



AENOR

GlobalEPD
A VERIFIED ENVIRONMENTAL DECLARATION

Environmental Product Declaration

EN ISO 14025:2010, EN 15804:2012+A2:2019,
UNE 36904-2:2018

HDPE Sheathed Galvanized Stay Cable Strand

From:
TYCSA PSC – Grupo Celsa

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The EPD holder is responsible for the content of the Declaration. The holder is responsible for keeping the records and documents supporting the content of the Declaration.

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UNE 36904-2:2018. CEN Standard UNE-EN 15804:2012+A2:2020 serves as the core for the RCP

Independent verification of the declaration and data, according to Standard EN ISO 14025:2010

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1. General Information



1.1. The Organization

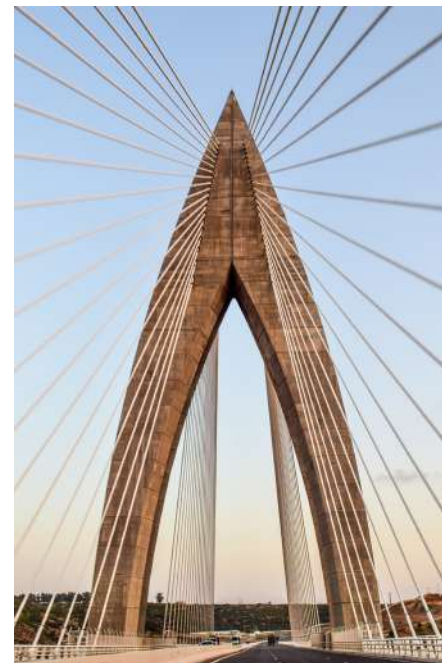
Tycsa PSC is the largest manufacturer of wires and high elastic limit steel strands for construction and the company in the sector with the largest presence in the international market, offering a long experience in manufacturing your products, with the contribution of a highly qualified human team and a global commercial presence.

Tycsa PSC began its journey in Barberá del Vallès (Barcelona) in the 1950s as one of the largest national producers of wires, strands and cables for different industrial applications, but with a strong export profile, with contact already at the time on a regular basis with different international markets.

Today, the extensive experience in combination with advanced production processes and rigorous control mechanisms make the quality of Tycsa PSC its best presentation.

Tycsa PSC is one of the Spanish steel companies that is part of the Steel Sustainability Brand, fulfilling all the objectives of this entity, which is associative and non-profit in nature.

Both the steel and the production process used to manufacture drawn products stand out for their ecological values and their recyclability compared to other products and technologies.





1.2. Scope of the Declaration

This environmental product declaration describes environmental information relating to the life cycle of the cradle-to-gate with options and modules C and D (modules A1-A3, A4, C1-C4 and D), of the seven-wire sheathed galvanized strand (P65) manufactured by Tycsa at its facilities in Santander.

The function performed by the product system studied is the **production of galvanized strand** for use in the construction sector as a construction element.

1.3. Life cycle and compliance

This EPD has been drawn up and verified according to the standards EN ISO 14025:2010, EN 15804:2012+A2:2020, UNE 36904-2:2018.

Table 1-1. Product Category Rule	
Title	Sustainability in construction. Environmental product declarations. Basic product category rules for construction products.
Register /version	UNE EN 15804:2012+A2:2020/AC:2021
Date of issue	2020-03
Administrator	AENOR

This EPD includes the lifecycle stages indicated in Table 1-2. This EPD is of the cradle-to-gate type with modules C and D.

Table 1-2. System boundaries. Information modules considered			
Production stage	A1	Supply of raw materials	X
	A2	Transportation to factory	X
	A3	Manufacturing	X
Construction	A4	Transportation to construction site	X
	A5	Installation/construction	MND
Use stage	B1	Use	MND
	B2	Maintenance	MND

Table 1-2. System boundaries. Information modules considered			
Use stage	B3	Repair	MND
	B4	Replacement	MND
	B5	Rehabilitation	MND
	B6	Energy use in service	MND
	B7	Water use in service	MND
End of life	C1	Deconstruction/demolition	X
	C2	Transportation	X
	C3	Waste treatment	X
	C4	Disposal	X
	D	Potential for reuse, recovery, and/or recycling	X

X = Module included in the LCA; NR = Not relevant module; MND = Not declared module

This EPD may not be comparable to others developed in other Programs or according to documents of different reference; specifically can not be comparable to EPDs not developed and verified according to the EN 15804 Standard.

Similarly, the EPDs may not be comparable if the source of the data is different (for example, databases), if all relevant information modules are not included or if they are not based on the same scenarios.

The comparison of construction products must be done on the same function, applying the same functional unit and at the level of the building or infrastructure, which means, including the behavior of the product throughout its entire life cycle, as well as the specifications of the section 6.7.2. of the EN ISO 14025 Standard.

1.4. Differences compared to previous versions of this EPD

This modification is issued to update the composition of the product.

2. The product

2.1. Identification of the product

This DAP applies to the P65 sheathed-coated galvanized drawn steel strand manufactured by Tycsa.

CPC Code: 4126. Cold-rolled bars, wire rod, shapes, angles and sections of iron or steel; hot-rolled, drawn or extruded angles, shapes and sections of alloy steel; steel wire.

NF A 35-035 2001

Galvanized Wire and Strand

NF A35-037-1_2021

Steel Products-Produced and sheathed high strength steel strands-General requirements

Product description	
Modulus of elasticity	195 GPa $\pm 10\%$
Elongation	$\geq 3,5\%$ w L > 500 m
Relaxation	$\leq 2,5\%$ after 1.000 h at $F_0=0.70 \times F_m$

NF A35-037-2_2021

Steel Products-Produced and sheathed high strength steel strands-Requirements for sliding protected and sheathed strands (type P)

NF A35-037-3_2021

Steel Products-Produced and sheathed high strength steel strands-Requirements for adherent protected and sheathed strands (type SC)

2.2. Composition of the product

The product for which this EPD is written has the following composition:

Material	% Weight
Wire rod steel	88-89%
Polyethylene (HDPE)	6-7%
Grease/Wax	4-5%
Zinc	3-4%

The manufacturer declares that during the product's life cycle, no hazardous substances listed in the "Candidate List of Substances of

Very High Concern (SVHC) for authorisation" are used in a percentage greater than 0.1% of the product's weight. The primary packaging used in the shipment of the product (distribution packaging) has been included in the study.

Material	Kg/ud. declared
Wood	3,49E+00
Paper	5,36E-03
Plastic	5,26E-01
Steel	1,65E+00
Others	5,62E-02

3. Information regarding the LCA

A large cable-stayed bridge with a city skyline in the background. The bridge has a tall, white, A-shaped pylon and numerous yellow cables. The city skyline includes several modern buildings. The bridge is reflected in the water below.

3.1. Life cycle analysis

The Life Cycle Assessment Report for the EPD of the 7-wire sheathed Zn-coated strand manufactured by Tycsa was prepared by Abaleo S.L. using the [Ecoinvent 3.10 database](#) and [SimaPro 9.6.0.1 software](#), which was the most up-to-date version available at the time of the LCA.

For the study, data from the Tycsa plant located in Santander (Cantabria) was used.

The LCA study follows the recommendations and requirements of international standards ISO 14040:2006, ISO 14044:2006, UNE-EN 15804:2012+A2:2020 and UNE 36904-2:2018 as RCP.



3.2. Study Scope

The scope of this ACV is the manufacture of cradle-to-door with options and modules C and D of the sheathed Zn-coated strand. Limitations of the study.

The following are not included in the LCA:

All equipment with a useful life greater than 3 years.

The construction of plant buildings and other capital assets.

Staff business travel, including staff travel to and from work.

Research and development activities.

3.3. Declared Unit

The declared unit is one tonne (1.000 kg) of product.

3.4. Reference Service Life (RSL)

The Reference Service Life (RSL) is not specified because the use stage is not included in the EPD.

3.5. Allocation criteria

In accordance with the criteria of the reference standard, the allocation of system inputs and outputs was applied based on physical properties (mass).

This allocation criterion was applied to general plant consumption (materials, fuel, water, and energy), transportation, packaging, emissions, discharges, and waste.

It has not been necessary to apply economic allocation criteria.

3.5.1. Cut-off Criteria.

The gross weight/volume of all materials used in the manufacturing process has been included in the LCA. Consequently, the criterion of including at least 99% of the total weight of the products used for the declared functional unit is met.



3.6. Representativeness, quality and selection of data.

To model the galvanized wire manufacturing process, **production data from the Tycsa plant for 2021** were used, a period with representative production data. The specific data for the galvanizing process at the TQ plant correspond to 2022, as no treatment was carried out for Tycsa in 2021.

Data were obtained on: **material and energy consumption, transportation; and waste generation.**

When necessary, the Ecoinvent 3.10 database (March 2024) was used, which was the latest version available at the time of the LCA.

For the inventory data, to model the LCA and to calculate the environmental impact categories required by the reference standard, SimaPro 9.6.0.1 software was used, which was the most up-to-date version available at the time of the study.

The following criteria were applied to select the most representative processes:

The data should be representative of the technological development actually applied in manufacturing processes. If this information is unavailable, data representative of an average technology has been chosen.

That the geographic data be as close as possible and, where appropriate, regionalized means.

That the data be as current as possible.

To assess the quality of the primary data used in the study, the semi-quantitative data quality assessment criteria proposed by the **European Union** in its **Guide to the Environmental Footprint of Products and Organizations** were applied. The results obtained are as follows:

Very good integrity. Score 1.

Good methodological suitability and coherence. Score 2.

Very good temporal representation. Score 2.

Good technological representation. Score 2.

Very good geographical representation. Score 1.

Low data uncertainty. Score 1.

According to the above data, the Data Quality Rating (DQR) takes the following value: $9/6 = 1.5$, which indicates that the data quality is excellent.

To better understand the data quality assessment carried out, it is indicated that **the score for each of the criteria varies from 1 to 5** (the lower the score, the higher the quality) and that the following table is applied to obtain the final score:

Overall data quality score (DQR)	Overall quality level of data
$\leq 1,6$	Excellent quality
1,6 a 2,0	Very good quality
2,0 a 3,0	Good quality
3 a 4,0	Reasonable quality
> 4	Insufficient quality





4. System boundaries, scenarios and additional technical information

4.1. Description of the system boundaries.

In the product system of the Life Cycle Analysis of Tycsa's galvanized strand, the following phases have been studied:

Module A1

Production of raw materials

This module includes the production process of raw materials, which considers:

Extraction of resources and raw materials.

Transportation to raw material processing/production centers.

Energy and fuel consumption during the production of raw materials.

Consumption of other resources (such as water) during the production of raw materials.

Generation of waste and emissions into the air and discharges into water and soil during the production of raw materials.

Generation of electricity and heat from primary energy resources used in the manufacturing process.

Module A2

Transportation of raw materials to the factory

The transportation of the materials used in the plant has been considered, from the production sites (suppliers) to the Tycsa PSC facilities in Santander, distinguishing the mode of transport used for each one: truck.

This stage also includes the round-trip transportation of the wire from the Tycsa facilities to the TQ plant where it is galvanized. The transportation distances have been provided by the facility managers, who know the location of their suppliers' facilities.

Module A3

Manufacturing

The different stages of production have been considered in the manufacturing process. This module considers water consumption, the production of auxiliary materials used in each stage, and the production of packaging. This stage also considers emissions to both water and air resulting from the production process, as well as the management and transportation of the waste generated. Waste transportation distances have been provided by plant managers, who are aware of the location of their waste management facilities.

Module A4

Transport to customer

Truck transportation of the plastic-coated galvanized steel strand from the Tycsa PSC production plant in Santander to the facilities where it is used has been planned. Transport distances to the customer have been provided by Tycsa PSC.

Parameter	Value (per unit declared)
Diesel in EURO 6 trucks (payload 15.79 t)	0,04357 l/tkm
Average distance by road	416,00 km
Occupancy coefficient (including empty return)	50 %*
Apparent density of the transported products	7.850kg/m³
Useful capacity factor	The variability of product formats does not allow identifying useful capacity factor.

* Percentage obtained from the Ecoinvent database

Module C1

Demolition

The LCA assumes that 100% of the steel produced was used to complement the structure of buildings.

A generic process from the Ecoinvent 3.10 database was used to represent the demolition process.

Module C2

Transportation to the waste treatment/recovery site

It is considered that, at the end of its useful life, the studied product is transported by road an average distance of 100 km to the nearest waste management point, with EURO6 trucks of 16-32 tons.

Module C3 y C4

Waste treatment, and Module C4 – Waste disposal

To determine the recycling and landfill and incineration percentages of the products studied, the criteria of Part C of Annex 2 V2.1 (May 2020) of the Circular Footprint Formula of the European Union Environmental Footprint methodology.

(COMMISSION RECOMMENDATION (EU) 2021/2279 of 15 December 2021 on the use of environmental footprint methods to measure and report the environmental performance of products and organizations throughout their life cycle) are applied.

Parameter	Value (per unit declared))
Demolition	It is considered that, during the deconstruction and disassembly process of the products studied, the consumption of material and energy are included within the framework of the building or civil works of which they are part.
Collection process, specified by type	1.000 kg. collected separately.
	0 kg collected with a mixture of construction waste.
Recovery system, specified by type	0 kg for reuse.
	756,476 kg of steel and 24,756 kg of PE for recycling
	0 kg for energy recovery..
Deletion, specified by type	60,073 kg of steel and 38,3372 kg of PE for incineration
	73,423 kg of steel and 46,900 kg of PE for final disposal.
Assumptions for scenario development (transport)	Transport of waste in a 16-32 tonne EURO6 truck:
–	Average distance of 100 km from the construction site to the management points..

Módulo D

Benefits beyond the system

The steel used in the manufacture of these products is 96.98% scrap, so module D is calculated based on the percentage of steel remaining.

Waste recovered or recycled during the product stage is not included in the system limits of this module because it represents less than 1% of the declared unit.

Stages and information modules for the evaluation of construction products. Life Cycle Information					
Life Cycle Information	A1 - 3 (Production Stage)	A1	X	Supply of raw materials	-
		A2	X	Transport	-
		A3	X	Production	-
	A4 - 5 (Construction Stage)	A4	ND	Transport	Stage
		A5	ND	Construction / installation process	Stage
	B1 a 7 (Use Stage)	B1	ND	Use	Stage
		B2	ND	Maintenance	Stage
		B3	ND	Repair	Stage
		B4	ND	Substitution	Stage
		B5	ND	Rehabilitation	Stage
		B6	ND	Energy use in service	Stage
		B7	ND	Water use in service	Stage
	C1 a 4 (End of life stage)	C1	X	Deconstruction, demolition	Stage
		C2	X	Transport	Stage
		C3	X	Waste treatment	Stage
		C4	X	Waste disposal	Stage
Additional Information	Benefits and burdens beyond the system	D	X	Potential for reuse, recovery and recycling	-

X: Assessed module. ND: Non-declared module.

4.2. Description of the manufacturing process

The production process consists of the following phases:

Pickling of wire rod

The pickling phases are as follows:

Pickling in an HCl bath:
HCl plus water.

Activation:
water plus the addition of a salt.

Phosphating:
water plus the addition of a salt.

Salt:
water plus the addition of a salt.

Drying:
using hot air blowers produced by gas combustion.

To represent the production of wire rod, the current published EPD of the supplier's wire rod has been used.

Wire drawing

Once the pickled wire rod is obtained, it moves on to the drawing process, where a distinction is made between the operations intended to manufacture:

Prestressing wire

Prestressing wire uses a drawing machine that incorporates an induction furnace, which requires a significant amount of electricity.

Post-tensioning wire

Used to manufacture strand components.

As materials to be incorporated in the process, soap powder is used here as a wire drawing lubricant.

Water is also consumed for cooling.

Galvanizing

Between the drawing stage and the stranding stage, the wire is transported to the galvanizing plant located 40 km from the Tycsa plant. The entire process is carried out here, before being returned to the Santander plant where it continues with the manufacturing stages.

Stranding

The next phase is stranding, which is the stage to form the 7-wire strand.

No products are added to the process except for the drawn wires. The main consumption is electricity, and water is used to cool the wire, as these machines also incorporate an induction furnace.

Extruding

The next phase is extrusion. In this stage, a high-density polyethylene sheath is added to protect the strand and is filled with a filler material, which can be grease or wax.

The materials used are PE, grease, or wax. The consumption is electrical.



Inlets

Wire rod.
Electricity.
Natural gas.
Hydrochloric acid.
Pickling activator.
Phosphate salts.
Salt.
Pickling additives.
Swamp water.
Soap.
Tungsten carbide dies.
Auxiliary steel elements.
Plastic caps (PVC and LDPE)
Diesel.
Lubricant/oils.
Grease.
Polyurethane foam.
Plastic coating (HDPE).
Alcohol.
Sodium hydroxide.
Lime hydroxide.
Flocculant.
Packaging (plastic and metal).
Paper.
Hypochlorite.
Cooling tower additives.

A1

Production of raw materials



A2

Transport to factory



A3

Production process of drawn steel products



A4

Transportation of the final product to the construction site.



C

End of life



D

Benefits and burdens beyond the system

Outlets

Drawn steel products
Air emissions.
Wastewater treatment in our own treatment plant.
Discharge to municipal wastewater treatment plant.
Transportation of waste to the management point.
Management of generated waste.



Production process diagram.

5. Declaration of the environmental parameters of the LCA and the LCI.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks.



Mandatory environmental indicators according to EN 15804

(reference package EF 3.1)

Indicator	A1-A3	A4	C1	C2	C3	C4	D
GWP-total	1,33E+03	6,31E+01	5,88E+01	7,69E+00	9,96E+00	9,69E+01	-8,54E+01
GWP-fossil	1,32E+03	6,31E+01	5,88E+01	7,69E+00	9,94E+00	9,69E+01	-8,54E+01
GWP-biogenic	5,01E+00	2,38E-03	0,00E+00	3,00E-04	7,30E-03	2,16E-03	-3,53E-02
GWP-luluc	4,26E+00	1,55E-03	2,02E-03	1,95E-04	9,95E-03	2,58E-04	-3,05E-02
ODP	3,42E-05	1,29E-06	9,25E-07	1,62E-07	1,06E-07	5,50E-08	-2,51E-06
AP	4,88E+00	7,36E-02	5,49E-01	9,19E-03	3,56E-02	2,64E-02	-2,68E-01
EP-freshwater	3,99E-02	5,29E-05	5,55E-05	6,67E-06	2,97E-04	1,55E-05	-2,60E-03
EP-marine	1,03E+00	1,63E-02	2,58E-01	2,01E-03	1,17E-02	1,33E-02	-5,23E-02
EP-terrestrial	1,06E+01	1,79E-01	2,83E+00	2,19E-02	1,27E-01	1,35E-01	-5,87E-01
POCP	5,74E+00	1,60E-01	8,42E-01	2,00E-02	4,03E-02	3,80E-02	-3,81E-01
ADP-minerals&-metals ¹	7,73E-02	2,09E-06	2,46E-06	2,63E-07	3,07E-06	6,59E-07	-3,03E-04
ADP-fossil ¹	3,08E+04	8,34E+02	7,74E+02	1,05E+02	1,12E+02	3,09E+01	-2,02E+03
WDP ¹	8,87E+02	3,48E-01	6,11E-01	4,38E-02	9,07E-01	1,39E-01	-3,49E+01

GWP - total (kg CO2 eq.): Global warming potential; GWP - fossil (kg CO2 eq.): Global warming potential of fossil fuels; GWP - biogenic (kg CO2 eq.): Biogenic global warming potential; GWP - luluc (kg CO2 eq.): Global warming potential of land use and land-use change; ODP (kg CFC-11 eq)Stratospheric ozone depletion potential; AP (mol H+ eq): Acidification potential, accumulated surplus; EP-freshwater (kg Peg): Eutrophication potential, fraction of nutrients reaching the final freshwater compartment; EP-marine (kg N eq): Eutrophication potential, fraction of nutrients reaching the final marine water compartment; EP-terrestrial (mol N eq)Eutrophication potential, accumulated surplus; POCP (kg NMVOC eq): Tropospheric ozone formation potential; ADP-minerals&metals (kg Sb eq): Abiotic resource depletion potential for non-fossil resourcesAPD-fossil (MJ, v.c.n): Abiotic resource depletion potential for fossil resources; WDP (m3 eq): Water deprivation potential (user) , water deprivation-weighted consumption; NR: Not relevant.

Additional environmental indicators

Indicator	A1-A3	A4	C1	C2	C3	C4	D
GWP-GHG*	3,70E-05	6,31E+01	5,88E+01	7,69E+00	9,96E+00	9,69E+01	-8,54E+01
PM	2,05E+02	3,74E-06	1,58E-05	5,95E-07	6,20E-07	3,31E-07	-3,68E-06
IRP ¹	2,29E+04	1,14E-01	6,92E-02	1,43E-02	5,73E-01	2,01E-02	-1,67E+00
ETP-fw ²	4,49E-06	2,85E+01	2,68E+01	4,04E+00	3,31E+01	2,08E+02	-2,75E+03
HTP-c ²	2,76E-05	4,40E-09	4,10E-09	5,74E-10	5,01E-08	6,65E-09	-1,01E-05
HTP-nc ²	5,76E+03	4,19E-07	5,83E-08	6,56E-08	5,57E-08	2,24E-07	-4,46E-07
SQP ²	3,70E-05	1,87E+00	1,64E+00	2,35E-01	1,06E+01	3,60E+01	-1,04E+02

GWP - GHG (kg CO2 eq.): Global warming potential excluding biogenic CO2; PM (disease incidence): Potential for disease incidence due to particulate matter emissions; IRP (kBq U235 eq): Human exposure efficiency relative to U235; ETP-fw (CTUe): Comparative ecosystem toxic unit potential - freshwater; HTP-c (CTUh): Comparative ecosystem toxic unit potential - carcinogenic effects; HTP-nc (CTUh): Comparative ecosystem toxic unit potential - non-carcinogenic effects; SQP (Pt): Soil quality potential index.

Notice 1. This impact category primarily addresses the potential impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider effects due to potential nuclear accidents or occupational exposure from radioactive waste disposal at underground facilities. The ionizing radiation potential of soil, due to radon or some building materials, is also not measured in this parameter.

Notice 2. The results of this environmental impact indicator should be used with caution, as the uncertainties in the results are high and experience with this parameter is limited.

*This indicator takes into account all greenhouse gases except the absorption and emissions of biogenic carbon dioxide and biogenic carbon stored in the product. As such, the indicator is identical to the total GWP except that the CF for biogenic CO2 is set to zero.

Resource usage indicators

Indicator	A1-A3	A4	C1	C2	C3	C4	D
PERE	3,40E+03	2,90E+00	1,70E+00	3,65E-01	1,51E+01	9,34E-01	-7,21E+01
PERM*	6,29E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	3,46E+03	2,90E+00	1,70E+00	3,65E-01	1,51E+01	9,34E-01	-7,21E+01
PENRE	3,08E+04	8,34E+02	7,74E+02	1,05E+02	1,12E+02	3,09E+01	-2,02E+03
PENRM*	4,68E+03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	3,55E+04	8,34E+02	7,74E+02	1,05E+02	1,12E+02	3,09E+01	-2,02E+03
SM	9,12E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	1,52E+01	2,14E-02	2,43E-02	2,69E-03	6,04E-02	-1,09E-01	-5,52E-01

PERE (MJ, v.c.n.): Renewable primary energy use excluding renewable primary energy resources used as feedstock; PERM (MJ, v.c.n.): Renewable primary energy use used as feedstock; PERT (MJ, v.c.n.): Total renewable primary energy use; PENRE (MJ, v.c.n.): Non-renewable primary energy use, excluding non-renewable primary energy resources used as feedstock; PENRM (MJ, v.c.n.): Non-renewable primary energy use used as feedstock; PENRT (MJ, v.c.n.): Total non-renewable primary energy use; SM (kg): Use of secondary renewable fuels; RSF (MJ, v.c.n.): Use of secondary renewable fuels; NRSF (MJ, v.c.n.): Use of non-renewable secondary fuels; FW (m3): Net use of freshwater resources; NR: Not relevant.

* Energy used as raw material is declared according to option B of PCR 2019:14 – the indicator for energy used as raw material reflects the energy used as raw material in the product and packaging, and is not subsequently transferred in a useful form to another product system.

Waste indicators

Indicator	A1-A3	A4	C1	C2	C3	C4	D
HWD	5,60E-01	5,53E-03	5,31E-03	6,96E-04	4,19E-04	4,78E-04	-3,57E-02
NHWD	4,18E+01	2,54E-02	2,26E-02	3,20E-03	8,30E-01	1,61E+02	2,07E-01
RWD	1,35E-01	7,83E-05	3,95E-05	9,86E-06	4,63E-04	1,48E-05	-1,27E-03

HWD (kg): Hazardous waste disposed; NHWD (kg): Non-hazardous waste disposed; RWD (kg): Radioactive waste disposed; NR: Not relevant.

Outflow indicators

Indicator	A1-A3	A4	C1	C2	C3	C4	D
CRU	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	4,20E-01	0,00E+00	0,00E+00	0,00E+00	7,81E+02	0,00E+00	0,00E+00
MER	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,84E+01	0,00E+00
EEE	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

CRU (kg): Components for reuse; MFR (kg): Materials for recycling; MER (kg): Materials for energy recovery; EE (MJ): Exported energy; NR: Not Relevant.

Biogenic carbon content

	Galvanized Strand
Product - Kg C/ud. declared	0
Packaging - Kg C/ud. declared	1,75

6. Additional environmental information

6.1. By-Products

The production of Tyksa strands does not generate by-products.

6.2. Indoor air emissions

The manufacturer declares that the strands studied do not generate emissions into the indoor air during their useful life.

6.3. Release to soil and water

The manufacturer declares that the studied strands do not generate emissions to the soil or water during their useful life.

6.4. Electrical mix used

The electricity mix used for the characterization of electricity for the year 2021 in Tyksa and 2022 in TQ is that of the marketing companies, obtained from the annual reports of the National Commission of Markets and Competition:

GWP mix Tyksa 2021: 258 gCO₂e/kWh.

GWP mix TQ 2022: 273 gCO₂e/kWh.

6.5. Human toxicity and ecotoxicity

The human toxicity and ecotoxicity of the studied life cycle of the Tyksa cord have been evaluated by applying the ReCiPe 2016 Midpoint (E) V1.09 /World (2010) E methodology.

The results refer to the declared functional unit, which is 1.000 kg (1 ton) of product.

Human toxicity and ecotoxicity

Indicator	A1-A3	A4	C1	C2	C3	C4	D
Terrestrial ecotoxicity	1,19E+04	1,26E+03	6,23E+01	2,07E+02	1,51E+02	6,13E+01	-9,82E+03
Freshwater ecotoxicity	7,01E+00	3,80E-01	1,30E-02	6,24E-02	3,17E-02	8,84E-02	-6,47E-01
Marine ecotoxicity	9,29E+04	4,85E+03	2,19E+02	7,92E+02	3,10E+02	4,28E+02	-2,40E+03
Human carcinogenic toxicity	4,17E+03	2,36E-01	2,91E-01	3,11E-02	2,37E+00	1,38E+01	-5,44E+01
Human non-carcinogenic toxicity	8,43E+04	3,60E+03	1,51E+02	5,88E+02	2,32E+02	2,12E+02	-9,48E+02

Terrestrial ecotoxicity (kg 1,4-DCB); Freshwater ecotoxicity (kg 1,4-DCB); Marine ecotoxicity (kg 1,4-DCB); Human carcinogenic toxicity (kg 1,4-DCB); Human non-carcinogenic toxicity (kg 1,4-DCB)



7. References

- [1] Standard UNE-EN 15804:2012+A2:2020. Sustainability in construction. Environmental product declarations. Basic product category rules for construction products.
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- [3] General Rules of the GlobalEPD Program, 2nd Revision. AENOR. February 2016.
- [4] Standard UNE-EN ISO 14025:2010. Environmental labels and declarations. Type III environmental declarations. Principles and procedures. (ISO 14025:2006).
- [5] Standard UNE-EN ISO 14040:2006/A1:2021. Environmental Management. Life Cycle Assessment. Principles and Framework. Amendment 1. (ISO 14040:2006/Amd 1:2020).
- [6] Standard UNE-EN ISO 14044:2006/A1:2021. Environmental Management. Life Cycle Assessment. Requirements and Guidelines. Amendment 2. (ISO 14044:2006/Amd 2:2020).
- [7] Life Cycle Assessment Report for the EPDs of Tycsa PSC's 7-wire galvanized strands. Written by Abaleo S.L., March 2025. Version 5.
- [8] Databases and impact assessment methodologies applied using SimaPro 9.6.0.1



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