



At a glance

Biaxial Glass Fabric 450 g/m² is a high-quality E-glass reinforcement consisting of two layers of continuous glass fibres oriented at +45° and -45° relative to the longitudinal direction of the fabric.

The fibre layers are held together by polyester stitching yarn. This construction keeps the reinforcing fibres virtually straight, unlike traditional woven glass fabrics.

The material is particularly suitable for composite structures subjected to shear forces and torsional loads.

It is compatible with epoxy, polyester and vinyl ester resins and can be processed using hand lay-up, wet bagging and vacuum infusion techniques.

The fabric is available in a full roll width of 127 cm and as narrow reinforcement tapes in widths of 12.5, 15 and 21 cm.

Applications

Biaxial Glass Fabric 450 g/m² is suitable for a wide range of applications, including:

- Boatbuilding and marine repairs
- Structural composite reinforcement
- Reinforcing hulls, decks and other structural components
- Reinforcing corner joints and fillets
- Reinforcing frames, ribs and bulkheads
- Repairing cracks and damaged laminates
- Reinforcing seams and joints
- Manufacturing sports equipment
- Model making and prototyping
- Laminating curved and complex surfaces

The full-width fabric is suitable for larger surfaces and structural components. The narrow reinforcement tapes are particularly suitable for local reinforcements, corner joints and narrow structural elements.



Properties

- Biaxial fibre orientation of +45°/-45°
- Manufactured from E-glass fibres
- Continuous, virtually straight reinforcing fibres
- Fibre layers joined with polyester stitching yarn
- Good resistance to shear loads
- Suitable for structures subjected to torsional loads
- Good impregnation properties with suitable resins
- Suitable for hand lay-up and vacuum processing techniques
- Available in various widths

The mechanical properties of the finished laminate depend on the resin system, fibre orientation, laminate construction and processing conditions.



Technical data

General properties

Property	Value
Type	Biaxial glass fabric
Material code	EBX450
Glass fibre type	E-glass
Fibre orientation	+45° / -45°
Angle tolerance	±1°
Commercial weight class	450 g/m ²
Nominal total areal weight	464 g/m ²
Areal weight tolerance	±3%
Construction	Stitched multiaxial fabric (NCF)
Stitching type	Chain stitch
Stitching yarn	Texturised polyester
Compatible resins	Epoxy, polyester and vinyl ester

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Polyestershoppen BV
Oostbaan 680
2841 ML Moordrecht
The Netherlands
tel: +31 (0)85-0220090
info@polyestershoppen.com



Material construction

The fabric consists of two layers of continuous glass fibres oriented at +45° and -45°. The layers are joined together using fine polyester stitching yarn.

Component	Areal weight
E-glass fibres +45°	228 g/m ²
E-glass fibres -45°	228 g/m ²
Polyester stitching yarn	8 g/m ²
Total	464 g/m²

The nominal total areal weight is 464 g/m² with a tolerance of ±3%.

The commercial product designation of 450 g/m² refers to the weight class of the glass reinforcement.



Glass fibre specifications

Property	Value
Glass fibre type	E-glass
Roving type	PPG Roving 2002 or equivalent
Roving linear density	300 tex
Filament diameter	14 µm
Glass fibre density	2.59–2.62 g/cm ³
Roving binder content	0.55–0.65% (nominal)
Tensile strength	1,900–2,400 MPa
Tensile modulus	69–76 GPa
Elongation at break	3.5–4%
Test method for tensile properties	ASTM D2343

The stated mechanical properties are derived from the glass fibre manufacturer's specifications and were determined using resin-impregnated rovings.

These values describe the properties of the individual reinforcing fibres and must not be regarded as guaranteed mechanical properties of the finished laminate.

Actual laminate properties depend on factors including the resin system, fibre orientation, fibre volume fraction and processing method.



Dimensions

Version	Width
Full-width fabric	127 cm
Reinforcement tape	12.5 cm
Reinforcement tape	15 cm
Reinforcement tape	21 cm

The standard width of the original fabric is 1,270 mm $\pm$ 10 mm.

The narrow reinforcement tapes are manufactured by machine-cutting the full-width base material to the required width. As a result, all versions have the same material construction and technical properties.

Available roll lengths depend on the selected version and packaging.



Resin consumption and laminate thickness

The required resin consumption and final laminate thickness depend on the processing technique used.

During hand lay-up, more resin generally remains in the laminate than when vacuum processing techniques are used. This results in a greater laminate thickness and a lower fibre volume fraction.

Indicative values by processing method

Processing method	Resin consumption	Laminate thickness
Hand lay-up	Approx. 415 g/m ²	Approx. 0.59 mm
Wet bagging	Approx. 193 g/m ²	Approx. 0.37 mm
Vacuum infusion	Approx. 198 g/m ²	Approx. 0.36 mm

The stated values are indicative for one layer of biaxial glass reinforcement under typical processing conditions.

Actual resin consumption and laminate thickness depend on factors including the resin system, amount of resin applied, laminate consolidation and vacuum pressure.

When calculating the required quantity of resin, additional consumption due to substrate absorption, processing materials, application losses and resin remaining on tools must also be taken into account.



Fabric weight and resin consumption per linear metre

The following table shows the calculated dry fabric weight and indicative resin requirement per linear metre when using hand lay-up.

Width	Dry fabric weight	Resin consumption
12.5 cm	Approx. 58 g/m	Approx. 52 g/m
15 cm	Approx. 70 g/m	Approx. 62 g/m
21 cm	Approx. 97 g/m	Approx. 87 g/m
127 cm	Approx. 589 g/m	Approx. 527 g/m

The dry fabric weight is calculated using 464 g/m². Resin consumption is calculated using 415 g/m² for hand lay-up.

The stated values are theoretical guidelines.



Application instructions

General

Ensure that the substrate is suitable, clean and properly prepared.

Use an epoxy, polyester or vinyl ester resin system suitable for the intended application and processing method.

Refer to the Technical Data Sheet of the resin system used for the correct mixing ratio, working time, application temperature and curing conditions.

Fibre orientation

Fibre orientation has a significant influence on the mechanical properties of the finished laminate.

In Biaxial Glass Fabric 450 g/m², the reinforcing fibres are oriented at +45° and -45° relative to the longitudinal direction of the roll.

This fibre orientation is particularly suitable for carrying in-plane shear loads and improving resistance to torsion.

For structures subjected to high loads in the longitudinal or transverse direction, it may be necessary to combine biaxial glass reinforcement with materials having other fibre orientations, such as 0°/90° or unidirectional reinforcements.

For structurally critical applications, the laminate construction should be designed according to the expected loads.

Hand lay-up

Apply a layer of suitable laminating resin to the prepared substrate.

Place the glass reinforcement into the wet resin and carefully impregnate the material using a suitable laminating roller, brush or spreader.

Ensure that all fibres are fully saturated with resin. Avoid dry areas and unnecessary excess resin.



Use an air-release roller to remove trapped air and consolidate the laminate.

Apply additional layers in the same manner, if required.

For hand lay-up, the indicative resin consumption is approximately 415 g/m², with an expected laminate thickness of approximately 0.59 mm per layer.

Wet bagging

Biaxial Glass Fabric 450 g/m² is suitable for processing using the wet bagging technique.

With this method, the glass reinforcement is first impregnated with resin, after which the wet laminate is enclosed in a vacuum bag.

Vacuum pressure consolidates the laminate and allows excess resin to be removed. This can result in a higher fibre volume fraction compared with conventional hand lay-up.

For wet bagging, the indicative resin consumption is approximately 193 g/m² and the laminate thickness is approximately 0.37 mm per layer.

The final values depend on the resin system, processing materials and applied vacuum pressure.

Vacuum infusion

The glass reinforcement is also suitable for processing using vacuum infusion.

With this method, the dry fabric is placed in the mould and compressed under a vacuum bag. A suitable infusion resin is then drawn through the fibre reinforcement.

A properly designed infusion process can produce a laminate with a relatively high fibre volume fraction and controlled resin distribution.

The indicative resin consumption is approximately 198 g/m², with a laminate thickness of approximately 0.36 mm per layer.

Actual results depend on factors including resin viscosity, vacuum pressure, infusion setup and permeability of the reinforcement.



Processing reinforcement tapes

The narrow reinforcement tapes are particularly suitable for reinforcing corners, seams, ribs, frames and other local joints.

The tapes are machine-cut from the full-width fabric and have the same fibre construction and material properties as the full-width version.

For corner joints, it is recommended to first round off sharp internal corners by creating a suitable fillet using thickened resin.

Then apply the reinforcement tape and fully impregnate it with resin.

Carefully consolidate the material and remove trapped air.

Depending on the required reinforcement, multiple layers of reinforcement tape can be applied.

Safety and personal protection

Glass fibres may cause mechanical irritation to the skin and eyes upon direct contact.

Wear suitable gloves, safety glasses and protective clothing when cutting and processing glass reinforcement materials.

Dust may be generated when cutting, sanding or mechanically processing glass fibre materials. Avoid inhaling this dust and use suitable dust extraction and respiratory protection where necessary.

When working with synthetic resins, the safety instructions for the resin system used must also be followed.

Consult the latest Safety Data Sheets (SDS) for the relevant resin and hardener.



Storage and handling

Store the glass reinforcement in a dry, clean environment, preferably in its original packaging.

Protect the material against moisture, dust, dirt and mechanical damage.

Avoid unnecessary folding, crushing or deformation of the fabric to preserve the fibre structure.

Inspect the material for damage and contamination before use.