



STEULER

Plastic | Linings

KERAVERIN® EQUIPMENT FROM FRP COMPOSITES

Reliable technology for the industry

Focus on Performance

CUSTOM-MADE TO PERFECTION

Where aggressive media meet complex processes, a reliable material is crucial. Glass-fibre-reinforced composites offer excellent resistance to aggressive chemicals and do not require additional corrosion protection measures such as external coatings, which can fail over time. Even at extreme temperatures, the composite system remains stable: there is no delamination between the thermoplastic inner liner and the load-bearing FRP laminate.

Composite vessels are generally designed to a higher safety standard than steel components, whilst being significantly lighter in weight. Furthermore, they can withstand full vacuum and are also available in an electrically conductive version. These and other properties make FRP composite materials a future-proof alternative to metallic materials in process equipment – particularly in the chemical industry. Wherever highly corrosive media are involved, our materials can withstand the high chemical, mechanical and thermal stresses.

Process vessels, columns, storage tanks and special components designed to meet customer-specific requirements are used in process engineering plants. Component sizes typically range up to 4.5 m in diameter and 15 m in length. In addition, we can produce custom sizes on request.

Everything from a single source – from the initial idea to on-site implementation.

APPLICATIONS IN

- Chemical processing industry
- Chlorine-alkali industry
- Acid production plants (sulphuric acid, phosphoric acid)
- Pulp and paper industry
- Power plants
- Semiconductor industry
- Pharmaceutical industry

PORTFOLIO

- Vessels with skirts
- Horizontal vessels
- Hanging vessels
- Stripping columns
- Chlorine drying towers
- Dechlorination towers
- Evaporators
- Process vessels
- Chlorine destruction vessels
- Defluorination columns
- Packing columns
- Separators
- Mixing vessels
- Scrubbers
- Absorption columns
- Desorption columns

YOUR BENEFITS AT A GLANCE

- ✓ **Reduced weight** – ideal for handling, transport and static requirements
- ✓ **Low-maintenance & durable** – thanks to corrosion-resistant materials
- ✓ **High temperature resistance** – due to specially formulated resin systems
- ✓ **Customised material selection** – depending on the load and liner used
- ✓ **Reduced number of flange connections** – lower risk of potential leaks, making it safer and more secure for staff and the environment
- ✓ **Excellent emergency operating characteristics** – due to the outer FRP load-bearing laminate
- ✓ **Significantly longer service life** – lower maintenance and investment costs



MATERIALS FOR DEMANDING PROCESSES

The selection of the appropriate liner is made on a project-by-project basis, depending on the specific application. This is how we ensure the most technically and economically sensible and suitable solution for the customer, also with regard to service life. Our speciality is the field of fluorinated plastics. For vessels and equipment, we use our composite material KERAVERIN®. This consists of FRP equipment lined with a thermoplastic inner liner.

In equipment manufacturing, KERAVERIN® PTFE-M has proven itself as a high-performance material, particularly for columns and reaction vessels – in almost all sizes and specifications. By using appropriate resin systems, it is possible to manufacture components that can be used at temperatures up to 160 °C. The bonding bridge between the structural laminate and the PTFE liner allows operation even under full vacuum and reduces the number of main body flange connections – thereby eliminating potential weak points. The resins are selected with regard to the specific load and the liner. PTFE-M / FRP offers a proven alternative to equipment made of steel / PTFE, steel enamel and graphite. The carbon fibre backing is chemically inert and electrically conductive. These are just some of the advantages of the PTFE-M we use.

THERMOPLASTIC LINERS				Adhesion strength
PVC-U		Polyvinyl chloride	Max. 60 °C	7,0 N/mm ²
PE	also electrically conductive	Polyethylene	Max. 60 °C	3,5 N/mm ²
PP		Polypropylene	Max. 95 °C	3,5 N/mm ² *
PVC-C		Chlorinated polyvinyl chloride	Max. 95 °C	7,0 N/mm ²
PARTIALLY FLUORINATED LINERS				
PVDF	also electrically conductive	Polyvinylidene fluoride	Max. 100 °C	5,0 N/mm ²
E-CTFE		Ethylene chlorotrifluoroethylene	Max. 110 °C	5,0 N/mm ²
FULLY FLUORINATED LINERS				
PTFE-M	weldable, also electrically conductive	Modified polytetrafluoroethylene	Max. 160 °C	5,0 N/mm ²

* with SKC backing fabric up to 7.0 N/mm²

These temperature values are standard values. Please contact us for advice regarding your specific application.

PERFECTLY INTEGRATED – OUR INTERNAL COMPONENTS

In addition to our customised process vessels and columns, we also manufacture the associated internals to individual customer specifications or based on process engineering designs provided by third parties. Our product range includes, among others, distributors, support and hold-down grids, feed and inlet pipes as well as vortex breakers. Depending on the requirements, we manufacture these internals either in solid thermoplastic or using a sandwich construction. For components subject to particularly high stress, we rely on our proven thermoset material KERA® DUROSTRONG, which has proven to be exceptionally durable and resistant in a wide variety of applications.

Steuler works closely with renowned manufacturers of plastic components. These components are taken into account during the engineering phase – this enables us to ensure maximum precision and functionality. A trial assembly is typically carried out directly at our factory to guarantee a smooth subsequent installation. In addition, our technical advisors oversee the final assembly on site, ensuring flawless installation with a focus on maximum operational safety.



Separator made of KERAVERIN® PTFE-M / FRP. Dimensions DN 3100 x 5639 mm.



HCl absorption column made of KERAVERIN® PTFE-M / FRP. Dimensions DN 1700/2300 x 31460 mm.



PLANNING AND IMPLEMENTATION FOR SERVICE LIFE & SAFETY

In addition to materials, design, and static calculations in accordance with AD2000-N1 / DIN EN 13121-3, Steuler's range of services naturally includes reliable and timely project logistics, deliveries, site organisation and the professional installation of all necessary components and elements. Furthermore, where required, we carry out detailed FEM (Finite Element Method) calculations for various load cases, particularly for structural stability. Experienced Steuler fitters or technical advisors carry out the installation, undertake and document all necessary certifications following leak, pressure and acceptance tests, and provide onsite commissioning support

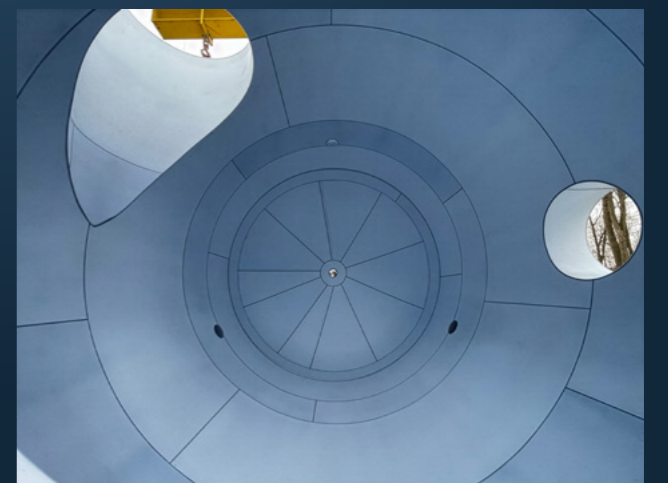
- **Our staff is SCC-certified; welders and laminators are DVS-certified**
- **Development, production and complete onsite assembly – the implementation of your project entirely from a single source**

Composite plastic vessels are generally designed for a service life of 23 years (2×10^5 h). After five years of operation, we recommend having plastic components inspected by one of our well-experienced plastics specialists. Maintenance is the responsibility of the operator in accordance with the requirements of the relevant Industrial Safety Regulations. Any damage will be recorded in a damage / inspection report, including photographic documentation. Based on this report, we will then draw up an individual adjusted repair quote.

- **Life cycle assessment of plastic vessels in cooperation with TÜV Rheinland / End-of-life (EoL) assessment**
- **Maintenance and inspections / Periodic inspections**



HCl stripping column made of KERAVERIN® PTFE-M / FRP. Dimensions DN 1500 x 12997 mm.



View into the top section of an HCl absorption column. DN 2600/1400 x 22450 mm.

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Together with our subsidiaries and representatives, Steuler offers a worldwide network to our clients that develops and implements comprehensive system solutions.

Alphaplast, S.L.U.
Spain

Ancorite Surface Protection Ltd.
United Kingdom

CIMA S.r.l.
Italy

Ditescor S.A. de C.V.
Mexico

**Shanghai STEULER-KCH
Anticorrosion Engineering Co., Ltd.**
China

STEULER Chile SpA
Chile

**Steuler Korozyon Koruma
Teknolojileri A.Ş.**
Turkey

Steuler Linings Corp.
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