

PULTRUSION WITH GRAPHENE

PICKS AND PROFILES FOR
LIVESTOCK FENCING



Graphenano Composites is a pioneer in the development of **composites with graphene additive**. For the **construction sector**, Graphenano has an agreement with Polymec for the manufacture and marketing of a wide range of fiberglass reinforced resin profiles doped with graphene additive.

Graphene improves traditional composites in terms of mechanical resistance, lightness, structural rigidity, protection against hydrolysis and bacteria, and greater durability of the material. A new generation of composites that opens the doors to an era of applications.

Graphenano Composites belongs to the **Graphenano group**, world leader in the industrial-scale production of graphene, while Polymec is a consolidated company with more than 30 years of experience in pultrusion technology.

RESIN AND FIBERGLASS PULTRUSION

Graphenano Composites works with **fiberglass** and thermosetting synthetic resins (polyester, vinylester and epoxy), the latter doped **with graphene additive**.

Fiberglass is a good thermal insulator, inert to acids and capable of withstanding high temperatures. Furthermore, graphene-doped resins confer more features to final composites, such as greater resistance, greater rigidity or flexibility, and anticorrosive, fireproof and self-extinguishing properties.



During the **pultrusion process**, the glass fibers wetted with the resins are carefully formed and pulled through a heated die, so that the process of polymerization and curing of the resin is produced inside.

Among its advantages over other processes, we can highlight:

- High rigidity and consistency of final products.
- Versatility of shapes, depending on the geometry of the mold.
- Custom cut of profiles. Possibility of obtaining great lengths.
- High speed and continuous manufacture.
- Good surface finish.

COMPOSMART TECHNICAL FEATURES

Our research team and commercial department ensure that the development of new products is carried out according to the demands of our collaborators and clients, always maintaining a commitment of efficiency and quality.

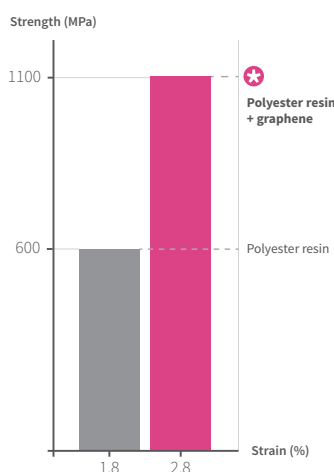
PHYSICAL PROPERTIES WITH GRAPHENE

Specific weight	1,65 / 1,85	kg/dm ³
Glass content	50 / 70	%
Water absorption	< 0,5 / 1,0	% weight
Coefficient of linear expansion	< 15 / 17	10 ⁻⁶ /°C

MECHANICAL PROPERTIES WITH GRAPHENE

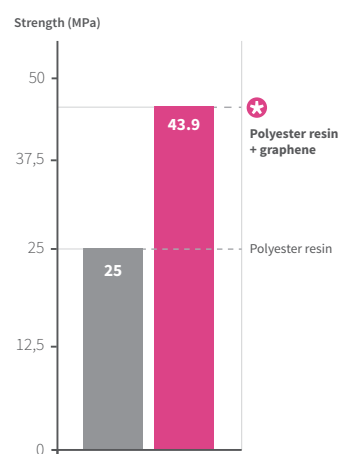
Flexural strength	1040 / 650	MPa
Tensile strength	838 / 600	MPa
Compressive strength	560 / 300	MPa
Modulus of elasticity	45000 / 28000	MPa
Resistance to impact	240 / 150	kJ/m ²
Hardness	> 50	Barcol
Interlaminar shear strength	43,9 / 22	MPa

FLEXURAL STRENGTH (PULTRUSION)



Tests according to UNE-EN ISO 14125 regulation.

INTERLAMINAR SHEAR STRENGTH (ILSS) (PULTRUSION)



Tests according to UNE-EN ISO 14130 regulation.

COMPOSMART CONTAINS GRAPHENE

CompoSmart products are altered with the addition of Graphene, thanks to which the principal mechanical properties of the commercial thermostable resins are increased.

The addition of graphene works in for all the usual production procedures in the manufacture of composites (Hand Lay-Up, RTM, Infusion Filament Winding and Pultrusion).

With the addition of Graphene, CompoSmart guarantees the following properties in their products:

High mechanical resistance

The mechanical properties of the polyester resin with graphene are similar or greater than higher cost and higher technology resins (vinylester – epoxy bisphenol A).



Greater structural rigidity

The CompoSmart profiles have a higher elasticity modulus than standard materials.

Greater durability

Resins altered with graphene have a greater durability with the same design.



Protection against hydrolysis and bacteria

Graphene has positive properties against the effects of hydrolysis and bacteria.

Lower weight, lighter

Resin altered with graphene allows for a product with a reduced weight but the same mechanical characteristics without influencing its durability.



Greater productivity

Graphene favours polymerisation, which reduces the curing time. A lower cost per metre for production, promoted in regards to the environment.

Higher traction resistance

Thanks to graphene, the ultimate tensile strength is increased by more than 30% when compared with the standard GFRP profile.



Same density

The stoichiometric mix of polyester altered with graphene does not cause changes in density or viscosity.

In addition to the general characteristics of pultrusion:

Resistant to corrosion, chemical and atmospheric agents

Suitable for every weather condition. Resistant to fertilizers, pesticides and phytosanitary agents. Prevents the appearance of virus.



Magnetically and electromagnetically transparent

Thermal and electric insulator

Magnetic insulator. Minimizes the fall of lightning.



Minimal maintenance

Greater durability and economic saving. Protection against ultraviolet radiation (UV). High resistance to water.

Made to measure



Wide range of colours according the RAL colour standard, at the request of the customer.

QUALITY CERTIFICATE

Our success comes from the quality. Our philosophy is based on the customer satisfaction. Likewise, we understand this quality is not possible without a continuous training of ours employees.

In order to attain this aim, we got ISO 9001 Certification under the international accreditation company *Bureau Veritas*.



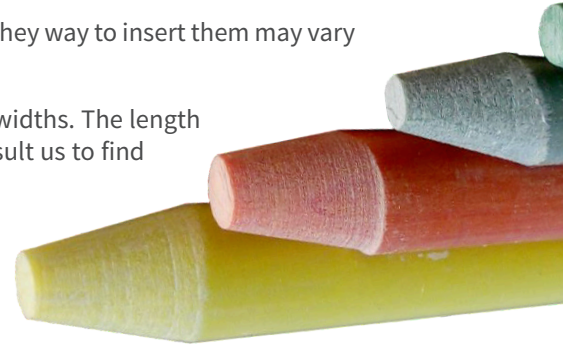
PICK FOR LIVESTOCK FENCING

FEATURES

The CompoSmart picks can be manufactured with or without a pointed end. The way to insert them may vary according to the characteristics of the ground.

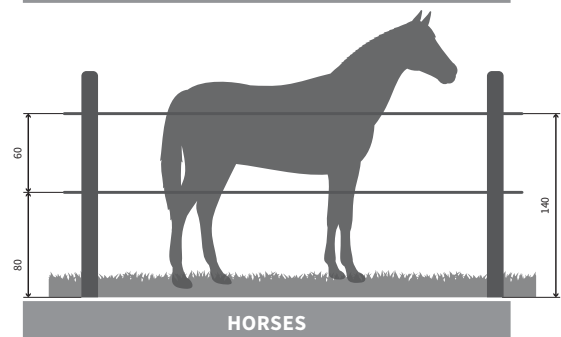
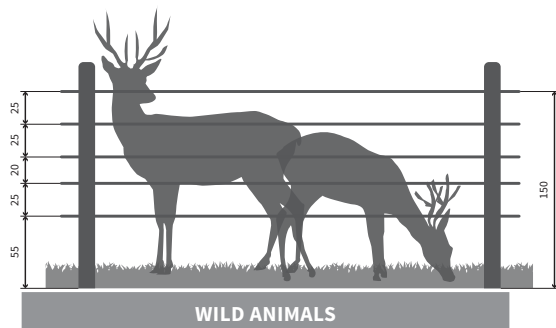
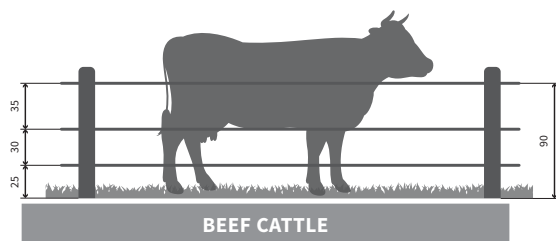
According to the needs of the client, they may come in different lengths and widths. The length may range between 1 m and 2 m, and width between 8 mm and 40 mm. Consult us to find out the ideal measures for your fences.

They are available in a wide range of colours and can be manufactured on request according to the RAL chart.



NOTE

Please be reminded that for pigs, goats, sheep, dogs and predators, 3 times more energy will be needed within the same surface, than that is required for bovine. To achieve maximum fixation, it is advised to insert the pick 15 or 20 cm into the ground.

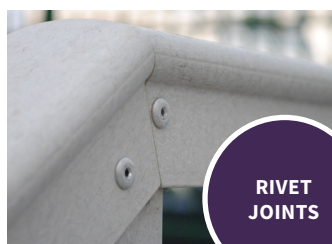


JOINING METHODS

CompoSmart products can be joined in different ways, with **screw joints**, **rivets** or with **adhesive soldering**. Graphenano Composites offer an **structural adhesive for composites**. It is a bi-component adhesive that guarantees maximum mechanical and thermal resistance as well as elasticity and is quick drying.



SCREW
JOINTS



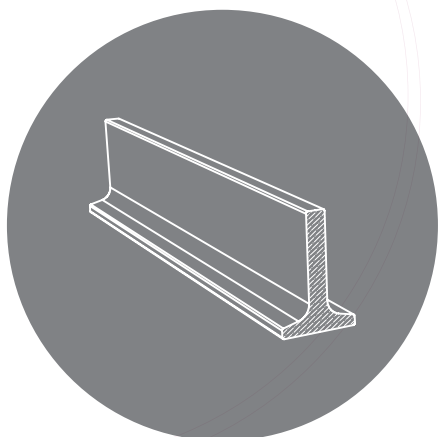
RIVET
JOINTS



ADHESIVE
SOLDERING

PROFILES FOR LIVESTOCK FENCING

*Pultrusion with **graphene***



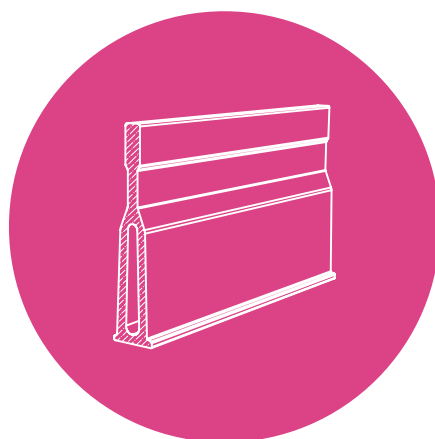
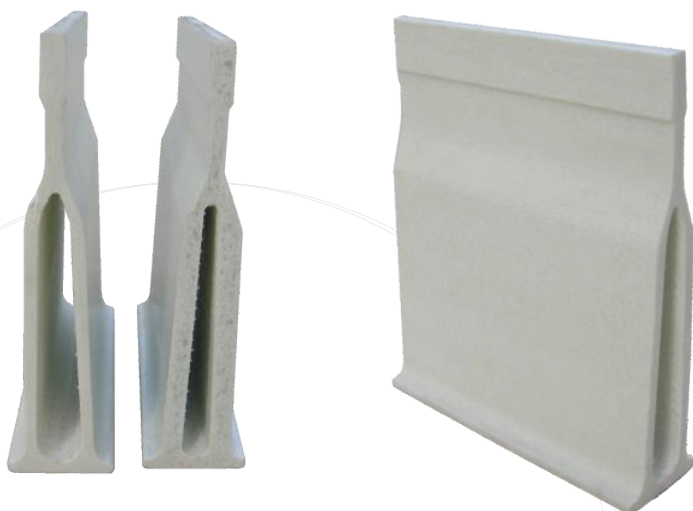
PROFILES FOR LIVESTOCK FENCING

REF	Description	g/m
G-PEV02-01	Agricultural platten de 60	800
G-PEV02-00	Agricultural platten de 120	1320
G-PEV02-02	Agricultural platten de 80	1000
G-PEV100-00	100 x 5 reinforced	915
G-PEV100-01	100 x 10 reinforced	1850

FEATURES

The CompoSmart profiles for livestock fencing can be manufactured in varying heights and measurements.

On request, the profiles can be manufactured in a range of colours according to the RAL chart.





CompoSmart

GRAPHENE COMPOSITES



graphenano
COMPOSITES

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