LAMILUX Composites

High-Tech Materials for the Markets of the Future

Customized Intelligence
Dem Kunden dienen als Programm

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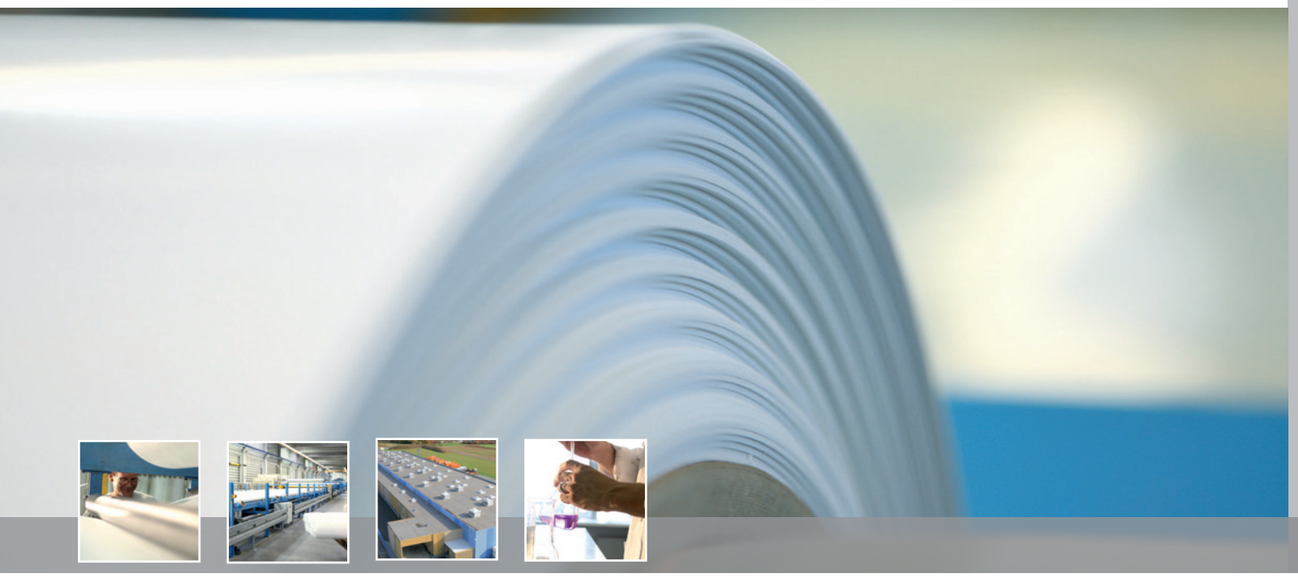
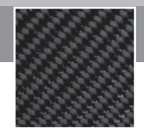
High-Tech Materials for the Markets of the Future





LAMILUX Composites is Europe's leading developer and manufacturer of fibre-reinforced plastics.

With knowledge and experience from over 60 year in plastics manufacturing, we produce panels and sheeting from high-strength and sturdy, yet very light fibre-reinforced materials on four production lines.

These high-performance and individually adaptable high-tech materials are used in industrial areas including the transport, logistics, automotive and construction sectors.

The high quality and the ideal adaptation of material properties to the fields of application have secured LAMILUX Composites a leading position in the international composites market for many years.

The LAMILUX CI Philosophy

Customer value is the reason for our existence and is the focus of our activities. This requires harmony, identity and a balance between customer value and company strategy.

These guiding ideas for our company's actions and our day-to-day relationship with our customers are described in LAMILUX's company philosophy:

"Customized intelligence – serving the customer is our mission
This requires outstanding performance and leadership in all areas relevant to customers, particularly in the role of:

- Quality leader - optimum benefit for customers
- Leader in innovation - at the cutting edge of technology
- A leader in service - fast, uncomplicated, reliable and friendly
- A leader in expertise - optimum sales and technical consultation
- Leader in solving problems - individual, tailor made solutions

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Numerous material properties – numerous material benefits

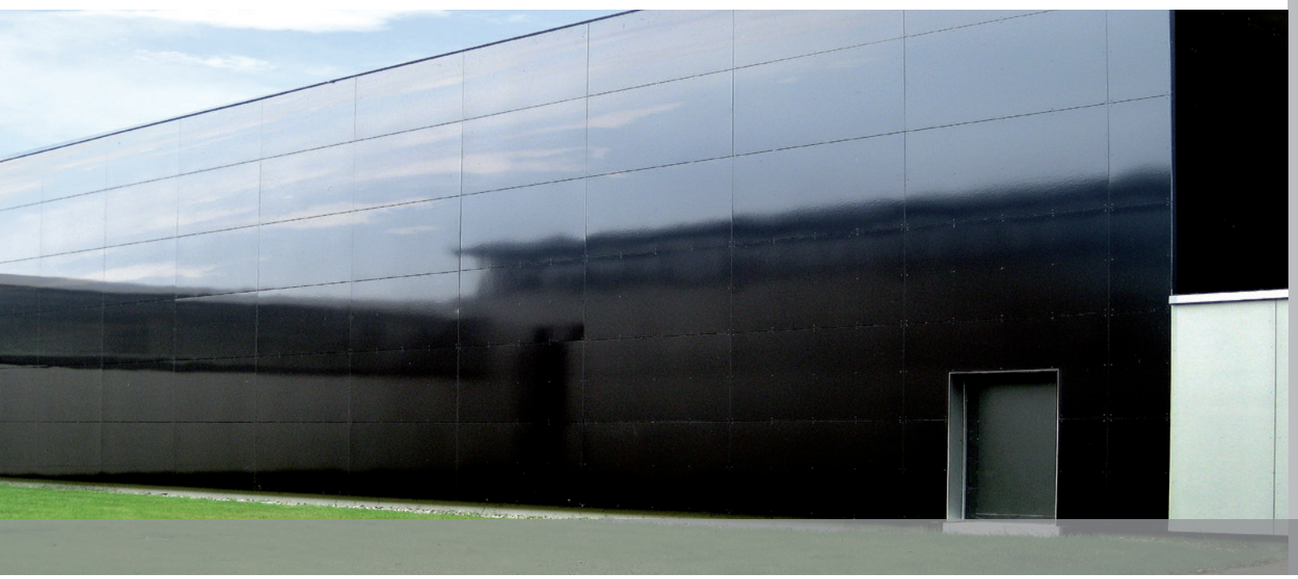
LAMILUX Composites are ground-breaking construction materials in expanding industries like energy-efficient mobility, safe haulage of foodstuffs, hygienic foodstuff preparation and aesthetic-functional construction. Whether it involves a low weight with high resistance, non-porous and easy-to-clean surfaces or good thermal insulation values and low thermal expansion – LAMILUX Composites combine numerous beneficial material properties into individually tailored glass or carbon fibre reinforced plastics.

Unique production process – unique quality

Four flat sheet production lines of over one hundred metres each produce the LAMILUX Composites in a continuous production process. Due to the high level of automation, which guarantees reproducible manufacturing of the different material variants at all times, the plants are the most advanced of their type in Europe. The high production standards are assured through consistent quality management throughout the entire production process. In addition to the monitoring which accompanies the process, this also includes intensive laboratory-based incoming raw material and output material inspections.

LAMILUX façade panels made of fibre-reinforced plastic

Creative leeway for custom tailored external skins of buildings



From the functional building to prestigious architecture

Ventilated project façades made of fibre-reinforced plastic sheets are setting a new trend in contemporary architecture: They lend visual flair to functional buildings, turning them into attractive, prestigious buildings.

Architects and builders can individually tailor façade skins with fibre-reinforced plastic sheets on the basis of aesthetic ideas and object-specific building characteristics.

LAMILUX produces the facing sheets in a wide variety of versions according to requirements: The numerous possibilities with respect to colouring and sheet dimensions provide for creative leeway in order to ideally adapt the façade's appearance to the building characteristics.

In the course of continuously increasing demands on the energy efficiency of buildings, LAMILUX façade panels make a major contribution to thermal insulation with the realisation of ventilated project façades.

The outstanding quality of the LAMILUX façade panels is exemplified first and foremost by the physical and chemical material properties.

The GRP specially developed for outdoor areas is highly resistant to UV, weathering and frost. This also guarantees that the colour is non-fading and extremely durable. In addition, the sturdy sheets with fire protection classification B2 provide excellent protection against driving rain.

Appearance and design

- Wide variety of colouring options ranging from translucent to complete colour saturation
- Realisation of striking backlighting effects, high-contrast plays of colours or muted, consistent colouring of façade surfaces
- Variable façade appearance with changing LED colour compositions
- Elegant, brilliant outer surface structure
- Creative leeway with various element dimensions and low sheet weight
- Variety of colours in standard and custom shades

Efficiency and function

- Rapid implementation of ventilated project façades on a filigree joint framing construction
- Energy efficiency through low thermal conductivity
- Solid and extremely resistant to frontal force effects and hail
- Long-lasting UV and weathering resistance thanks to a gelcoat surface sealing
- DIBt approval in fire protection class B2
- Simple material preparation
- Easy to clean and polish

Fibre-reinforced plastics in refrigerated warehouses, cold stores and sanitary facilities

Ideal protection in a hygienic environment

The food industry has an enormous responsibility: Absolutely flawless protection of our foodstuffs must be guaranteed in production and storage. Particular care is required when handling fresh and frozen goods in refrigerated warehouses and cold stores.

LAMILUX fibre-reinforced composites are leading the way in food safety.

With fibre-reinforced composites as face sheets on walls in refrigerated warehouses, cold stores and sanitary rooms, you can

- create smooth and easy-to-clean surfaces.
- provide extremely hygienic, food-safe walls.
- benefit from exceptional performance in heat-insulating, corrosion-free sandwich composite systems which offer optimum insulation and resistance to damp and chemical attacks.

Advantages

- Lightweight, yet highly resistant and sturdy
- Low tendency to deform and no dents in the event of mechanical impact
- No corrosion
- Personalised colours from the full RAL and NCS ranges or in customer-specific shades
- Easy to repair if damaged or scratched
- Also available and easy to process in large widths up to 3.20 metres

Flexible materials for flexible construction

Fibre-reinforced plastics in mobile units

Whether it involves temporary room solutions for construction sites, offices and sanitary containers, flexible housing units or individual modular buildings for daycare centres and schools: Project-based room mobility can only be realised with materials which have versatile physical and chemical properties. Fibre-reinforced plastics produced in sheets are construction materials in high demand for mobile units, modular housing and agricultural buildings.

Available in several product variants, LAMILUX is the ideal material available for wall elements which set up quickly both indoors and outdoors or for mobile room units.

- Since the entire spectrum of colours is available in all RAL, NCS and customer-specific shades, very unique spaces can be designed, which can be harmonically adapted to existing architecture in the surroundings – e.g. as modular systems.
- The smooth and easy-to-clean wall surfaces in the indoor area are setting new standards for cleanliness and hygiene.
- The cover layers of the sandwich construction made of fibre-reinforced plastics have an extremely stabilising effect and ensure a very sturdy construction even for temporary room solutions.

Further applications in the building industry


Clarification plants

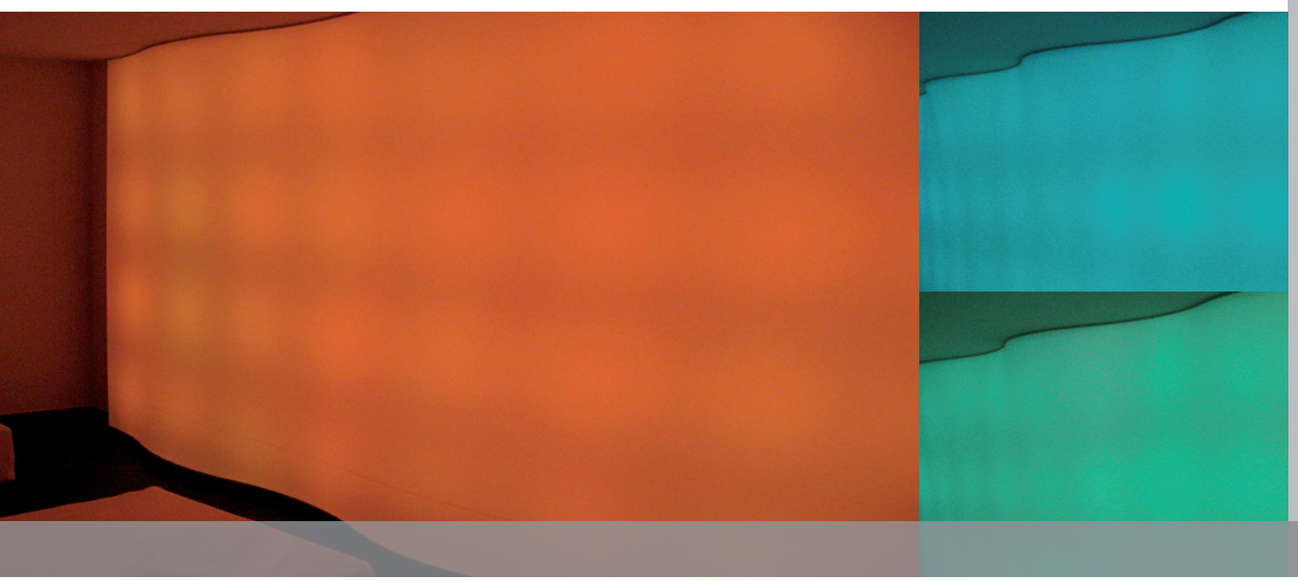

Wall cladding


Door panels


Agricultural buildings

Fibre-reinforced plastics in trade fair stand construction

Solid, yet elegant design



Creating accents with high-performance materials

Fibre-reinforced plastics provide visual accents in the construction of trade fair stands.
In this application they distinguish themselves as expressive and visually pleasing design elements.
The breadth of variants and the stability make this easy-to-process material ideal for design-oriented temporary structures.

The broad pallet of materials is accentuated with various surface structures and degrees of lustre. The variety of colours, including all RAL and NCS shades, as well as shiny metallic and customer-specific colours, also enhances the creative leeway. Translucent material variants have a particularly striking effect and can be used to achieve attractive backlighting effects.

Premium material for sheen and perfection

- Entire colour spectrum possible, from translucent to completely saturated
- High-quality appearance
- Fibre-structured, matte or glossy surfaces
- Sturdy and highly resistant with a stabilising effect on the entire structure
- High degree of flexibility and good flexural properties
- Easy material preparation
- DIBt approval in fire protection class B
- Easy to clean

Fibre-reinforced plastics for the sports industry

Along with the customer and application-based development and production of its composites, LAMILUX is opening up entirely new application possibilities.

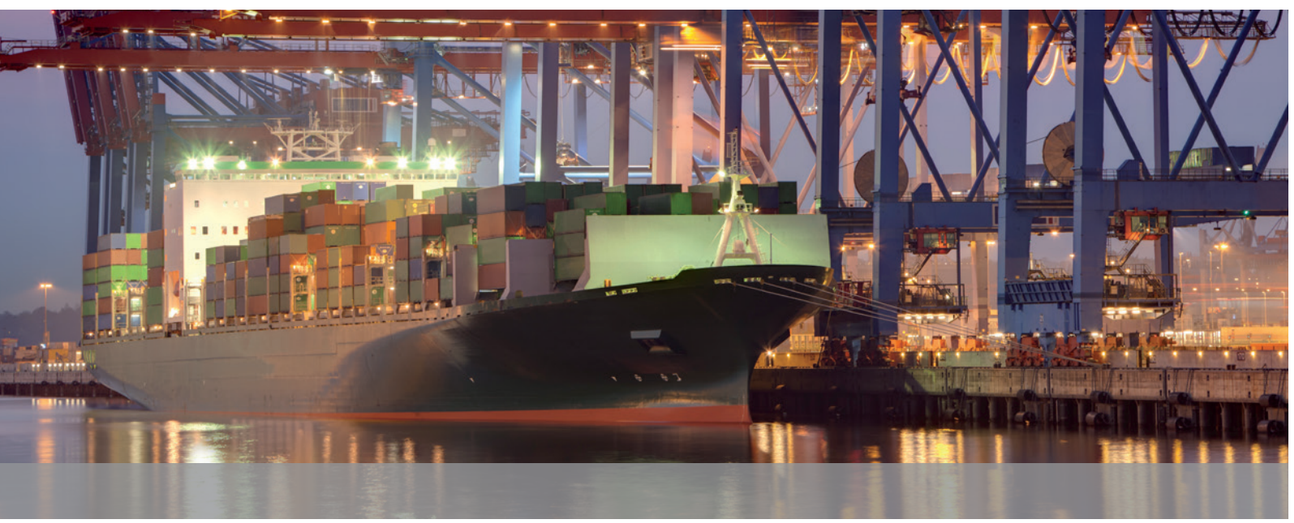
From the initial idea to the final product, LAMILUX pursues the objective of creating and offering very innovative, personalised industry solutions with a wide range of advantages over the materials employed up until now.

With these product developments, LAMILUX solidifies its reputation as an innovative force. For example, the material LAMILUX High Strength X-treme is opening up new fields of application in areas of the sports industry

LAMILUX High Strength X-treme is extremely well-suited as a sturdy yet very flexible component in the sandwich construction of snowboards and wakeboards. The plastic LAMILUX X-treme is also integrated into other sports equipment.

Worldwide service and fast distribution

With local contact partners always available and its fast international distribution, LAMILUX is an industry leader in delivery reliability. This is partly thanks to our long-time experience in worldwide shipping and the logistical know-how of our customer-oriented sales team. In addition, the large production capacities of the four flat sheet production lines assure short-term material production.

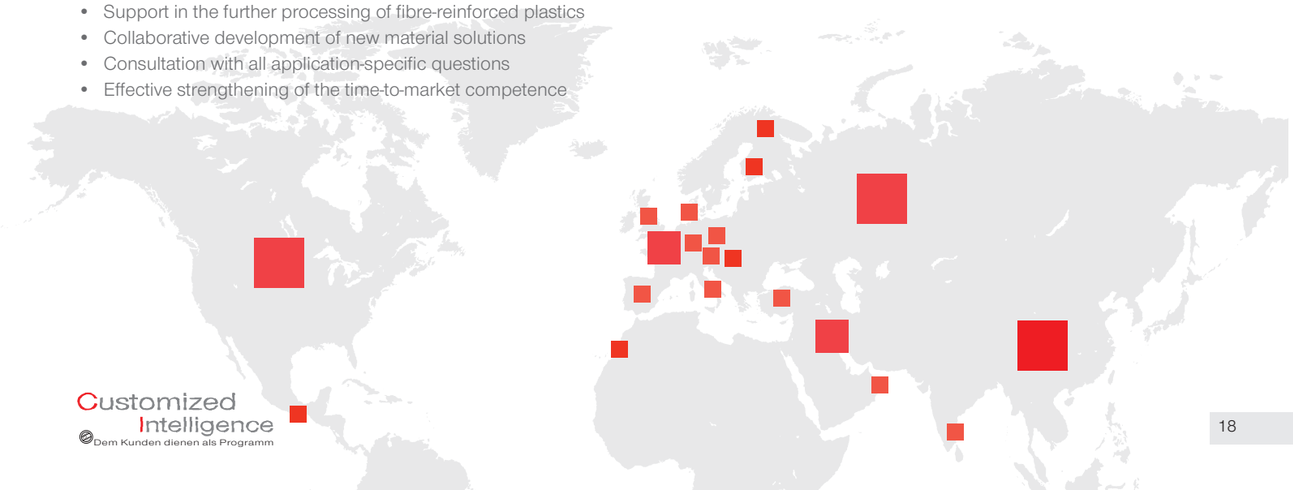


- With strategic, intelligently distributed dependencies in numerous countries around the world, we are always available for our customers in the respective time zones.
- The long-sheet final format of the fibre-reinforced plastics developed predominantly on rollers enables optimal utilisation of the container volume.
- With warehouses in international locations stocked with the most common material qualities, fast regional delivery is guaranteed worldwide.
- Our decades-long logistical experience enables cost-efficient material delivery.
- The continuous, highly-automated and very flexible manufacturing process can be converted at any time to accommodate the production of custom material variants - and usually with short change-over times.

INTENSIVE TECHNICAL SUPPORT

The service of LAMILUX is also intensified through a thorough exchange of engineering know-how on site.

- Support in the further processing of fibre-reinforced plastics
- Collaborative development of new material solutions
- Consultation with all application-specific questions
- Effective strengthening of the time-to-market competence



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Mechanical Properties	Unit of measurement	Value approx.	Test specification
Density	g/ cm^3	1.3 – 1.5	DIN 53452
Tensile strength (standard)	N/ mm^2	50 – 90	DIN EN ISO 527-4|2|2
Tensile strength (reinforced with woven fabric)	N/ mm^2	90 – 150	DIN EN ISO 527-4|2|2
Strain at break	%	1 – 2	DIN EN ISO 527-4|2|2
Flexural strength	N/ mm^2	130 – 170	DIN EN ISO 14125 WKII
Compressive strength	N/mm^2	150 – 180	DIN 53452
Impact resistance	KJ/m^2	40 – 60	DIN EN ISO 179|2n
Modulus of elasticity (bending test)	N/mm^2	5000 - 10000	DIN EN ISO 14125 WKII
Barcol- hardness	Mg	40 – 60	DIN EN 59

Thermal Properties			
Application temperature	°C	-30 to +80	
Application limit temperature (short-term)	°C	-50 to +130	
Coefficient of linear thermal expansion	K-1	30-40 * 10^{-6}	VD 0304
Vapor diffusion resistance factor	µ	60,000 – 90,000	DIN 52615
Thermal conductivity	W/mK	0.21	DIN 52612
Heat transfer coefficient k	W/m^2K	5.5	DIN 4701

Electrical Properties			
Spec. volume resistivity	Ω*cm	10^{15} -10^{16}	DIN 53482
Dielectric strength	kV/ mm^2	15 – 25	DIN 53481
Surface resistance	Ω	10^{12} - 10^{13}	DIN 53482

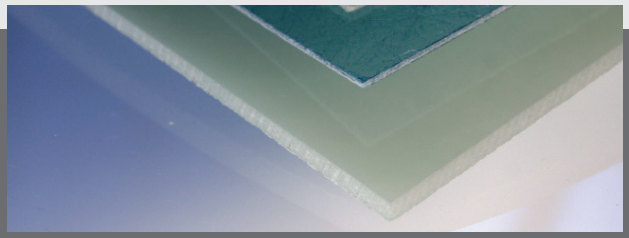
Optical Properties			
Luminous transmittance in the visible range (380-780 nm) colourless material approx. 1mm	%	80 – 90	

Heat transmission (measured in range 200 – 2600 nm)			
Transmission	%	58	
Based on the solar spectrum	%	84	

Fire behaviour			
Approx. 1.2 mm thick and above		B2	DIN 4102 part 1
with additional fire protection equipment SL		Resistant to flying sparks and radiating heat	DIN 4102 part 7
Resistance to glow heat		Grade 3a	DIN 53459

The values are based on a glass content of approx. 28%. Depending on the product type, the glass content and thus the technical values may vary. The technical values are not a guarantee of characteristic features in the scope of specifications. The suitability of the product for the respective application must be checked by the user due to the variety of application parameters. Changes and errors excepted.

Other companies in the LAMILUX Group



PECOLIT Composites

PECOLIT is one of the leading manufacturers of glass-fibre reinforced composite flat sheets. With a constantly growing range of products for an increasingly broader application spectrum, PECOLIT flat sheets
are used throughout the world in commercial vehicles and water technology, as well as in the construction,chemical and leisure activity areas.

LAMILUX Heinrich Strunz GmbH
Daylight systems

LAMILUX Heinrich Strunz GmbH has been producing high-quality daylight systems made of plastics, glass and aluminium for more than 60 years. The purpose of these structures primarily consists in optimising the use of natural light and guiding it into building interiors. Fitted with controllable flap systems, they also serve as smoke and heat exhaust ventilation systems (SHEVS) and energy-efficient building systems providing natural ventilation. The product range includes a wide variety of different structures – from rooflight domes and continuous rooflights to glass roof constructions.

LAMILUX

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