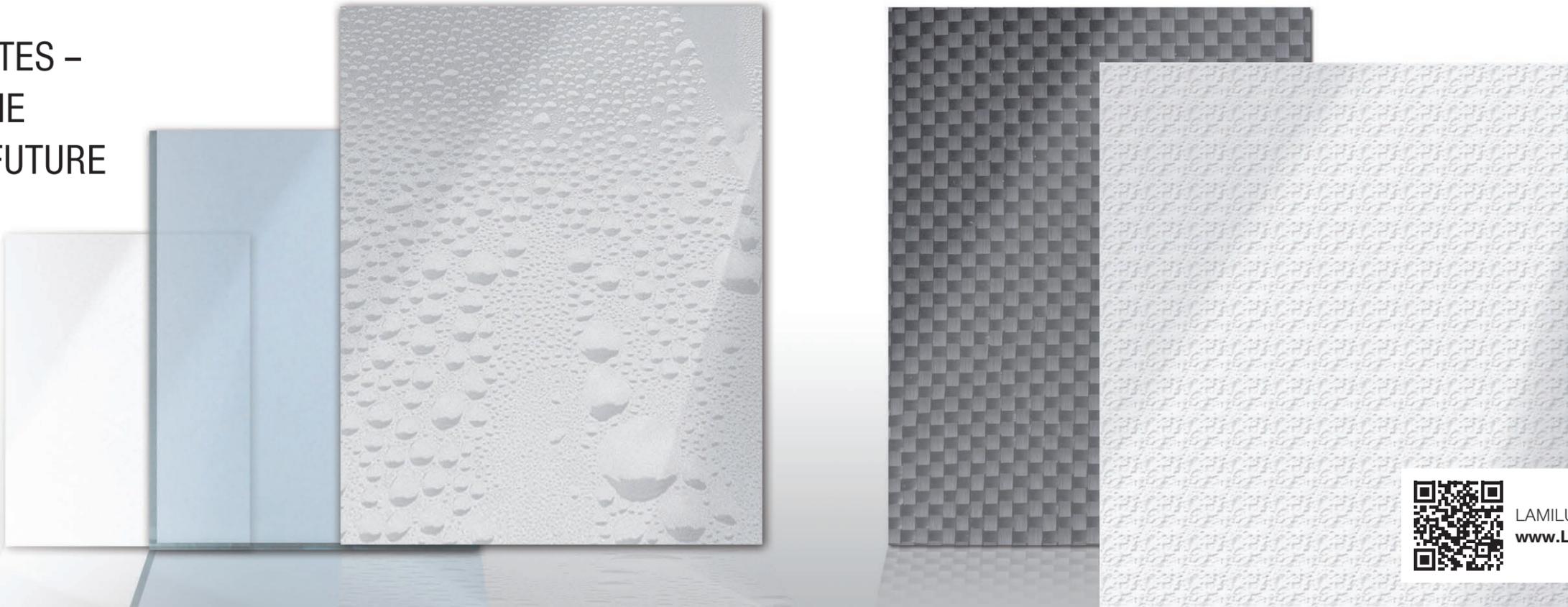




LAMILUX COMPOSITES

**HIGH-TECH MATERIALS FOR THE REFRIGERATION
AND FOOD INDUSTRY**

LAMILUX COMPOSITES – MATERIALS FOR THE MARKETS OF THE FUTURE



LAMILUX product finder at:
www.LAMILUX.com

LAMILUX is Europe's largest producer of sheets and lengths of fiber-reinforced plastic.

The composites produced on several production lines in a large scale industrial flat sheet process make highly stable, resilient and extremely light-weight construction materials, which pave the way for promising product developments and also open up new fields of application in growing global industries such as lightweight construction of caravans, commercial vehicles and busses.



» Our enthusiasm for impressing our customers with innovative, well-developed products and creative solutions and helping them achieve their own successes with their company is what drives both me and our company. Every day at LAMILUX is devoted to adapting our technological developments and our services to meet our customers' demands and needs: Our company philosophy puts our customers at the heart of everything we do. «

Dr. Heinrich Strunz,
the third generation of managing partners at LAMILUX
Heinrich Strunz GmbH

Unparalleled benefits for versatile use in the refrigeration and food industry

- Good thermal insulation values and low heating expansion – particularly important in the refrigeration sector
- Sealed, pore-free and easy-to-clean surfaces – for the highest degree of hygiene
- Food safe – substantiated by test certificates
- Extremely lightweight, yet highly stable – an important factor in the area of transport



TÜV SÜD certified quality

LAMILUX is the world's first manufacturer of fibre-reinforced composites to have voluntarily submitted a major portion of its laboratory and testing facilities to testing by TÜV Süd Deutschland and to have successfully obtained certification. With this, LAMILUX has submitted itself to the very highest quality requirements.



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 benefit 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:

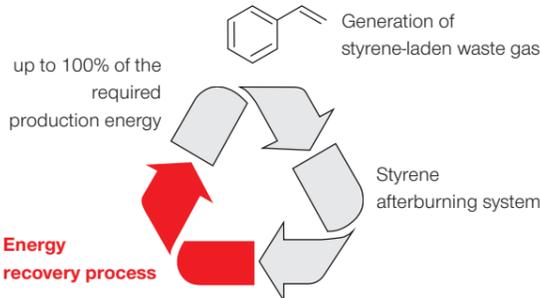
Customized intelligence - Serving the customer is our mission:

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 advisory services
- A leader in solving problems - individual, tailored solutions

LAMILUX WILL HELP YOU ACHIEVE SUSTAINABILITY

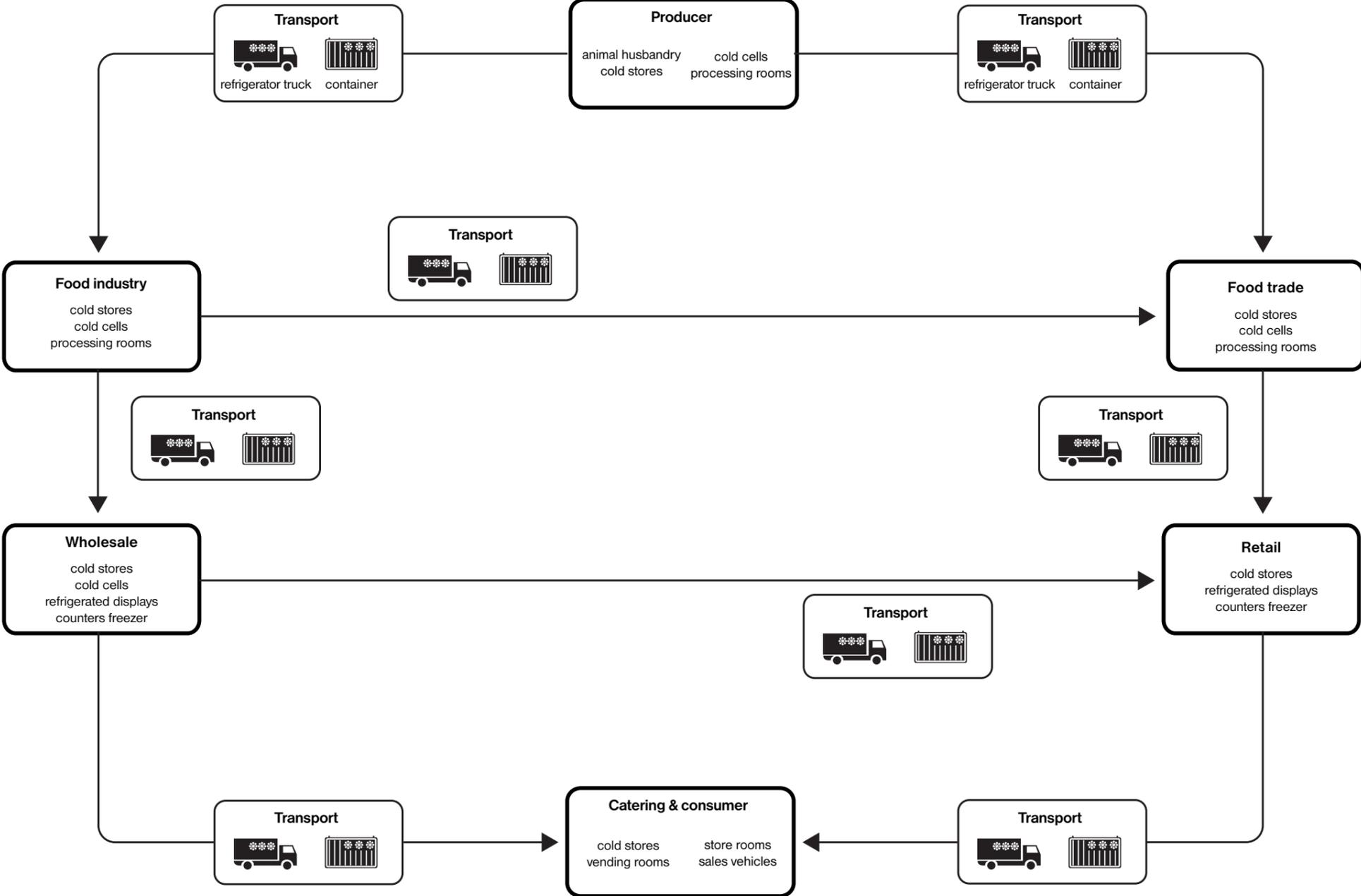
- **We produce** your materials in an extremely **raw-material- and energy-saving production process we developed ourselves.**
- **We manufacture your construction material in an environmentally-friendly manner with award-winning technology.** Our afterburning systems transform the extracted styrene-laden air into energy and direct it back into the production process.
- We select our suppliers based on their **sustainability in the production** procedures.



PROCESSING, STORAGE AND TRANSPORT – LAMILUX COMPOSITES PROTECT FOOD

From production and processing to transport and sales: A comprehensive, temperature-controlled system is required to protect fresh as well as frozen food from spoiling.

LAMILUX Composites is put to use throughout all phases of the processing and cold chain, e.g. in face sheets of walls in processing and storage rooms as well as in refrigerated truck bodies and cold cells.





PROCESSING AND STORAGE ROOMS

Cleanliness and hygiene – usually dictated by very strict national and international regulations – have the very highest priority in the food-processing industry. Known to be easy to clean (optional: food safe) wall coatings, fibre-reinforced composites are employed in processing and storage rooms.

ADVANTAGES

- Easy, residue-free cleaning for the very highest degree of hygiene
- Pore-free, sealed surface
- No corrosion
- Good chemical resistance against a number of cleaning agents
- Reduced formation of condensate compared with steel surfaces
- Very durable and low-maintenance

MATERIAL RECOMMENDATIONS



LAMILUX Woven Roving Gelcoat - highly robust and stable construction (very high stability, low coefficient of linear expansion, surface with woven fabric structure)



LAMILUX Anti Slip - for anti-slip floor coatings (intensively worked-in grain finish, very high durability and long service life)



REFRIGERATED WAREHOUSES AND COLD CELLS

The highest degree of sensitivity with regard to fresh and frozen goods is also required in refrigerated warehouses and cold cells. LAMILUX Composites form the interior and the exterior top layers of the wall elements. In this foam-filled sandwich construction, the fibre-reinforced composites display their insulating properties: A nearly 60-millimetre thick wall element has the same insulating properties as a 400 mm thick wall made of timber frames.

ADVANTAGES

- Low tendency to deform and no dents in the event of impact
- Easy, residue-free cleaning
- Food safe
- No corrosion
- Available for delivery in large 3.20 metre wide containers
- Single one-piece, wall-height production possible

MATERIAL RECOMMENDATIONS



LAMILUX High Gloss 4000 - for high-gloss and smooth surfaces (very high quality material, Gelcoat sealing for high optical demands)



LAMILUX Super Plus Gelcoat - low-weight and durable, attractive surface finish (for interior and exterior use, Gelcoat-sealed surface, highly UV and weather resistant)



REFRIGERATED TRUCK BODIES AND SEMI-TRAILERS

For the temperature-controlled transportation of refrigerated food products, fibre-reinforced composites stand out with their low heat conductivity. As a face sheet on side walls and roofs, they provide for the exceptional insulating properties of refrigerated truck bodies and semi-trailers. Plus the side walls are also ideal backgrounds for company and product advertisement. This turns refrigerated vehicles into moving advertisements.

A further outstanding feature is also the low weight of LAMILUX Composites, which is decisively lower than aluminum or sheet steel. This enables lighter truck bodies and consequentially, also fuel savings and less damage to the environment. Plus, UV and weather resistance, and the longer service life that this entails, are just some of the major benefits of fibre-reinforced composites.

ADVANTAGES

- Simple application of company and product advertisements thanks to the clean and smooth surface
- Low weight with highest stability
- Reduced fuel consumption thanks to the lightweight construction of the truck bodies
- No corrosion
- Easy cleaning and repair
- Very durable and resistant against sunlight and weather
- Strength to withstand mechanical stress

MATERIAL RECOMMENDATIONS



LAMILUX High Impact - for extreme impact resistance and tensile strength in the interior (very good resistance to sunlight, weather and corrosion, extremely stable and low-weight)



LAMILUX Woven Roving Gelcoat - highly robust and stable exterior construction (very high stability, low coefficient of linear expansion, surface with woven fabric structure)

REFRIGERATED CONTAINERS

Refrigerated containers are subjected to very high mechanical stress during loading and transport. In addition, they must maintain low temperatures using as little energy as possible over very long periods of time. LAMILUX Composites ensure the safe and energy-efficient transport of food in refrigerated containers.

Cooling container interiors are equipped with wall paneling made of highly impact resistant fibre-reinforced composites, their stiffening effect lending high stability to the entire container construction. Further outstanding features are their thermal insulation properties and the low heat expansion of the material due to its high fibre content.

ADVANTAGES

- High impact resistance and robustness
- High loads thanks to the lightweight design
- Easy to clean and no corrosion
- Very durable and resistant against sunlight and weather
- Avoidance of thermal bridges with reinforced materials

MATERIAL RECOMMENDATIONS



LAMILUX High Strength X-treme - for high strength and durability (exceptional tensile and bending strength, low linear expansion coefficient, temperature resistant)



REFRIGERATED AND FREEZER DISPLAY CASES

Cleanliness and hygiene directly at the PoS: The pore-free surface of LAMILUX Composites is an outstanding feature in refrigerated and freezer display cases that is directly visible to the consumers. The benefits of fibre-reinforced composites used in the refrigeration of food products in sales rooms: easy and residue-free cleaning, the clean appearance and the insulation properties in sandwich design.

The food safety of materials that come into contact with food is a very important aspect in refrigerated and freezer display cases. The food safety of several material qualities has been tested. This means that even in direct contact with food, these materials do not emit any chemical substances.

ADVANTAGES

- Easy cleaning without any residues
- Antibacterial
- Available in food-safe material variants
- Highly resistant against moisture and no corrosion
- Very durable and resistant against pressure loads
- No formation of mould

MATERIAL RECOMMENDATIONS



LAMILUX Super Plus Gelcoat - low-weight and durable, attractive surface finish (interior and exterior use, Gelcoat-sealed surface, highly UV and weather resistant)

ANIMAL HOUSING

Periodical cleaning to ensure cleanliness and sterility is a decisive means against bacteria in stalls. Only this way can businesses involved in animal husbandry comply with the increasing requirements pertaining to disease control.

Fibre-reinforced composites by LAMILUX with their pore-free and therefore easy-to-clean and residue free surfaces greatly contribute in providing sustainably improved hygiene.

ADVANTAGES

- Easy to clean
- No corrosion
- Resistance against mould formation
- Easy to handle in daily production
- Good chemical resistance against a number of cleaning agents
- Low tendency to deform and no dents in the event of impact

MATERIAL RECOMMENDATIONS



LAMILUX Super Plus Gelcoat - low-weight and durable, attractive surface finish (interior and exterior use, Gelcoat-sealed surface, highly UV and weather resistant)



LAMILUX Embossed - for structured and easy-to-clean surfaces (exceptionally suited for interior use, wall paneling with minimum joints)

LAMILUX COMPOSITES – AUTOMOTIVE STANDARD IN THE REFRIGERATION AND FOOD INDUSTRY

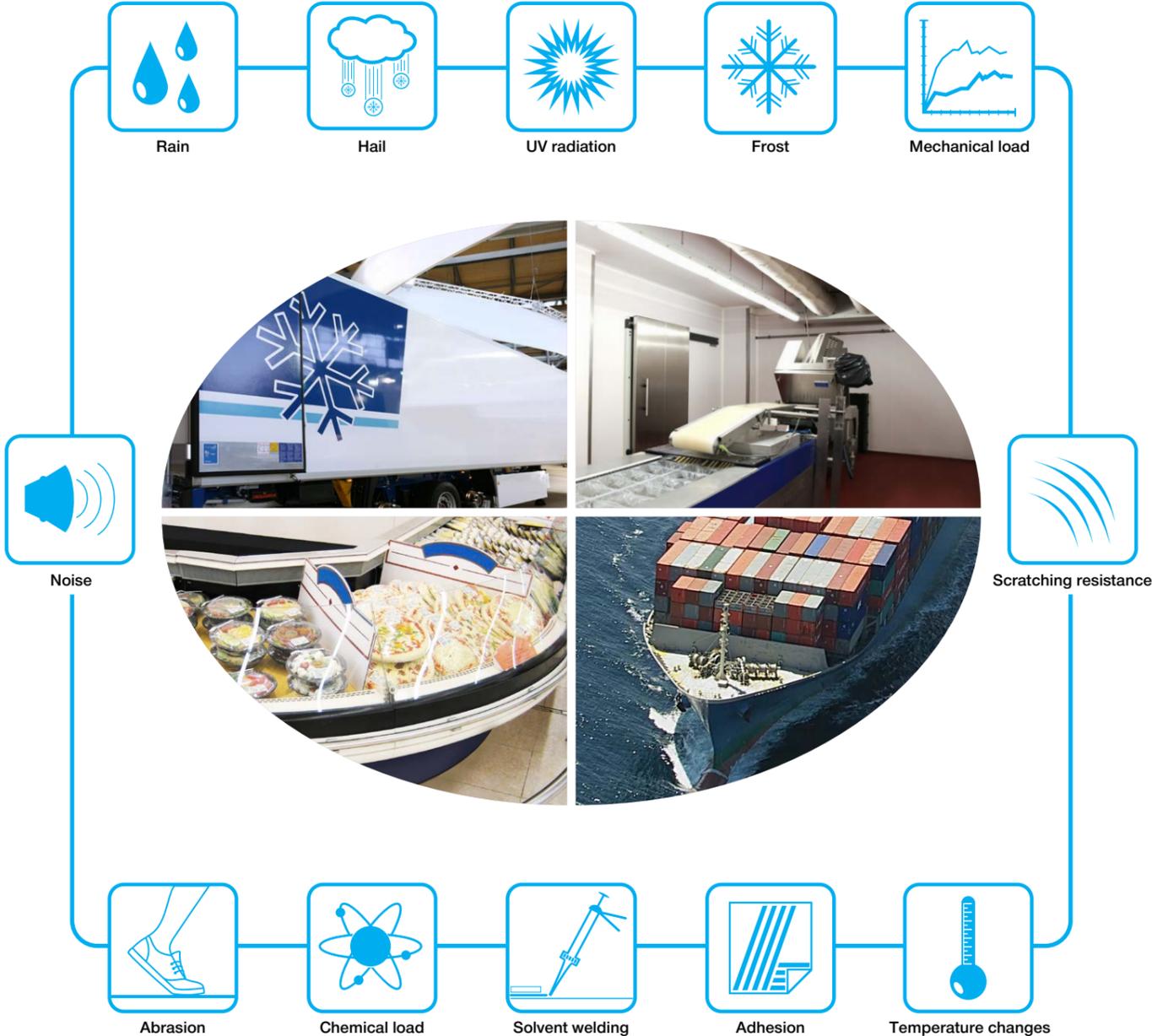
LAMILUX is the world's first manufacturer of fibre-reinforced composites to have voluntarily submitted a major portion of its laboratory and testing facilities to testing by TÜV Süd Germany and to have successfully obtained certification. With this, LAMILUX has submitted itself to the very highest quality requirements. This is thanks to our research and development department that provides extensive input throughout all

stages of LAMILUX Composites materials' development, production and life cycle. Extensive substance tests and analyses form the basis in reliably examining the properties of our composites and in securing their durability and service life - to provide you with constant 100% quality at all times. For this purpose, we make use of our state-of-the-art laboratory technology and simulation environments.

ALL TESTS CERTIFIED IN COMPLIANCE WITH TÜV SÜD QUALITY



Sun-/Xenotest	Infrared/halogen radiation	Outdoor weathering	Thermography test
Noise prevention acc. to PIEK	Abrasion/slip resistance	Adhesion/delamination test	Gas chromatography
Impact test	DMA measurement	Temperature change test	Condensation water test
Tensile/bending strength	Torsion test	Barcol hardness	Impact resistance acc. to Charpy



WITH LAMILUX YOU GAIN SAFETY – MADE IN GERMANY

- An excellently trained maintenance and repair team ensures **the smooth and error-free operation of our four production lines.**
- Our **decades of logistical expertise** enable **cost-efficient, worldwide shipment of materials.**
- Our **continuous manufacturing processes monitored by highly qualified experts** ensure that you get **constant and highest quality, at all times.**
- **We create your unique selling points.** Our engineers and technicians work in close collaboration with you to produce customised and industry-specific **product solutions.**
- As Europe's market leader, we have extensive **production capacities** which guarantee **supply reliability.**
- Prior to each composite production, we conduct **comprehensive controls of the delivered raw materials.** Our supplier selection is performed on the basis of the very highest quality criteria.
- **During and after production,** we subject your material to extensive controls and **laboratory inspections.**
- **We examine the mechanical, chemical and physical properties** of the completed composite in **real application environments** and tests its behaviour in combination with other materials.
- **We continue to develop your individual materials** and optimize material properties for the respective areas of applications.

WITH LAMILUX YOU SAVE TIME AND MONEY

- With our international local offices we are available to you **in the respective time zones.**
- **Our warehouses in several countries and regions** ensure the **quick delivery of your materials around the world.**
- **We transfer our knowledge and offer you on-site engineering support** for further processing of composites and on any application-specific questions you may have.
- With our **flexible manufacturing technology,** we can start the production of your individual material following short **machine changeover times.**
- Our highly automated, continuous manufacturing processes always create **reproducible material variants in the very highest, unvarying quality.**



LAMILUX COMPOSITES – INDIVIDUAL SOLUTIONS FOR YOUR APPLICATIONS



Bus industry



Commercial vehicle industry



Construction industry



Caravan industry

The information submitted in this brochure is based on our current knowledge and experience. Technical values do not represent any assurance of characteristics within the scope of a specification. Users have to check the product's suitability for the respective application owing to the wide range of available application parameters. We reserve the right to make mistakes or modifications.



LAMILUX Composites GmbH
Zehstraße 2 · Postfach 1540 · 95111 Rehau · Tel.: +49 (0) 92 83 / 5 95-0 · Fax +49 (0) 92 83 / 5 95-29 0
E-Mail: composites@lamilux.de · www.lamilux.com

