

powerRibs™

Art. No. 5022

235 gsm

Architecture

Fibres : Flax (EU)

Mesh size : 29.6 x 29.6 mm

Flax yarn : 3333 tex

Supporting fleece: 11.5 gsm polyester

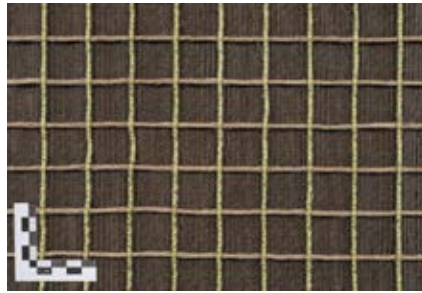
Areal weight* : 235 gsm ± 5 %

* Including polyester fleece. Valid at ambient storage conditions (22 °C, 50 %RH).

Measurements

Standards width : 1100 ± 15 mm

Standards roll length : 50 m



powerRibs™ is a natural fibre composite reinforcement engineered to significantly increase the bending stiffness of thin-walled laminates, by producing a ribbed surface structure that mimicks leaf venation for high performance and lightweight applications.

Performance and advantages

The exceptional rigidity of the powerRibs™, in combination with ampliTex™ standard fabric reinforcement, allows for a full-flax fibre laminates with the same flexural stiffness and weight of a full-carbon monolithic laminate. In combination with any fibre substrate (carbon, glass, aramid and natural fibres), they can provide a significant weight reduction compared to monolithic laminates of the same flexural stiffness within a certain performance window.

When combined with carbon or glass fibres, powerRibs™ will significantly increase damping properties and confine crack propagation in a damaged structure. Unlike carbon fibres, a full natural fibre composite with powerRibs™ and ampliTex™ has a ductile failure behaviour with blunt edges, improving safety on the road and on the track.

In vacuum infusion, they inherently improve the resin flow on the laminate surface and can replace the flow media to a large extent, significantly reducing consumables and resin waste. In autoclave processes with prepregs, they are self-ventilating and remove the need for breather or bleeder.

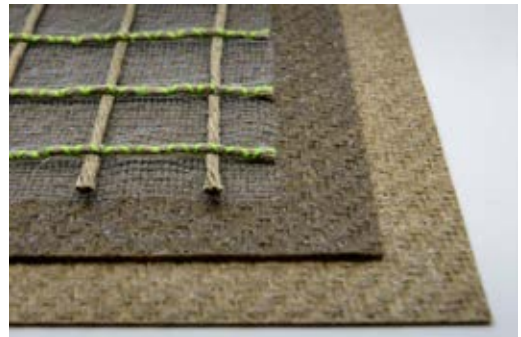
Thanks to the inherent properties of flax fibres, the powerRibs™ have a very low thermal expansion, ensuring good compatibility with carbon fibre components and tooling. Unlike carbon fibres, they also benefit from a near-total RF transparency, allowing for radio communication pathways.

Key applications

Shell structures where bending stiffness is critical.

Typical examples :

- Bodywork (bumper, fender, door, rear quarter panel, wing, small aircraft fuselage, etc)
- Dashboards, covers and other interior parts
- Structural parts (tubes, profiles) sensitive to compression buckling in axial or radial loading



Important notes

powerRibs™ are compatible with epoxy and polyester resins.

They naturally contain about 6-7 % water by weight in ambient storage conditions (22 °C, 50 %RH). When used in combination with resins that are sensitive to humidity, dry before use (example: 105 °C, 15 min).

The key to optimize the stiffening effect of the powerRibs™ lies in the creation of a ribbed surface feature. Therefore, a half-rigid mould process is required, with a flexible vacuum film, bladder or silicone that will conform to the shape of the ribs on the B-side of the laminate.

The mechanical properties of a 3D-structured powerRibs™ layer can be simulated efficiently in FEM or mechanical analysis using a virtual equivalent monolithic layer of a given thickness, modulus and density, depending on processing parameters. For information and support regarding mechanical predictions, please contact Bcomp directly.

Processing guidelines

General

To optimize their shape and maximize efficiency, we recommend not to use any extra consumable (flow media or breather/bleeder) between the powerRibs[™] and vacuum film.

To help with draping in tight features, the supporting polyester fleece can be cut without cutting the ribs themselves.

In out-of-autoclave processes, after vacuum is applied, a quick pass with a heat gun onto the vacuum film helps soften it to better adapt to the shape of the powerRibs[™], reducing resin consumption and optimizing weight. The latter is not recommended for autoclave processes, where the high pressures serve the same purpose.

Manufacturing with wet lay-up

Laminate your fabrics in the mould as usual.

Be sure that there is a little excess resin quantity on the fabrics (~250 g/m²)

Place the dry powerRibs[™] on top of the impregnated fabrics.

Place vacuum bag (flexible, self-releasing) directly on the wet lay-up, without peel-ply or flow media.

Pull the vacuum: at first the ribs act as air circulation media. Later they get impregnated with excess resin (usage of low viscosity resin is recommended).

Manufacturing with prepreg

Place your prepreg fabrics in the mould as usual.

Make sure that there is a certain excess resin quantity in the prepregs (220 g/m²). Bcomp provides specific resin-rich prepregs for this purpose. Otherwise, an additional resin film can be used.

Place the dry powerRibs[™] on top of the resin-rich prepreg lay-up.

Place vacuum bag (flexible, self-releasing) directly on the fabrics, without peel-ply or flow media.

Pull the vacuum. The powerRibs[™] act as air circulation media to help with venting. Under curing pressure and temperature, they get impregnated by the excess resin from the prepreg underneath.

It is also possible to pre-impregnate the powerRibs[™] before placing them on the prepreg.

Ask Bcomp for support on the best manufacturing method according to your needs, and check our video on how to make prepreg parts with powerRibs[™] on our YouTube channel: <https://youtu.be/YRM-XasvJlM>

Manufacturing with vacuum infusion

Place your fabrics in the mould as usual.

Place the powerRibs[™] fabric as last layer on the top of the dry laminate.

Place the vacuum bag (flexible, self-releasing) directly onto the powerRibs[™], without peel-ply nor flow media (NB: for large parts, strips of flow media may be required to infuse the part completely. Contact Bcomp for additional support on infusion.)

At this stage, we recommend shrinking the vacuum bag around the powerRibs[™] using a common heat gun to minimise bridging and reduce resin consumption.

Infuse the laminate with the resin, accounting for about 250 g/m² for the powerRibs[™].

Check our video for instructions on how to make infusion parts with powerRibs: <https://youtu.be/tM-p6u28tnM>

Manufacturing with bladder inflation molding

Place dry or pre-impregnated powerRibs[™] over the elastic bladder.

Place the substrate fabrics over the powerRibs[™]. If the powerRibs[™] are placed dry, use excess resin in the fabrics.

Place bladder and fabrics in the mould.

Inflate the bladder and cure the resin. If the ribs were placed dry, the excess resin in the fabric impregnates them.