

# GREENBOATS FABRICS

## Natural Reinforcement Fabrics for Sustainable Composites.

### Introduction

GREENBOATS FABRICS are reinforced textiles based on natural raw materials such as flax fibers, specially developed for fibre reinforced polymer composite applications. The fabric can be used with a variety of resins for vacuum infusion, resin transfer molding (RTM), compression molding, prepreg, and more.

GREENBOATS FABRICS offer high performance and ease of processing, but have a significantly lower environmental impact compared to synthetic fibers. The Fibres we are using are grown in France and Belgium. Production of Flax has a negative impact on global warming due to the CO2 sequestration during its growth.

GREENBOATS FABRICS use high quality twist-free flax fibre rowings to ensure a high level of fibre orientation and associated performance. The fabrics are suitable for a wide range of structural and semi-structural applications in industries such as automotive, construction, marine, sports and consumer goods.

### Sustainability

For the Supply Chain of our Fabrics, the below data reflects all currently available information. We are in close exchange with our suppliers and regularly review and if necessary update the information. The main impact for the transformation of the agricultural products into technical fabrics lays in the manufacturing of the roving, which requires water and energy. Overall, the environmental impact of producing flax reinforcements is approx. 70% lower than that of manufacturing equivalent glass reinforcements. This is reflected in the GWP Value: it is 0,48kg CO2e for a Kg of Flax fabrics compared to 2,9kg CO2e for a Kg of glass fabric.

Impact category	Unit	Agriculture	Flax straw	scutched	hackled	Roving	fabric	Glass fabric
Abiotic depletion	kg Sb eq	3,6E-06	3,7E-06	3,8E-06	3,7E-06	4,1E-06	4,2E-06	1,2E-05
Abiotic depletion (fossil fuels)	MJ	1,1E+00	1,5E+00	1,5E+00	2,1E+00	1,2E+01	1,5E+01	4,4E+01
Global warming (GWP100a)	kg CO <sub>2</sub> eq	9,8E-02	1,4E-01	1,4E-01	1,7E-01	4,2E-01	4,8E-01	2,9E+00
Ozone layer depletion (ODP)	kg CFC-11 eq	1,3E-08	1,5E-08	2,2E-08	8,1E-08	2,8E-07	3,2E-07	4,8E-07
Human toxicity	kg 1,4-DB eq	5,3E-02	7,2E-02	7,6E-02	8,6E-02	2,1E-01	2,3E-01	2,3E+00
Marine aquatic ecotoxicity	kg 1,4-DB eq	1,4E+02	2,2E+02	2,2E+02	2,3E+02	4,3E+02	4,7E+02	4,1E+03
Terrestrial ecotoxicity	kg 1,4-DB eq	2,1E-03	2,2E-03	2,3E-03	2,4E-03	3,3E-03	3,5E-03	5,3E-03
Photochemical oxidation	kg C <sub>2</sub> H <sub>4</sub> eq	2,3E-05	3,4E-05	3,5E-05	4,3E-05	1,7E-04	2,0E-04	7,8E-04
Acidification	kg SO <sub>2</sub> eq	4,6E-04	6,8E-04	6,9E-04	8,3E-04	2,4E-03	2,8E-03	1,8E-02
Eutrophication	kg PO <sub>4</sub> <sup>3-</sup> eq	6,7E-04	7,6E-04	7,7E-04	7,8E-04	1,1E-03	1,2E-03	4,4E-03
Water consumption	m <sup>3</sup>	1,3E-03	2,3E-03	2,5E-03	3,1E-03	8,3E-03	9,1E-03	2,7E-02
Non renewable, fossil	MJ	1,1E+00	1,6E+00	1,6E+00	2,2E+00	1,3E+01	1,6E+01	4,8E+01

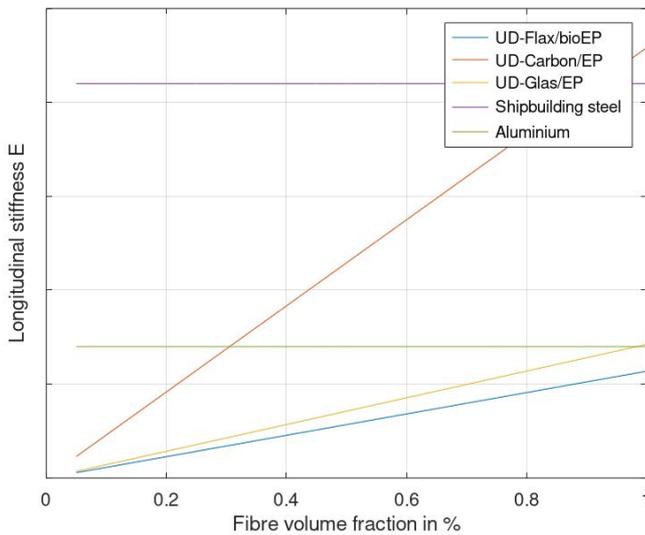
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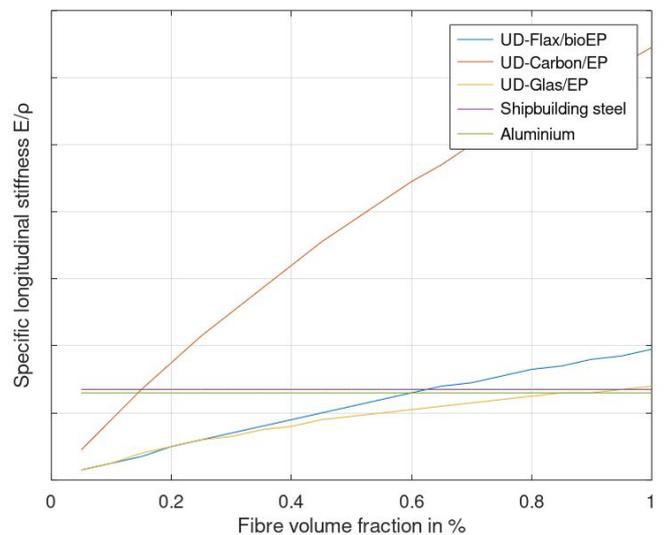
### Composite Properties

Choosing the optimal combination of materials and processes for the requirements of your product, will allow you to create a superior combination of relative price/ costs, performance and sustainability. In the following an overview of how GREENBOATS Flax reinforcement fibres compare with other materials.

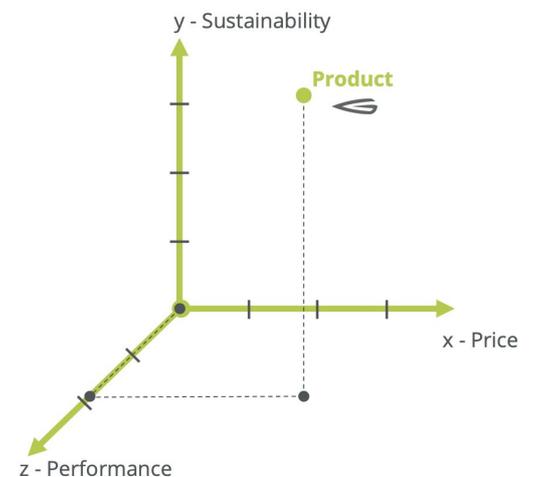
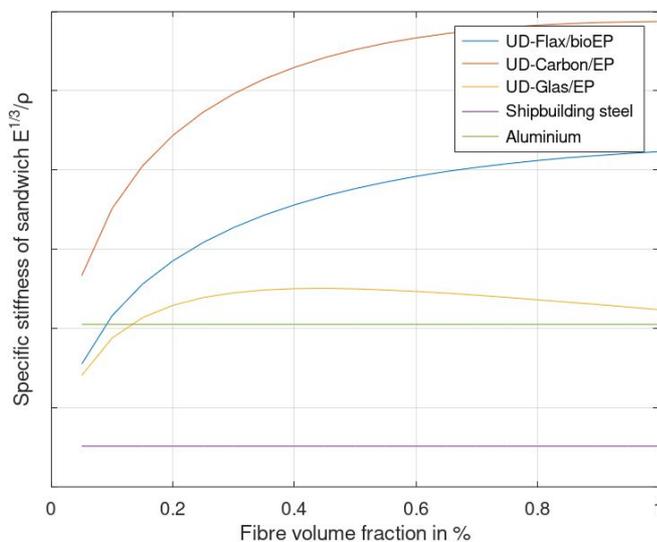
Absolute Values



As a Laminate



As a Sandwich Structure



\*All Flax Data based on empirical tests by GREENBOATS. Rest adapted from Verpoest & Baets, 2012.

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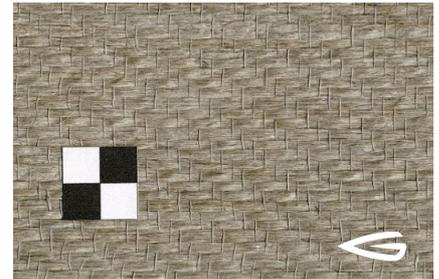
### Product Overview

We use a variety of Fabrics in our production. The below are the fabrics we use most often and therefore also usually have on stock. Please get in touch for additional information. Next to Fabrics we also offer ready to use Sandwich Panels as well as Custom Components (see images below).

### GB-UD 200g/m<sup>2</sup> & 300g/m<sup>2</sup>

Unidirectional Fabrics. Ideal for specific Fibre Orientation.

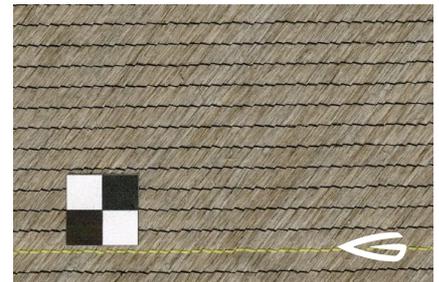
[Request Technical Product Data Sheet for additional information.](#)



### GB-BIAX (+/-45) 400g/m<sup>2</sup> & 600g/m<sup>2</sup>

Ideal for cost-efficient production of structural composites.

[Request Technical Product Data Sheet for additional information.](#)



### GB-WOVEN(+/-90) 350g/m<sup>2</sup>

Ideal as Design/ Finishing Layer.

[Request Technical Product Data Sheet for additional information.](#)

