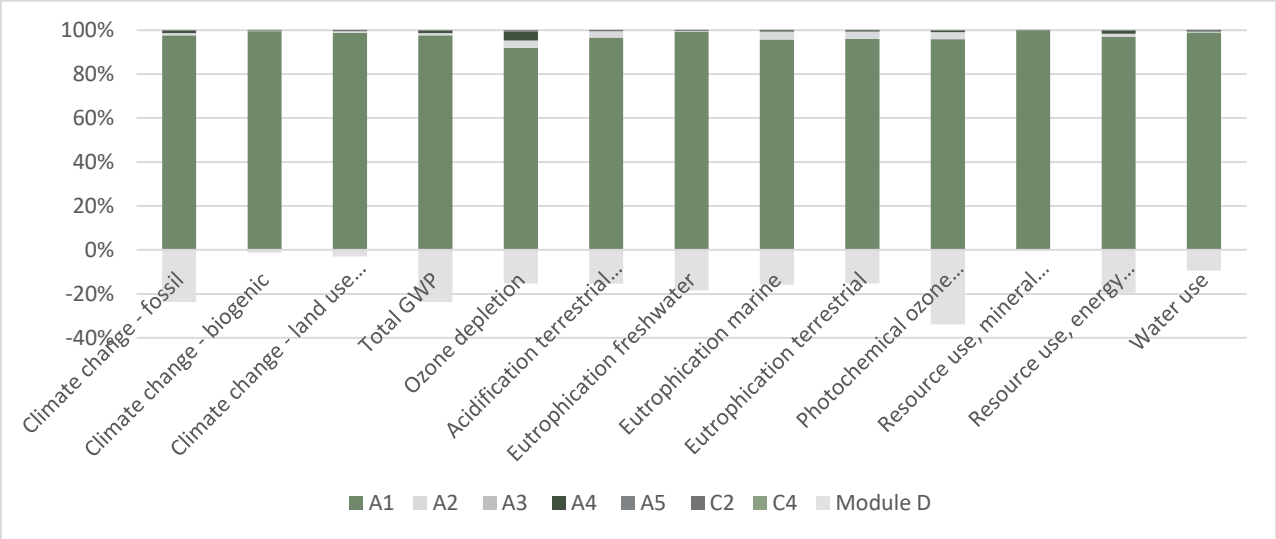
Results per declared unit														
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**A5**	**A1-A5**	**B1 -B7**	**C1**	**C2**	**C3**	**C4**	**Total**	**D**
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00 E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	7,20E-02	0.00E+00	0.00 E+00	7,20E-02	0.00E+00	0.00E+00	0.00E+00	9,50E+02	0.00E+00	9,50E+02	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00 E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00 E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00 E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0.00E+00

Information on biogenic carbon content

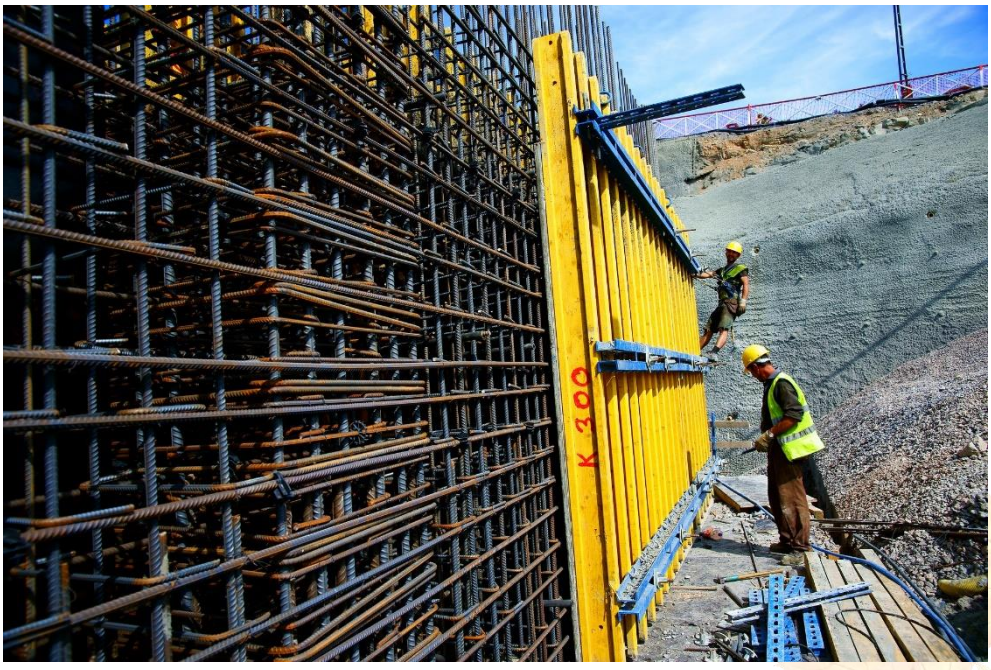
Results per declared unit		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in product	kg C	0
Biogenic carbon content in packaging	kg C	0

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

In general terms, as it is shown in the table of potential environmental impact, and figure results impact categories, A1 Module has the biggest impact, representing at least 97% of the whole impact. A2 Module has a little impact, representing at most 2% of the life cycle impact. Finally, A4 Module has little impact too, representing at most 1% of the whole impact. Module D represents savings between 0,1% and 23,7% of the total impact. The life cycle has an impact of 4,01E+03kg of CO2 equivalent



Results on impact categories



Additional information

Protection and Conservation of soils and vegetation.

The following measures are proposed: delimitation of working area, definition of exclusion areas as well as restriction to the location of landfills and support facilities, reuse of topsoil, vegetation protection, priority habitat protection and protection of public utility.

Protection of the hydrologic system and water quality.

The following measures or actions are taken: rectification and channeling banks are avoided, by not allowing the concentration of several ones in a single work of drainage and the remaining of isolated pools with fish are also avoided because of the mortality risk for them, hence applying, in this case, systems for the recovery of affected individuals.

In addition, during construction, there are barriers for sediment retention, settling ponds, infiltration trenches or other similar devices to avoid the removal of soil to the rivers, ensuring that the placement of these systems does not alter the environmental values to be protected, and their subsequent removal after their function.

Protection of wildlife

In order to protect the fauna around the new infrastructure and minimize the barrier effect, the following steps are taken: measures for correction of barrier effect for amphibians and reptiles, measures to protect fish fauna as well as birds, measures for correction the barrier effect for micro and meso-mammals, and establishment of wildlife crossings for vertebrates, being perfectly located, sized and integrated into the environment.

Atmospheric protection.

To avoid the inconvenience of dust generated during construction of the road, regular irrigation is made to all access roads to work as well as auxiliary facilities areas and machinery parks. The frequency of watering is adapted to the characteristics of the soil and the weather, to keep the roads used permanently wet. The materials capable of emitting dust into the atmosphere are transported covered.

Defense against erosion, environmental restoration and landscaping of the work.

Measures against erosion, environmental restoration and landscaping of the work are applied, consisting of the restoration of all items directly associated with the work, as abutments, mouths of the tunnels, etc. Additionally, measures for restoring other associated items indirectly are proposed, as loan and landfill areas, work roads and auxiliary facilities.

Information related to Sector EPD

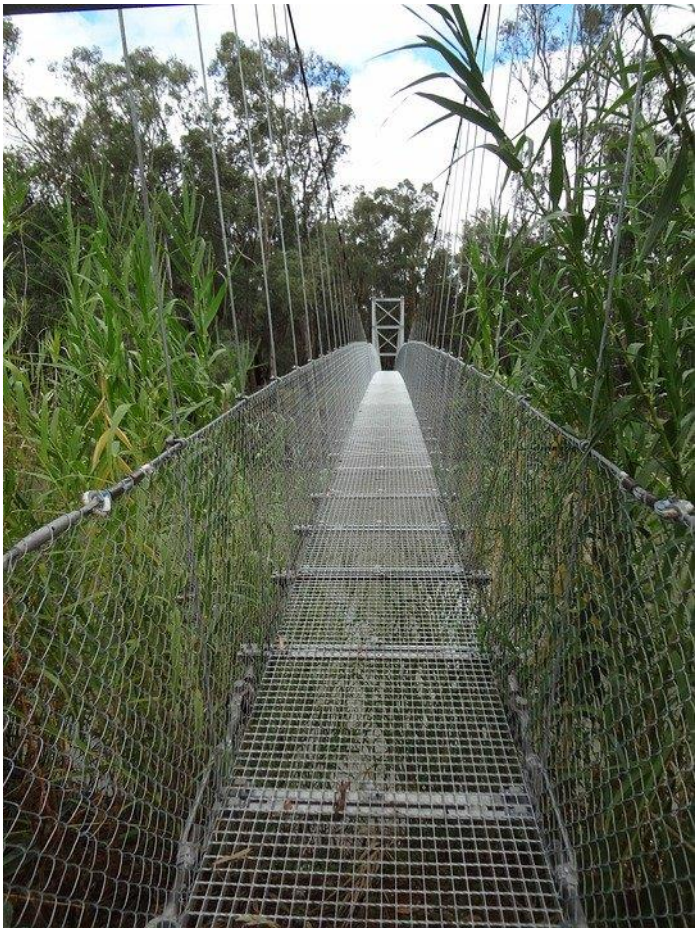
This is not a sector EPD.

Differences versus previous versions

This is the first version of the EPD®.

References

- General Programme Instructions of the International EPD® System. Version 3.01.
- PCR 2019:14. Construction Products. 2019-12-20 (version 1.0).
- CEN (2019): EN 15804:2012+A2:2019, Sustainability of construction works – Environmental product declarations – Core rules for product category of construction products.
- ISO 14040:2006: Environmental Management-Life Cycle Assessment-Principles and framework.
- ISO 14044:2006: Environmental Management-Life Cycle Assessment-Requirements and guidelines.
- ISO 14025:2006: Environmental labels and declarations-Type III Environmental Declarations-Principles and procedures.
- ISO 14020:2000: Environmental labels and declarations — General principles.
- LCA G.P. MANUFACTURAS DEL ACERO



ECO PLATFORM

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