STEULER KCH

Plastics Engineering

Process Equipment and Piping Systems for Optimum Reliability and Cost-Effectiveness

Focus on Progress

Range of services from STEULER-KCH plastics technology:

- Manufacture of equipment components and piping from composite materials
- Technical backup from initial discussion to final assembly or installation
- Selection of the optimum material with due regard to the chemical, mechanical or thermal stresses and the geometric design involved.

Dialogue at all stages:

- Consulting
  - Plausibility checks on material and design
  - Project monitoring for smooth handling in good time
- Provision of components and complex services
- Installation and supervisory services
- After-sales service
  - Modifications and adjustments to components
  - Exchange of operational experience and information on current product development
  - Inspection and expert reporting

STEULER-KCH – Your global partner for industrial corrosion protection

The companies in the STEULER-KCH group are worldwide operations, specialising in protection for surfaces and against corrosion in industry. Thanks to their experience and extensive know-how, STEULER-KCH can provide optimum corrosion protection materials of the highest quality for practically any application. The picture is filled in by intensive research and development, expert knowledge of production methods and experience in how our products are used.

Plastics engineering

The product portfolio of STEULER-KCH Plastics Engineering includes piping systems, tanks, vessels and process equipment exposed to high chemical, thermal and mechanical stresses. These items are manufactured either from fiber glass-reinforced plastics with or without an inner liner, or from fiber-reinforced phenolic resin materials to ensure reliable and long-lasting resistance to chemicals.

Surface protection systems

The STEULER-KCH range of surface protection systems includes coatings and rubber lining, brick lining or panelling to provide protection for industrial surfaces and to prevent corrosion. Services provided by STEULER-KCH naturally include advising customers regarding the planning and design of corrosion and surface protection measures as well as expert handling of materials and execution of construction work.

Leading innovators

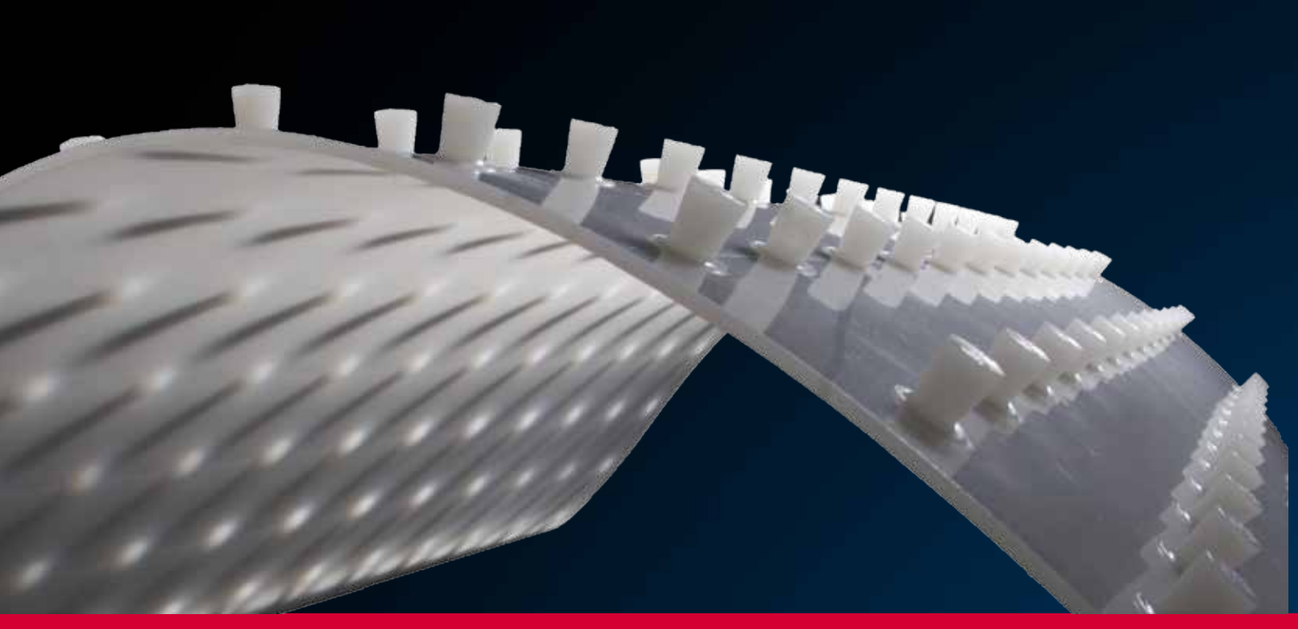
For decades now, STEULER-KCH has been working to develop new and ever more cost-effective technical solutions. Our aim has always been to offer you the optimum right across the board – not just optimum materials, but also optimum processing and testing of our products. This is because STEULER -KCH supplies everything you need from a single source – from initial technical advice to quality assurance of the final product.

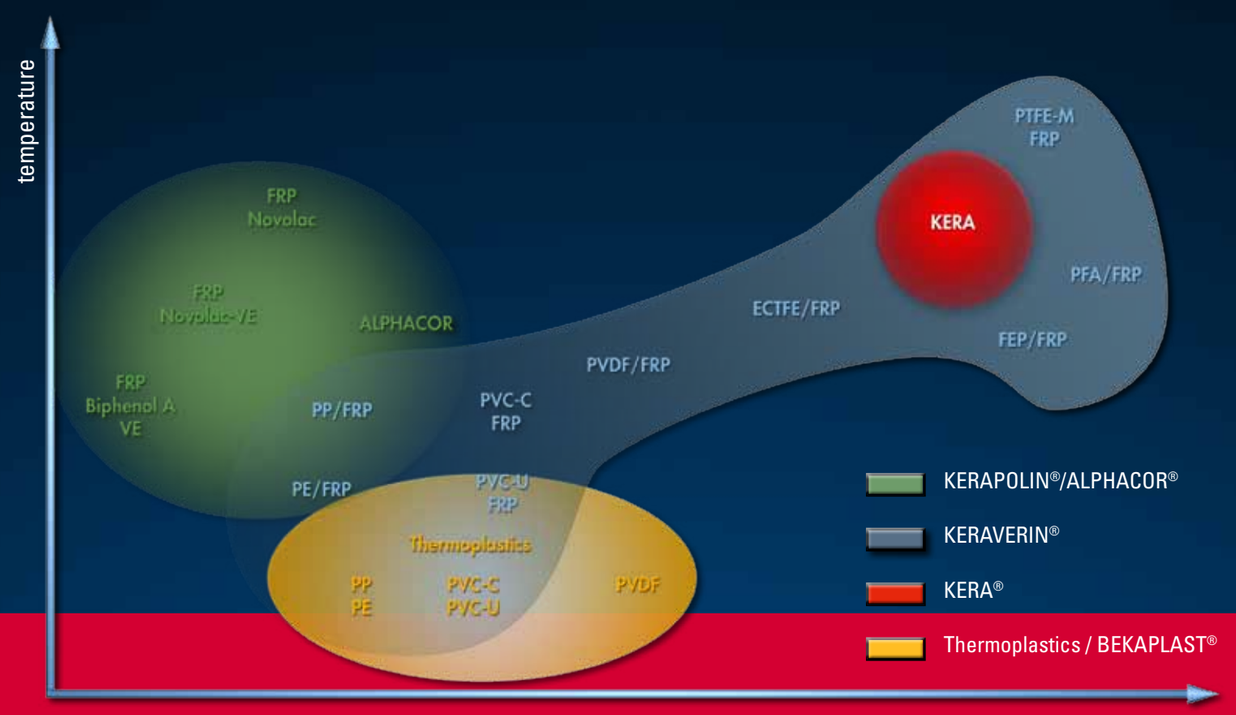
Refractory systems

STEULER-KCH is among the major innovators and market leaders in fireproofing systems on the international stage. Manufacturing encompasses shaped non-alkaline products based on raw materials from fire clay to corundum, including chrome corundum, zircon and silicon carbide as well as unshaped, semi-finished goods. STEULER-KCH offers specialised refractory solutions, taking in research and development and engineering as well as in-house manufacturing and assembly of systems.

Pool construction

STEULER-KCH's swimming pool operation is the first name to call with regard to sealing public or private swimming pools for customers all over the world. The STEULER-Q^7 system is regarded as the top product for swimming pool construction and may be the safest lining system for pools anywhere. In particular, thermal baths, solar facilities, mineral and sea water baths with their inherently more corrosive contents can benefit from the long-term sealing provided by the system. Hotel pools, health spas and even ambitious private pools trust in the special properties of the STEULER-Q^7 system.





Engineering and materials: A complete solution right down to the installation

STEULER-KCH has been building plant and components from technical plastics for decades, using its competencies and practical experience to help its clients meet the requirements they place on their plant and processing technologies. From research and development, to engineering and Steuler's own, in-house production on the most state-of-the-art manufacturing equipment to complete assembly, STEULER-KCH is a single-source provider for complete plastics solutions.

Research and development
Materials and applications are changing all the time. Our products and services are constantly being researched and further developed to meet all the latest demands placed upon them. The newest materials are tested for suitability, component groups enhanced and improved. Our goal is to offer our clients state-of-the-art materials to install in the most efficient plants.

Detailed materials concepts and constructions
Each material ideal for each application: We can advise you on selecting the right material and on its suitability for your specific application. We make sure you have the proper and functionally correct design for your plant, and use our state-of-the-art manufacturing processes to turn your demands into reality, from the first idea to the final product.

Utmost flexibility, even in manufacturing
When building plastic equipment and components, STEULER-KCH uses the latest state-of-the-art CNC milling machinery. Our strength lies in the flexible manufacture of small runs and specialist components, also plant component groups. Our manufacturing surface area is 4,500 square metres. Using our own construction department enables us to turn ideas into products that meet your demands in terms of performance, operational safety and durability.

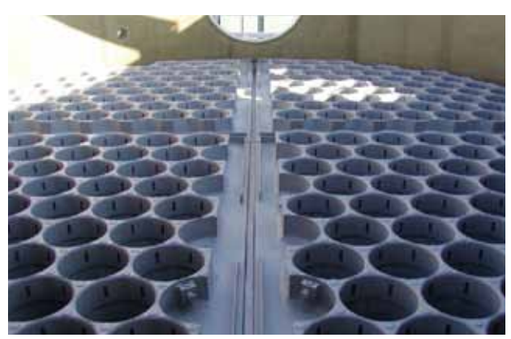
Complete assembly or assembly management by STEULER-KCH supervisors
Our highly qualified staff also allows us to offer on-site assembly by a highly efficient team. As an alternative, work can also be carried out by local staff. In this case, we can offer supervisors who can monitor work at the site and, if necessary, offer on-site training to workers.

Quality assurance
Our quality assurance meets the demands of worldwide standards for everything – from raw materials to finished components. Appropriate quality assurance testing is carried out at all stages of every project. Quality testing ensures safety. STEULER-KCH also provides comprehensive customer service even after the project has been completed.

Applications:
- Chemical industry
  - Chloralkali electrolysis
  - Titanium dioxide manufacture
  - Isocyanate manufacture
  - Acid concentration plant
  - Fertiliser industry
  - High-purity chemicals
- Metalworking industries
  - Annealing/pickling and acid regeneration plant
- Metal ore processing
- FGD's/Waste air purification plants
- Cellulose and paper industries
- Plants for making viscose rayon fibre
- Process gas combustion plant

Above picture: Tank made of PVDF and glass-fibre reinforced plastic in manufacturing process.

Above picture: Vat made using solid KERA for spun fibre industry.



Above picture: Built-in tube bundle in a wet electrostatic filter construction.

Above picture: Double-walled, solid thermoplastic tank for surface treatment plant.

Plastic tanks, vessels, apparatuses and piping systems for extreme conditions.

Demands made on chemical Plants

Equipment and piping systems in chemical plants are exposed to extreme process-induced stresses. Aggressive media, pressure differences and marked changes in temperature require corrosion protection systems that combine high chemical resistance, good mechanical strength and high thermal stability to ensure permanently reliable plant operation.

Weakness of conventional systems

Conventional metal components often fail to meet expectations for lasting reliability. The flange joints in glass- or PTFE-lined steel pipes, for instance, are familiar weak points that require a high level of maintenance work. Permeation of media through the PTFE liner and the associated corrosion of the steel shell are often unavoidable. The so-called "loose" PTFE lining of the steel pipes is the reason why such systems have only limited vacuum tightness. Impact strength in glasslined steel pipes in particular fails to meet expectations. Owing to their high costs, pipework systems in exotic metals are used only for special applications.

Example applications:

- Acid concentration plant
- Phosphoric acid plants
- Sulphuric acid plants
- Hydrochloric acid plants
- Chemicals for electronics
- Monochloric acetic acid plant
- Environmental protection plants
- Electrolysing plant
- Fertiliser industry

Product range:

- Pipes
- Process equipment
- Storage tanks
- Exchange towers and reaction columns
- Special designs

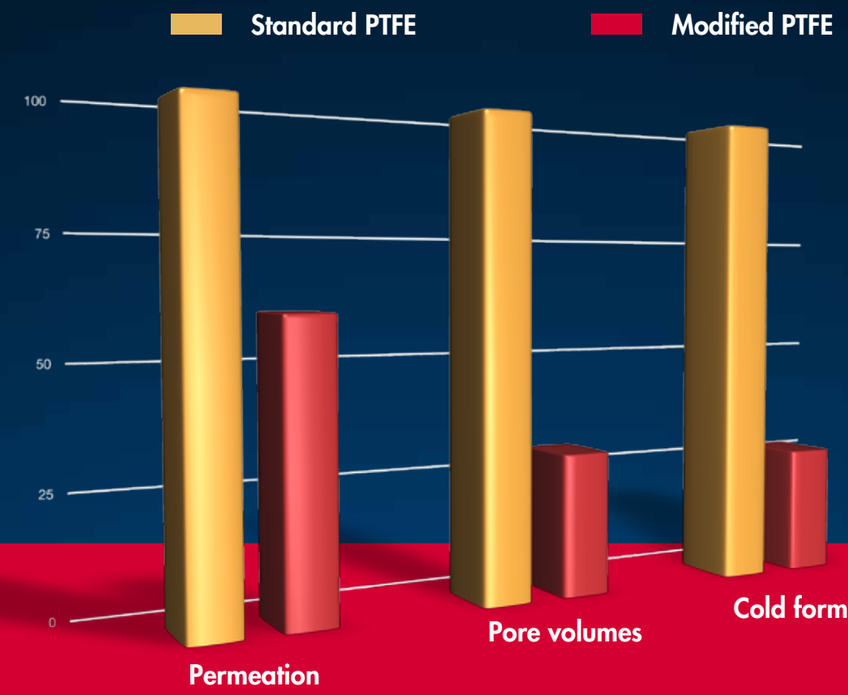
Above picture: Horizontal process tank made of PVC and glass-fibre reinforced plastic.

Above picture: Process tank made of PTFE and glass-fibre reinforced plastic.

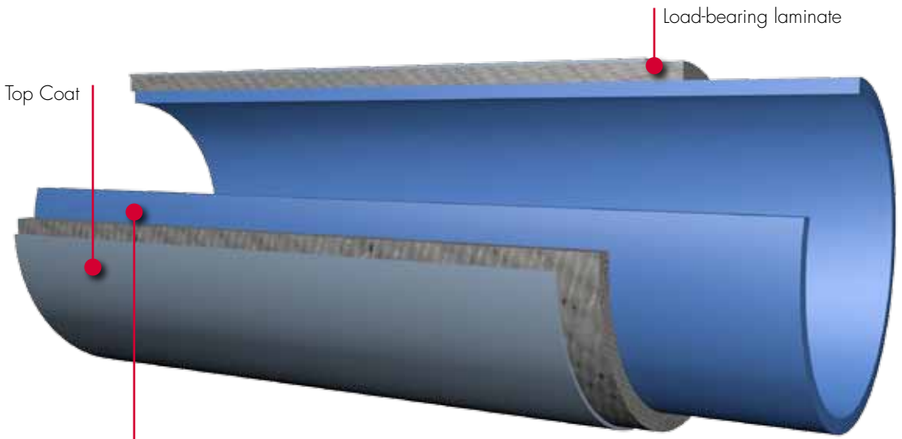
Above picture: Pipe distributor made of PTFE and glass-fibre reinforced plastic.

Above picture: Ring pipe made of PP and glass-fibre reinforced plastic for use in power stations.

KERAVERIN® / KERAPOLIN® / ALPHACOR®



KERAVERIN® is a composite material made from fiber-reinforced unsaturated polyester or vinylester resins with thermoplastic inner liner. The liner can be manufactured from various materials to match specific chemical stresses.
Piping is manufactured pipe type B in accordance with the standard DIN 16965 part 2, or to customers' own specifications.

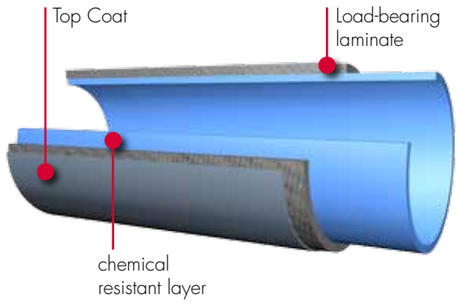


Internal linings can be made of the following materials:

- PE – Polyethylene
- PP – Polypropylene
- PVC – Polyvinyl chloride
- PVC-C – Chlorinated polyvinyl chloride
- PVDF – Polyvinylidene difluoride
- ECTFE – Ethylene chlorotrifluoroethylene
- FEP – Fluorinated ethylene propylene
- PFA— Perfluoralkoxy copolymer
- PTFE-M – Polytetrafluorethylene, modified

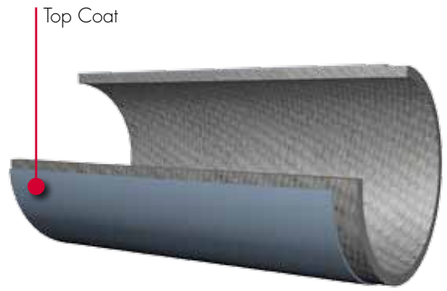
KERAPOLIN® is a resistant composite material made of a chemicalresistant layer and a load-bearing laminate based on fiber glassreinforced unsaturated polyester and vinyl ester resins. The choice of reactive resins used depends on requirements and operating conditions.

KERAPOLIN® is resistant to acids, alkalis and various solvents. Special antistatic or flame-retardant variants are also available.



Manufacture of KERAPOLIN® piping systems is generally carried out in compliance with the standard DIN 16965 part 4, resulting in pipe type D as per the standard but may also be made in accordance with customers' own specifications.

ALPHACOR® is a special laminate grade featuring a thicker chemical-resistant layer and structural reinforcement, notably by glass fibermatting. The glass fiber content is around 35 %. The choice of resins used depends on the operating conditions. Owing to the special resin formulation used, ALPHACOR® products are particularly suitable for piping used in chlor-alkali electrolysis processes. They are manufactured as pipe type E as per the standard DIN 16965 part 5 or in accordance with customers' own specifications.



The resins used include:

- Polyester resin
- Vinyl ester based on bisphenol A
- Vinyl ester based on Novolac
- Special resin mixtures for ALPHACOR® pipes

Product range:
- Absorption towers
- Tanks
- Pipes
- Fibre spinning vats
- Rollers
- Stirrers

KERA® – the specialised material

KERA® is a phenolic resin-based thermoset which provides customized shaping options for tanks, process equipment and piping. Reinforced with glass and/or carbon fibers and special fillers, this material provides outstanding stability to non-oxidizing acids and numerous solvents.

KERA® thermoset is the right material for any process equipment – no matter whether it is used to decompose hydrogen chloride gas into its chemical constituents (the electrolyzer thus acting as a 100 % recycling system), to concentrate phosphoric acid into white phosphoric acid, or to spin rayon lining or tire cord fabric in hot acid. After over 50 years' experience with this high-performance thermoset, it can justifiably be called the most effective material ever used in chemical plants.

Applications:
- Chemical industry
  - HCl electrolysis
  - Isocyanate production (HDI, MDI, TDI)
  - HCl concentration
- Rayon spinning units
- Metalworking industries
  - Pickling and acid regeneration plants

Benefits:
- Excellent chemical resistance
- Unlimited, individualised shaping
- Long-term temperature resistance up to 140 °C
- Peak resistance 170 °C

KERA® SP 20
With its specially pre-treated glass fibre and carbon fibre reinforced phenolic resin material, KERA® SP 20 is especially resistant to non-oxidising acids and many solvents. In addition, it is also suitable for environments subject to highly fluctuating mechanical and thermal stresses.

KERA® SP 21
Featuring carbon fibre reinforcement of phenolic resin material with good antistatic properties, KERA® SP 21 is particularly suitable for use with with highly fl ammable substances and hydrogen fluoride-containing media.

KERA® SP 30
Its phenolic resin material with specially treated glass fibre reinforcement gives KERA® SP 30 excellent resistance to non-oxidising acids and many solvents.

KERA® FU 23
Material based on furan resin, reinforced with carbon fibre for alkaline conditions.

Above picture: KERA vat for the viscose spun fibre industry.

Above picture: Electrolysis frame made of KERA.

Above picture: KERA Column strake with built-in bubble tray.

Thermoplastic materials for special applications

Detailed materials concepts and designs

The right materials for any application: we can advise you on the choice of materials and what is suitable for your specific application. Our product range includes all the most common thermoplastics such as polyethylene (PE), polypropylene (PP), polyvinyl chloride (PVC), polyvinylidene difluoride (PVDF) and fully fluorinated thermoplastics. We make sure the design for your plant components is functional and right for you. Using modern CAD equipment and production methods, we can implement a solution to your needs from conception to final product.

Applications:

- Chemical industry
- Annealing/pickling and regeneration
- Non-ferrous metals industry
- Power supply industry
- Galvanising industry
- Metal refining
- Gold and silver industries
- Exhaust air technology
- Waste water technology

Above picture: Nozzle arrays and linings made of polypropylene in concrete flue gas scrubber.

Plants, components and tanks made of thermoplastic materials

Double-walled, solid thermoplastic tanks are often used for various stages in plants carrying out the processes of surface treatment featuring polypropylene, polyethylene or PVC containers with walls up to 60 mm thick.

Processing receptacles and storage tanks form a single unit and a container can serve more than one function. The double walls make for optimum safety.

Spraying surfaces and sieve baskets for FGD plants

To meet the great chemical, thermal and mechanical loads, STEULER-KCH manufactures large-scale nozzle arrays entirely from polypropylene. No further protection, such as that required for steel or glassfibre reinforced plastic, is needed. Because of polypropylene's smooth, anti-adhesive surface, there is no caking or incrustation. Any damage from media absorption or the formation of deposits can also be ruled out. In addition, polypropylene's high degree of resistance to wear and tear can also be clearly demonstrated using a variety of different tests.

Pickling tanks and plant

STEULER-KCH has been a specialist for building tanks, tubs and plant components out of thermoplastics for many years now, offering the construction of both round and rectangular tanks in any size and dimension. Construction is carried out on the basis of DVS 2205 and AD 2000 Leaflets.

Wet electrostatic filters

Wet electrostatic filters are used wherever aerosol/solid mixtures have to be separated out of emission gases with a high degree of effectiveness. Particularly for the separation of acid vapours, aerosols, fine particulates, resin vapours, paint vapours, oil mists and odours, the wet electrostatic filters in use today offer a high cost/benefit effect.

The primary area for using tube bundles from STEULER-KCH can be found in nonferrous metal works, power plants, waste incinerators and chemical plants. The advantages of STEULER-KCH's tube bundles are, on the one hand, their modular construction based on a flexible building-block system and the use of polypropylene (PP) tubing with specified properties and, on the other, a special grounding system that meets the highest safety and security standards.

Above picture: Polypropylene butterfly valve with servo drive.

Oben: Patented tube bundle for wet electrostatic filter.

Above picture: Internal view of sump area in a flue gas scrubber built using concrete and BEKAPLAST™ including fixtures.

System BEKAPLAST™ – Mechanically anchored thermoplastic lining

The ideal combination of stability, safety and resistance

The exceptional feature of the BEKAPLAST™ System is the anchor technique at the back of the sheet, with special studs increasing in size in a conical shape. They create an inseparable mechanical bond between the plastic lining and the concrete, and additionally prevent differential expansion.

BEKAPLAST™ can be repaired repeatedly, ensures high impact durability, and is resistant even to biogenic corrosion, high and low temperatures and thermal shock.

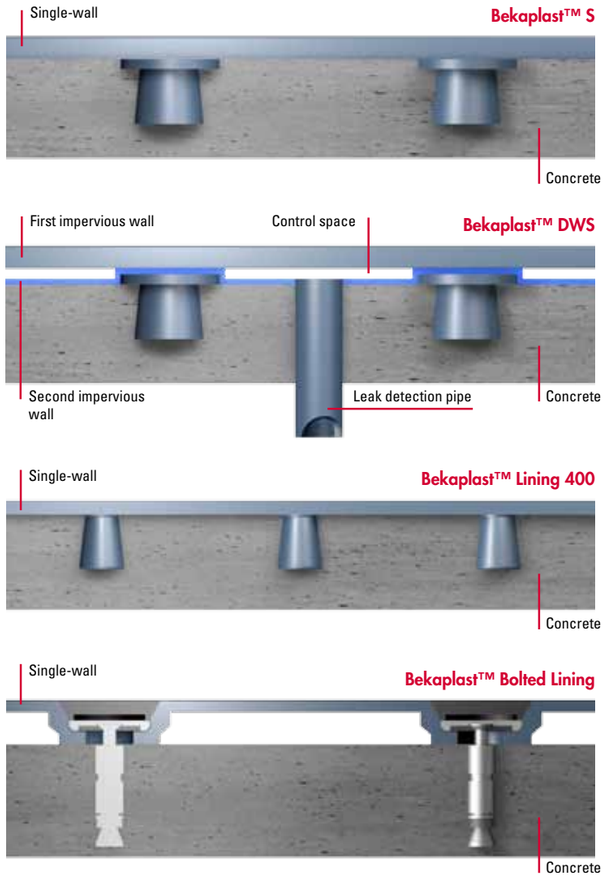
BEKAPLAST™ has been successful on the market for over 30 years. From problem solutions in the chemical industry and municipal sewage systems, to installation and repair of tank and shaft linings, through to tank construction – potential BEKAPLAST™ applications are as diverse as today's demands on modern, futureoriented lining technology.

Above picture: Pre-fabricated BEKAPLAST™ tank made of HDPE for concreting into place on site.

Above picture: Waste water collection shaft lined with natural-finish HDPE BEKAPLAST™.

Polypropylene lined concrete scrubber structures

The particularly high degree of resistance to abrasion offered by thermoplastic polypropylene means that this high-impact material from STEULER-KCH can also be used as mechanically anchored corrosion protection in concrete scrubber structures. BEKAPLAST™ lining consists of large thermoplastic panels 5 to 8 mm thick. When the mechanical stresses are especially high, such panels can also be manufactured in thicknesses of up to 20 mm.



Steuler Técnica S.L.
Spain

STEULER-KCH France SARL
France

Ditescor S.A. de C.V.
Mexico

Steuler Maroc S.A.R.L.
Morocco

Alphaplast S.A.
Spain

Steuler Nordic AB
Sweden

Shanghai STEULER-KCH Anticorrosion Engineering Co. Ltd.
China

CIMA S.r.l.
Italy

KCT Sp. z o.o.
Poland

Steuler Industrial Corrosion Protection Pty. Ltd.
Australia

Steuler New Caledonia S.A.R.L.
New Caledonia

STEULER-KCH
Branch Saudi Arabia

STEULER-KCH
Branch Austria

Together with its international subsidiaries and representatives, STEULER-KCH offers its customers a worldwide network which develops and implements comprehensive system solutions.

SURFACE PROTECTION
Lining and flooring systems
Cements, jointing materials, brick and rubber linings

PLASTICS ENGINEERING
Equipment, piping and tanks made of duroplastics and thermoplastics
Thermoplastic lining systems

REFRACTORY SYSTEMS
High temperature refractory linings

POOL CONSTRUCTION
STEULER-Q^{7} lining systems

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