

ENVIRONMENTAL PRODUCT DECLARATION



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

Glasspree® TS – Straight bars and stirrups

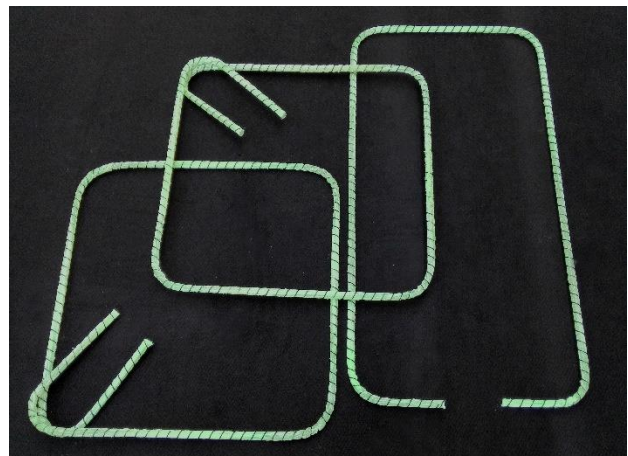
This EPD based on average results covers the following Glasspree® TS products: straight bars with diameters of 12, 16, 25, 32, 40 mm and stirrups with diameters of 20, 25 mm from



Sireg Geotech S.r.l. | www.sireggeotech.it

Programme:	International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	IES – 0016914
Publication date:	2024-10-25
Valid until:	2029-10-24

*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

EPD Programme Information

Programme:	The International EDP® 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). PCR 2019:14 Construction Products, v1.3.4 <i>UN CPC 369 "Other plastic products"</i> <i>PCR review was conducted by: Technical Committee of the International EPD ® System.</i> <i>The review panel may be contacted via info@environdec.com</i>
Life Cycle Assessment (LCA)	LCA accountability: <i>ambiente S.p.A., via Frassina 21 (Carrara)</i>
Third-party verification	Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: <input checked="" type="checkbox"/> EPD verification by individual verifier Third-party verifier: Mr. Guido Croce Approved by: The International EPD® System

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: Sireg Geotech Srl (Via del Bruno, 12, 20862 Arcore MB)

Contact: ufficiotecnico@sireg.it

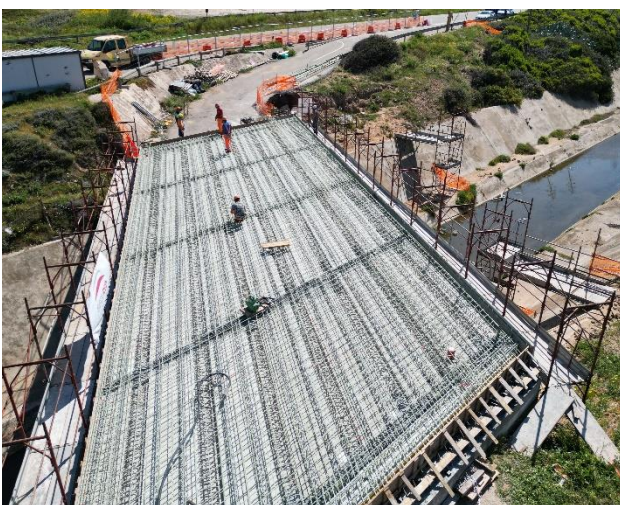
Description of the organization: Sireg Geotech is an Italian company founded in 1936, specialized in the manufacture of products and solutions for the geotechnical and civil engineering sector. Throughout its history the company has diversified its activities significantly, while consistently prioritizing the quality and efficiency of its products.

Operating from the historical plant located in Arcore (MB) and from the latest production facility in Agrate (MB), Sireg produces a wide range of thermoplastic and composite profiles used in major soil consolidation projects, underground excavations, reinforcement of concrete structures and restoration of both civil and historical buildings.

In the early 1990s Sireg pioneered the production of composite materials (FRP), using polymers reinforced with carbon, aramid and glass fibers. For over 30 years, these innovative products have been successfully used in applications like anchor bolts and diaphragm reinforcement cages for mechanized tunnel excavations (TBM) using the Soft-Eye technique, as well as in the restoration of damaged civil structures and historical monuments.

In 2009, building on its extensive experience and expertise, Sireg Geotech developed the Glasspree® TS bars, a new line of glass fiber reinforced polymer (GFRP) profiles, specifically designed for permanent applications in concrete reinforcements. Featuring greater corrosion resistance compared to steel, these rebars are ideal for use in particularly aggressive environments, such as saline ones, in areas with electromagnetic fields or where antifreeze chlorides are present. Thanks to these properties, their lifespan is estimated to exceed 100 years, significantly outlasting steel's typical 50-year durability.

Through cutting-edge R&D, collaborations with leading academic and technical institutions, and a focus on customer needs, Sireg Geotech aims at developing products that enhance the safety, resilience and efficiency of infrastructure projects worldwide. With a strong commitment to sustainability and long-term durability, the company provides the geotechnical and civil engineering sectors with innovative, high-quality solutions designed to meet the evolving needs of the industry.





Product-related or management system-related certifications: Sireg Geotech's Quality System has been certified to UNI EN ISO 9001 since 1997. For over 25 years, this has enabled the company to guarantee control of its production process, traceability of materials used in production, and compliance with all established procedures in

Name and location of production site(s): The facility where Sireg Geotech Srl manufactures the Glasspree® TS is situated in Arcore (MB)

PRODUCT INFORMATION

Product name: Glasspree® TS

Product identification: The Glasspree® TS, a product of Sireg Geotech Srl, is a designation for straight bars and stirrups fiberglass. This fiberglass reinforced polymer product line is particularly suitable for reinforcing permanent structures, making it ideal for new buildings and infrastructure in concrete reinforcement. They have a service life exceeding 100 years and require no maintenance.

In 2022 Sireg Geotech obtained the European Technical Assessment (ETA 22/0168) for the Glasspree® TS bars and stirrups for structural use based on EAD No. 260023-00-0301.

Product description: This EPD covers the following Glasspree® TS products: straight bars with diameters of 12, 16, 20, 25, 32, 40 mm and stirrups with diameters of 20, 25 mm

Product/technical characteristics:

Characteristics	Value
Density	2.00 ± 0.10 g/cm ³
Characteristic Tensile Strength	≥ 850 MPa
Modulus of Elasticity	≥ 46 GPa
Glass Transition Temperature	> 100 °C

Applications:

- Permanent concrete reinforcement
- Harbors, marinas and other structures close to seawater (corrosive and aggressive environments)
- Permanent piles and micro-piles
- Bridge slabs where the use of de-icing salt is foreseen
- Slabs for high voltage transformers
- Slabs for railway stations
- Airport runways
- Structural foundations
- Landslide stabilization close to water
- Areas where electromagnetic fields or anti-freeze chlorides are present

UN CPC code: UN CPC 369 "Other plastic products"

Geographical scope: Europe (A1-A2), Italy (A3)

PROCESS INFORMATION

PROCESS DESCRIPTION

The pultrusion process produces composite material by impregnating fibers with thermosetting resin, followed by curing. During curing the resin exhibits a rapid increase in viscosity with an exothermic reaction. Thermo-rheological control is crucial for both processability and the final properties of the material.

Pultrusion consists of pulling resins and fibers through a mold. The process begins with the reinforcement fibers being guided toward impregnation in a resin bath. The impregnated fibers are preformed and then pass through a heated mold to achieve the final shape. Heat activates the exothermic reaction in the resin, which is controlled by heating/cooling zones. Upon exiting, the material is fully cured, forming the composite. The solidified profile is continuously pulled and cut to the desired length.

CHARACTERISTICS OF PULTRUSION

- Produces linear profiles with a constant cross-section
- The process is automated and continuous
- The products have high mechanical properties and uniform qualities/quality

Correlation Table KG-M

Glasspree® TS 12	Glasspree® TS 16	Glasspree® TS 20	Glasspree® TS 25	Glasspree® TS 32	Glasspree® TS 40
226 g/m	402 g/m	628 g/m	982 g/m	1608 g/m	2514 g/m

LCA INFORMATION

Declared unit: 1 kg of finished Glasspree® TS with packaging

Reference service life: 100 years (European Technical Assessment – ETA – certification:

<https://www.sireggeotech.it/it/news/certificazione-eta/>)

Time representativeness: The LCA study, conducted in 2024, utilized input data from the calendar year 2023

Database(s) and LCA software used: Ecoinvent v3.9.1, OpenLCA v2.1, assessment EF 3.1

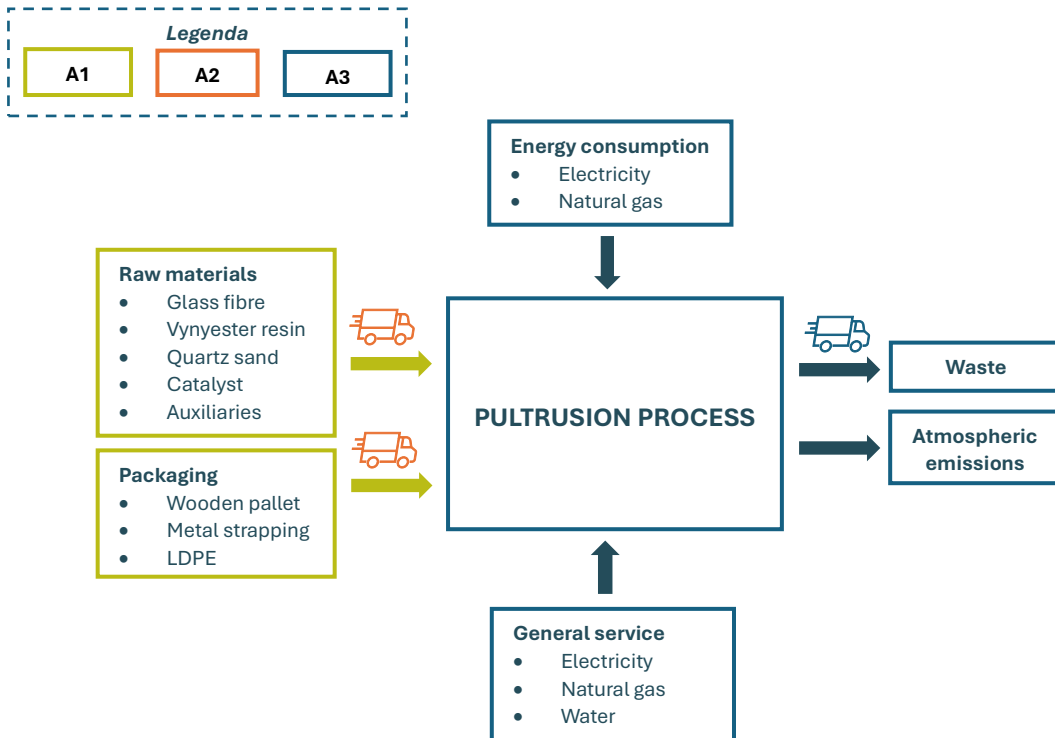
Description of system boundaries:

As per EN 15804 for all construction products and materials, modules A1-A3, modules C1-C4 and module D shall be declared. Nevertheless, products which fulfill all three of the conditions below shall be permitted to be exempt from this requirement:

- 1) the product or material is physically integrated with other products during installation so they cannot be physically separated from them at end of life;
- 2) the product or material is no longer identifiable at end of life as a result of a physical or chemical transformation process;
- 3) the product or material does not contain biogenic carbon.

According to EN 15804, the system boundary is limited to the product stage (A1-A3)

System diagram:



Following the reference standards, the following processes have been excluded from module A3: construction of company buildings and infrastructure, machinery production, staff activities, and maintenance and production of spare parts lasting more than three years.

Due to the use of the Ecoinvent database, impacts associated with the production of infrastructure and capital goods are included in modules A1 and A2.

A mass allocation approach was adopted for the impact assessment, given its better representation of the production-impact correlation.

Purchased electricity used in manufacturing process of module A3 is modeled on the 2023 Italian residual mix (AIB). Its impact is 0.669 kg CO₂eq/kWh (GWP-GHG).

More information: www.sireggeotech.it

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	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Water processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Module declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Geography	EU	EU	IT	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Specific data used	9.6% - 11.6%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	< 10%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

CONTENT INFORMATION

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Glass fibre	0.79	0%	0%
Vinylester resin	0.18	0%	0%
Quarz sand	0.03	0%	0%
Catalyst	0.01	0%	0%
TOTAL	1	0%	0%
Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Wooden pallets	0.015	1.5%	0.008
Metal strapping	0.001	0.1%	0
LDPE	0.002	0.2%	0
TOTAL	0.018	1.8%	0.008

Dangerous substances from the Candidate List of Substances of Very High Concern (SVHC):

The product does not contain any substance from the Candidate List of Substances of Very High Concern (SVHC).

RESULTS OF THE ENVIRONMENTAL PERFORMANCE INDICATORS

The results were calculated as the arithmetic average of all products included in the EPD.

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.

Mandatory impact category indicators according to EN 15804

Indicator		Unit	A1-A3
Global warming potential (GWP)	Fossil	kg CO ₂ eq.	2,73E+00
	Biogenic	kg CO ₂ eq.	6,03E-03
	Land use and land transformation	kg CO ₂ eq.	1,08E-02
	TOTAL	kg CO ₂ eq.	2,74E+00
Ozone layer depletion (ODP)		kg CFC 11 eq.	2,55E-07
Acidification potential (AP)		mol H ⁺ eq.	1,11E-02
Eutrophication potential (EP)	Aquatic freshwater	kg P eq.	4,16E-04
	Aquatic marine	kg N eq.	2,67E-03
	Aquatic terrestrial	mol N eq.	2,73E-02
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	1,07E-02
Abiotic depletion potential (ADP)*	Metals and minerals	kg Sb eq.	1,39E-05
	Fossil resources	MJ, net calorific value	4,65E+01
Water deprivation potential (WDP)*		m ³ world eq. deprived	1,11E+00

**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.*

Additional mandatory and voluntary impact category indicators

Indicator	Unit	A1-A3
GWP-GHG	kg CO2 eq.	2,72E+00

Resource use indicators

Indicator	Unit	A1-A3
PERE	MJ	1,79E+01
PERM	MJ	2,55E-01
PERT	MJ	1,82E+01
PENRE	MJ	4,20E+01
PENRM	MJ	5,69E+00
PENRT	MJ	5,69E+00
SM	kg	1,66E-01
RSF	MJ	2,47E-02
NRSF	MJ	4,00E-02
FW	m ³	2,58E-02

Waste indicators

Indicator	Unit	A1-A3
Hazardous waste disposed	kg	6,16E-02
Non-hazardous waste disposed	kg	2,85E-01
Radioactive waste disposed	kg	4,82E-05

Output flow indicators

Indicator	Unit	A1-A3
Components for reuse	kg	-1,40E-21
Material for recycling	kg	5,03E-02
Materials for energy recovery	kg	0,00E+00
Exported energy, electricity	MJ per energy carrier	0,00E+0
Exported energy, thermal	MJ per energy carrier	0,00E+0

REFERENCES

- *ISO 14040:2006 «Principles and framework»*
- *ISO 14044:2006 «Requirements and guidelines»*
- *ISO 14040:2006/AMD 1:2020*
- *ISO 14044:2006/AMD 1:2017*
- *ISO 14044:2006/AMD 2:2020*
- *UNI EN ISO 14025:2010, Environmental labels and declarations — Type III environmental declarations — Principles and procedures (ISO 14025:2006)*
- *General Programme Instructions for the International EPD® System – Version 5.0*
- *UNI EN 15804:2012+A2:2019 – Sustainability of construction works – Environmental product declarations Core rules for the product category of construction products*
- *PCR 2019:14 Construction Products, v1.3.4*
- *Studio di Life Cycle Assessment (LCA) relativo alle barre ed alle staffe GLASSPREE TS prodotte da Sireg Geotech S.r.l. – ambiente S.p.A.*