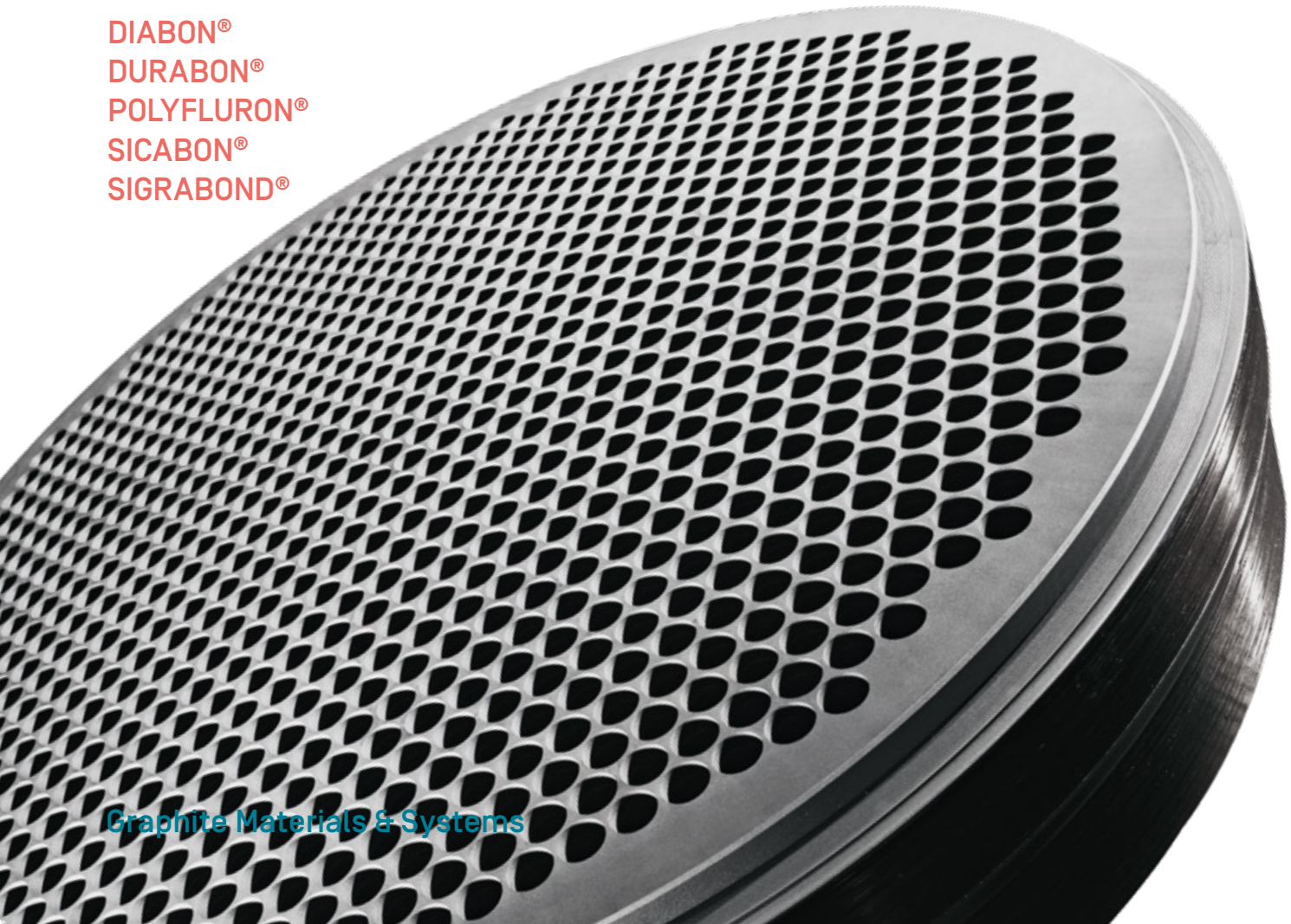
sgl carbon

The Resistants

Our process technology for corrosive applications

DIABON®
DURABON®
POLYFLURON®
SICABON®
SIGRABOND®



Graphite Materials & Systems

7 decad
3 generati

Skid-mounted HCl synthesis unit
Superior operational reliability

Each of our equipment and process solutions consists of up to 10000 single parts and uses high-performance materials such as our chemical-resistant, resin-impregnated DIABON graphite, which withstands the severe process conditions. Our products are designed to meet our customer's specification providing convincing total cost of ownership, long service intervals and low downtimes. Several of our more than 20000 deliveries have been doing this for over 70 years. It's like the grandfather started the unit his grandchild is operating. "Resistants", indeed, for three generations.

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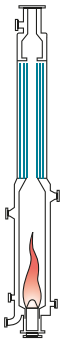
Our process technology for corrosive applications

Profit from our expertise in corrosive applications. As your development partner we will not rest until you – our customer – are satisfied. Our full backward integration with the consequent material know-how, our engineering competency, service focus and extensive application experience enable us to do exactly this. As a leader of our industry we are convinced that together with you we will develop tailored solutions, products and services as well as trend-setting innovations that keep you ahead of competition.



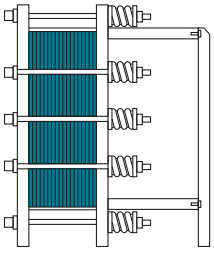
Your key benefits

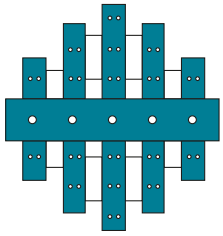
Our systems, equipments and components provide maximum safety for your production processes while ensuring both availability and cost effectiveness. Moreover our comprehensive range of services covers the entire lifecycle of your facilities. We are your reliable partner, not only your supplier.

Products of SGL Carbon

Process solutions

- HCl syntheses
- Absorption of HCl gas
- Production of HCl gas from hydrochloric acid
- Evaporation and concentration of hydrochloric acid
- Purification of HCl
- Dilution of H_2SO_4
- Concentration of H_2SO_4
- Concentration of H_3PO_4
- Defluorination of H_3PO_4
- Treatment of exhaust gas and flue gas
- Destruction of fluorochlorinated hydrocarbons (HCFC)
- Handling of acidic gases





Equipment

- Shell and tube heat exchanger
- Block heat exchanger
- Plate heat exchanger
- Groove heat exchanger
- Columns, reactors, vessels
- Quenchers
- Pumps

Parts and assemblies

- Rupture disks
- Column internals
- Feed tubes
- Expansion joints
- Piping
- PTFE liners
- PTFE hoses

Services

- Start-up
- Operation
- Upgrade
- End-of-use

Our materials

DIABON®: Impermeable synthetic graphite based on resin impregnation, PTFE impregnation or fluoroplastic bonding suitable up to a maximum material temperature of 220 °C. DIABON is certified by FDA.

DURABON®: Baked carbon with great hardness but low thermal conductivity.

POLYFLURON®: Synthetic fluoropolymer of tetrafluoroethylene (PTFE) available as paste extruded (white and antistatic black) and skiffed material grade.POLYFLURON is certified by FDA.

SICABON®: Compound of silicon and carbon (SiC) suitable for ultra-demanding applications such as oxidizing media.

SIGRABOND®: Carbon fiber reinforced carbon (CFRC) or carbon fiber reinforced plastic (CFRP) with superior mechanical properties suitable for processes up to 1000 °C and above.

Exotic Metals: Titanium, Hastelloy, nickel alloys and zirconium for demanding pump applications.

Process solutions

As market leader we provide support for all chemical processes in corrosive applications. We make the difference by our comprehensive backward integration, our in-house engineering competency and project execution. A perfect combination of enablers for delivering package systems from a single source in the shortest possible lead time.

Benefit from over 70 years of experience in equipment production and the competence to interconnect these equipment to trend-setting process solutions.

Isothermal absorption system

What makes the difference

In-house engineering know-how and project execution
We develop individually tailored solutions that satisfy your requirements in every respect. A team of experienced design engineers will work together with experts in plant construction and process engineering, as well as with other specialists if required, to execute the project successfully.

Material excellence and process knowledge
As an experienced material and equipment supplier, we can rely on the high quality of our materials, such as DIABON, POLYFLURON, SICABON and SIGRABOND. Combined with our wide-ranging expertise, we provide solutions for corrosive applications that focus on sustainability and resource efficiency.

Attractive cost-value ratio
Industries throughout the world are experiencing increasing competition and cost pressure. Long-term success will depend on the ability to address these challenges. With our state-of-the-art, commercially optimized systems we are your ideal partner to gain a decisive edge over your competitors.

Safety and quality first
We strive to deliver the lowest total cost of ownership while meeting tight environmental and safety regulations, as well as ambitious technical requirements. In any case, we will never compromise on quality and safety.

Tailor-made as well as standard solutions
With our tailor-made, innovative solutions and integrated approaches we ensure outstanding efficiency and improved customer value. Our offer comprises the whole range: from complex systems to single units, as well as a comprehensive standard portfolio.

↑ Decomposition unit for processing flourinated hydrocarbons

Your key benefits

- **Engineered**
  Inhouse engineering know-how and design capabilities.
- **Ingenious**
  Own laboratory for determination of phase change equilibria data, state-of-the-art modelling tools (e.g. Aspen+, FEM, CFD)
- **On-time, on-budget, on-specification**
  Inhouse project management - no external interfaces, simultaneous engineering, design and equipment competences
- **Warranted**
  Process warranty included
- **Certified**
  Design according to various code requirements possible (e.g. ASME, PED/AD2000, GB)

Applications (typical media)

- HCl gas and hydrochloric acid
- Sulphuric acid
- Phosphoric acid
- Acidic gases
- Exhaust gas and flue gas
- Destruction of flurochlorinated hydrocarbons (HCFC)
- Thermal reaction of halogens
- Other corrosive applications

Industries

- Chemical
- Environment
- Fertilizer
- Food
- Mining
- Plastics
- Pulp and paper
- Waste treatment
- Water

↓ HCl plant with synthesis, stripping and evaporation unit

Our standard solutions for your choice

DIABON and ECOSYN® HCl syntheses
- Standards available from 2.0 t/d up to 155 t/d (nominal output based on 100 % HCl)
- Production of hydrochloric acid with less than 1 ppm free chlorine
- Production of HCl gas with lowest H_2O content acc. to your requirements
- Reliable operation. Uptimes higher than 98 %
- Highest payback thanks to heat recovery system (e.g. steam recovery)

Absorption of HCl gas
- Standards available from 0.5 t/d up to 400 t/d of 100 % HCl per unit
- Product concentrations from 25 % to 38 % HCl
- Clean flue gases and high HCl concentrations in product acid
- Isothermal, adiabatic and quench absorption available (dependent on HCl concentration and temperature of feed gas)

Production of HCl gas from hydrochloric acid
- Standards available from 2.0 t/d up to 200 t/d of 100 % HCl per unit
- Very dry gas with moisture content 5-10 ppm possible
- Optimal design minimizes consumption of steam and cooling water

Evaporation and concentration of hydrochloric acid
- Suitable for removal of salts or other high-boiling substances from HCl solutions as well as re-concentration
- Pressure swing and extractive distillation technology (H_2SO_4, $CaCl_2$) available for demanding requirements like low feed quality, challenging product pressure or energy demand
- Diluted HCl solutions can be concentrated by distillation up to azeotropic concentration (approx. 20 %)
- Higher concentrations of HCl (> 20 %) can be achieved by means of a two-pressure distillation, extractive distillation or $CaCl_2$ system

Purification of HCl
- Standards available for feed streams up to 300 t/h of HCl
- Stripping columns with dedicated column internals (e.g. SIGRABOND distributor, grids, packing) ensure intensive fluid contact
- Temperatures over 100 °C

Dilution of H_2SO_4
- Standards available for capacities ranging from 0.5 m^3/h to 100 m^3/h of diluted H2SO4
- Continuous or batch process
- High homogeneous acid of consistent quality and temperature (full systems including density optimization)
- Systems fully preassembled in our workshops

Concentration of H_2SO_4
- High concentrations and temperatures over 170 °C possible with SICABON silicon carbide heat exchanger
- Natural or forced circulation
- Two- and three-stage concentration systems at different pressure levels significantly reduce steam consumption by up to 65 % compared to single-stage design

Concentration and defluorination of phosphoric acid
- FGPA conform equipment for defluorination step (corrosion, temperature and vacuum resistance, products free from metal ions)
- Up to 3 times less cleaning cycles (cycles with SGL equipment up to 21 days = 340 days uptime/a)
- Full systems including process warranty, engineering, equipment, piping, and instrumentation availbale

Environmental protection and waste treatment solutions
- Treatment of exhaust gas and flue gas (e.g. quench processes)
- Destruction of flurochlorinated hydrocarbons (HCFC)
- Handling of acidic gases (e.g. from waste incineration)

Missing something? Contact us!

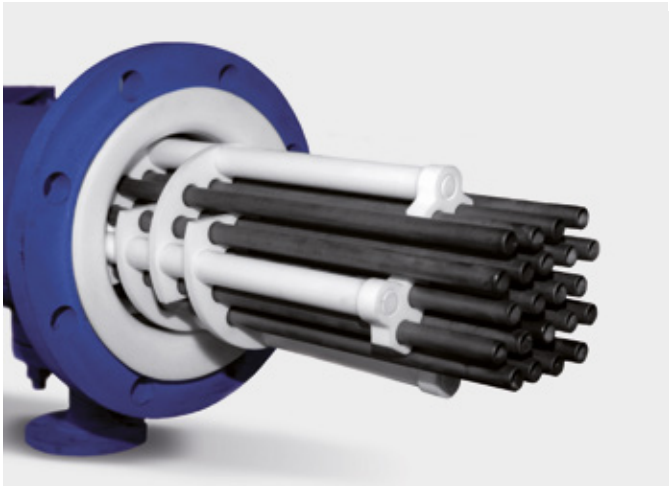
Equipment

Heat exchanger, columns, reactors and vessels, centrifugal and axial pumps, quenchers based on graphite, silicon carbide, PTFE and exotic metals. No matter what you are looking for, we have just the right equipment. Benefit from the safety, reliability, availability, efficiency and economy of our solutions.

Tube bundle of DIABON shell and tube heat exchanger

DIABON®, SICABON® heat exchanger

As a leading supplier with >20000 references all over the world we offer a wide range of corrosion-resistant heat exchanger based on our advanced graphite and silicon carbide materials in combination with a superior constructive design. Our engineering team relies to our global application expertise and assists you in selecting the most economic heat transfer solution.



↑ SICABON shell and tube heat exchanger

↑ DIABON block heat exchanger

DIABON graphite, SICABON SiC shell and tube heat exchanger
Graphite shell and tube heat exchanger have universal applications and are especially recommended for medium to large sizes up to 1500 m² while SiC shell and tube heat exchanger mainly are used to control highly corrosive or oxidizing applications. We provide optimized solutions for your specific requirements which significantly reduce operational costs and, at the same time, minimize risks when processing critical as well as demanding corrosive media.

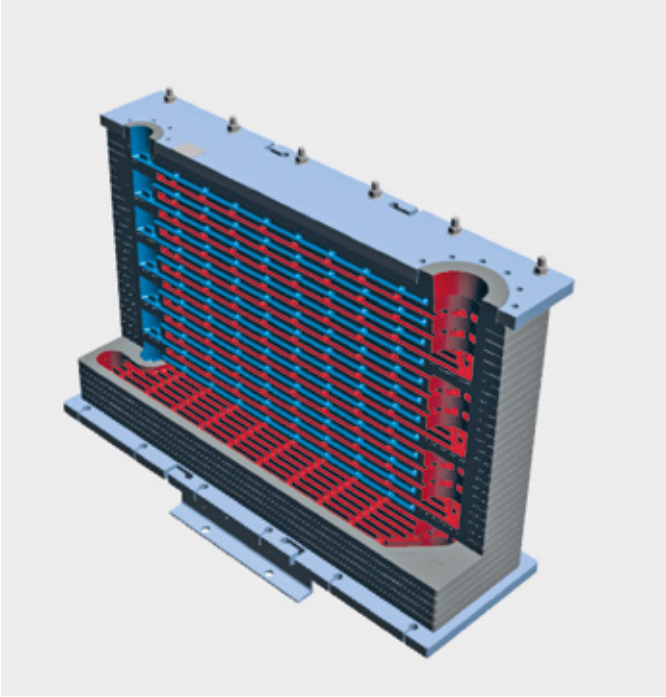
Your key benefits

- **Corrosion resistant**
  High quality graphites and first class phenolic resin impregnation. SiC for ultra demanding applications
- **Robust**
  Monolithic tubesheets up to 1600 mm in diameter.
  Unique tube sheet system for SICABON heat exchanger
- **Safe**
  Up to 20 times less tube breakages through fiber reinforcement technology CARBOGUARD®
- **Compact**
  Ultra efficient graphite tube qualities with lateral heat conductivities up to 70 W/mK (certified by TÜV)

DIABON graphite block heat exchanger
DIABON graphite block heat exchanger are one of the most robust and flexible solutions for heat exchange of corrosive media available on the market. They are universally applicable and recommended for small to medium sizes up to 300 m². Our solutions include cylindrical, cubical and mono-block designs.

Your key benefits

- **Durable**
  Long lifetime: Superior corrosion resistance by full range of graphite and impregnation qualities
- **Available**
  Sturdy design using soft gaskets between blocks result in significant reduced risk of block damages
- **Compact**
  Ultra efficient block drillings and resin film free holes available
- **Flexible**
  Large range of design options for a great variety of applications
- **Cost effective**
  Ease of handling for fast and favorable maintenance



↑ 3D model of a DIABON groove heat exchanger explaining the fluid management inside the unit

↑ DIABON graphite plate heat exchanger

DIABON graphite groove heat exchanger
DIABON groove heat exchanger are an economic and reliable choice – and a perfect solution when a gasket free heat exchanger is required. The machined graphite plates are directly interconnected by means of our cementing technology. In addition, the turbulent flow arrangement achieves high efficiency, thus requiring very small installation space. A compact alternative to e. g. annular groove heat exchangers.

Your key benefits

- **Gasket free**
  No risk of gasket failure and no need of replacement etc.
- **Corrosion resistant**
  Both media (cold and hot) can be corrosive. Only material in contact with process and service media is graphite
- **FDA approved**
  DIABON is FDA approved for food and drug applications
- **Compact**
  Low space requirement thanks to turbulent and resin film free flow channels
- **Compatible**
  Exchangeable with Korobon heat exchanger type KD and type K

DIABON graphite, SICABON SiC plate heat exchanger
Our DIABON graphite plate heat exchangers, developed in cooperation with Alfa Laval, use the most modern and efficient technology on the market and include continous innovations like the world's largest graphite plate heat exchanger type P90. Ultra-efficient and flexible, plate heat exchanger are recommended for small to medium sizes up to 60 m^2. In addition our SICABON silicon carbide plate heat exchanger is available up to type P05 (~5 m^2) to enable the use of the most efficient heat exchanger type also in environments where others fail.

Your key benefits

- **Efficient**
  Highest heat recovery for interchanger
- **Flexible**
  Modular expansion possible
- **Compact**
  Up to 75 % less space requirement
- **Available**
  Up to 50 % less production stops for maintenance, repair and service
- **On short call**
  Standard is 8 weeks

DIABON®, POLYFLURON® columns, reactors and vessels

↑ POLYFLURON PTFE lined column

↑ DIABON graphite column with internals

POLYFLURON linings – corrosion-resistance and high purity
Applied to steel columns, reactors and vessels, our universally resistant PTFE linings deliver virtually unlimited corrosion resistance and high mechanical stability, allowing pressures up to 16 bar and temperatures up to 250 °C; diameters up to 3000 mm can also be achieved. POLYFLURON is especially suited to highly pure applications as it avoids back diffusion of metal ions into the process media and minimizes fouling thanks to its anti-adhesive properties. Of course POLYFLURON is available in an antistatic version and certified by FDA

Your key benefits

- **Safe**
  Lowest permeation/diffusion rates of POLYFLURON avoids corrosion of steel shell
- **Cost-effective**
  section length up to 4000 mm reduced number of flanges
- **Pure**
  POLYFLURON is certified by FDA
- **Ingenious**
  Designed with state-of-the-art simulation tools (CFD, FEM)

Full package solutions
In addition, based on our extensive range of engineering services and mass-transfer calculations, we can offer full package solutions that include column internals. You benefit from less interfaces and clear responsibilities for mass-transfer.

DIABON graphite – robust and economical
Our columns, reactors and vessels made of DIABON graphite are fully vacuum resistant. They can cope with pressures up to 3 bar and reach diameters up to 3000 mm, which makes them the largest columns in the world. The excellent qualities of the material ensure a long lifespan and thus cost efficiency.

Your key benefits

- **Safe**
  Monolithic section design up to diameter 1700 mm, unique segementation technology above
- **Corrosion resistant**
  Designs based on superior material quality of DIABON phenolic resin impregnated graphite
- **Proven**
  Largest graphite columns worldwide in trouble-free operation since 2006
- **Ingenious**
  Designed with state-of-the-art simulation tools (CFD, FEM)

Missing something? Contact us!

DIABON®, DURABON® and exotic metal pumps

↑ DIABON centrifugal pump

↑ Exotic metal propeller pump

Centrifugal pumps
Thanks to our material expertise we deliver solutions that outperform standard pump constructions and help generate the lowest cost of ownership.

Graphite beats
Unlike plastic centrifugal pumps, DIABON graphite is neither permeable nor loses stability over time or at high temperatures. Even accidental dry runs, temperature peaks or other processing irregularities do not damage the pump. DIABON pumps are vacuum resistant, compatible with almost all corrosive fluids and extraordinarily durable.

Your key benefits

- **Efficient**
  Low thermal expansion and absence of swelling allows for very low tolerances and constant performance over years, even up to 200 °C
- **Durable**
  No permeation of corrosive fluids and resistance against nearly all chemicals
- **Abrasion resistant**
  DIABON has a good resistance to abrasion at elevated temperatures. With hard DURABON carbon and free-flow designs we offer solutions that stand up to even the toughest conditions
- **Standardized**
  Designs according to ISO 2858
- **Maintenance-friendly**
  "back-pull-out" design allows inspection and maintenance without disconnecting the piping and volute

Axial pumps
Specially designed to improve the performance of evaporation loops in the phosphoric acid industry, we offer exotic metal axial pumps based on titanium, zirkonium and nickel alloys.

Unreached performers
These pumps allow flow rates up to 20000 m³/h and top heads up to 10 m, even at low speeds. The welded constructions permit higher stability and purity than casted designs, while the outstanding shaft rigidity induces low tolerances resulting in higher efficiency. Moreover, the pumps are much less sensitive to pressure changes or vibrations.

Resistance at its best
The high corrosion resistance results in significantly lower maintenance costs compared to other pumps. In fact we are one of the very few manufacturers of pumps that are capable of working in phosphoric acid. Our axial pumps are used in industries that employ fertilizers/phosphates, potash and sulphuric acids, and are also available in various carbon materials.

Missing something? Contact us!

DIABON® quenchers

Robustness and efficiency
Our graphite-based quenchers are an excellent choice for the treatment of gases in an aggressive chemical environment (e.g. where acids can be generated), and also can withstand gas temperatures up to 1600 °C. Their design, with no moving parts, is extremely robust and is not affected by thermal shock or deformation, while impairment by dust particles is minimized. These are prerequisites for excellent production efficiency.

Pipe quenchers for high heat transfer rates
In this design, liquid and gas flow co-currently through pipes at high velocities. The turbulences created thereby ensure prolonged direct contact and thus high heat transfer rates, while they also reduce the risk of plugging, thus enhancing the effect of large pipe diameters.

Empty pipe quenchers reducing the risk of fouling
In these quenchers the cooling liquid forms a conical curtain which directly acts on the gases flowing through the pipe. This design eliminates the risk of fouling (with particles up to 2 mm) and is especially helpful when low pressure drops are indispensable or capacity fluctuations occur.

Your key benefits

- **Flexible**
  High turndown up to 100%, fast start-up and shut-down, insensitive against varying flue gas composition
- **Installable**
  Compact design due to direct contact heat transfer and optimized free flow cross section
- **Reliable**
  Stop of high temperature reactions by sudden reduction of process gas temperature
- **Durable**
  Long lifetime due to robust design and use of first grade graphite material DIABON

Upgrading your equipment
We also supply materials and designs to improve the temperature- and corrosion resistance of your units in case you do not operate with DIABON-based quenchers.

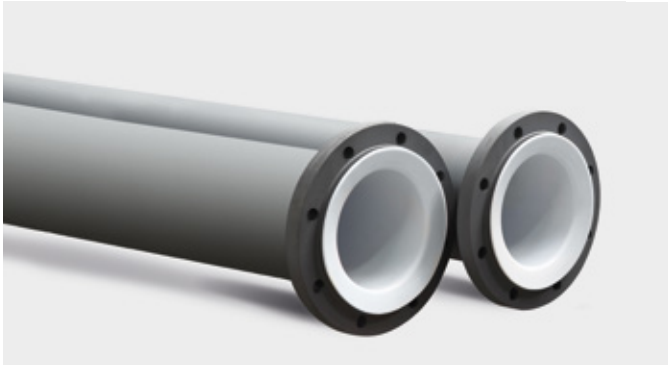
↓ Assembly of DIABON quencher DN2700

Parts and assemblies

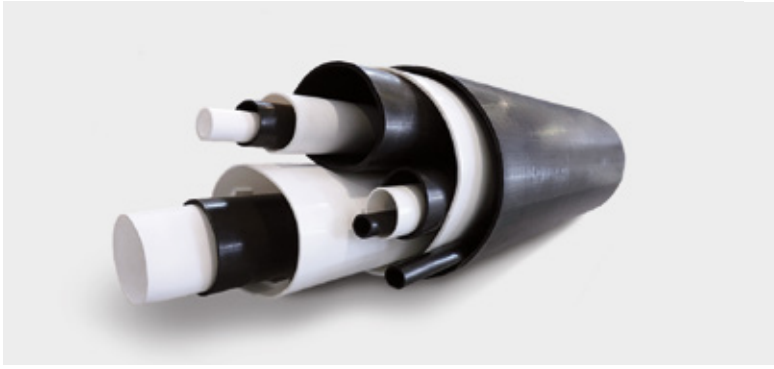
Lined parts as expansion joints and piping systems, carbon fiber reinforced column internals, and rupture disks. The complete range of components at your disposal to ensure safe and reliable operation of your entire process.

FLUROFLEX expansion joints based on POLYFLURON PTFE

POLYFLURON® lined parts



↑ POLYFLURON PTFE piping



↑ POLYFLURON PTFE liners

We provide global support for safe and economical handling of your corrosive media. The basis for our products and solutions is POLYFLURON, which continues to perform safely when other plastics have long since reached their limits.

POLYFLURON expansion joints are also used to absorb oscillations and vibrations – for instance those generated by pumps – because of its low susceptibility to material fatigue and the complete absence of brittle fracture.

Fluroflex expansion joints
Our expansion joints are based on POLYFLURON PTFE and mainly installed in steel- and PTFE-lined steel pipelines, enamel/glass-lined pipelines and plastic and fibre-reinforced plastic (FRP) pipelines. Because of their flexibility and low spring rates, they are also used in sensitive plant components with enamel finishes, in FRP and graphite process equipment and graphite heat exchangers.

- Diameter: DN 25 to DN 2500
- Pressure ratings: Vacuum up to 25 bar/2.5 MPa
- Temperature: Up to 200 °C
- Lining: White or antistatic black
- Large axial, lateral and angular movements

POLYFLURON piping systems
Based on our experience with paste-extruded PTFE and more than 1000 reference customers, we supply a comprehensive range of POLYFLURON lined piping systems, mainly for the transport of corrosive media.

- Diameter (seamless): DN 25 to DN 600
- Length: 100 to 6000 mm
- Pressure rating: PN10 (10 bar/1 MPa)
- Temperature: -10 to +200 °C
- Flange types: EN or ANSI flanges
- Lining: White or antistatic black
- As dip pipe or inlet sleeves for transferring fluid
- Flange safety devices: Safety tapes and shields

POLYFLURON linings and lining services
For the lining of components, we supply a comprehensive range of POLYFLURON liners. You can also request to have your existing components lined directly by our specialists. Our pipe liners are seamless and available in many different sizes:

- Diameter: DN 25 to DN 600
- Length: Up to 8000 mm
- Thickness: 1 mm to 8 mm

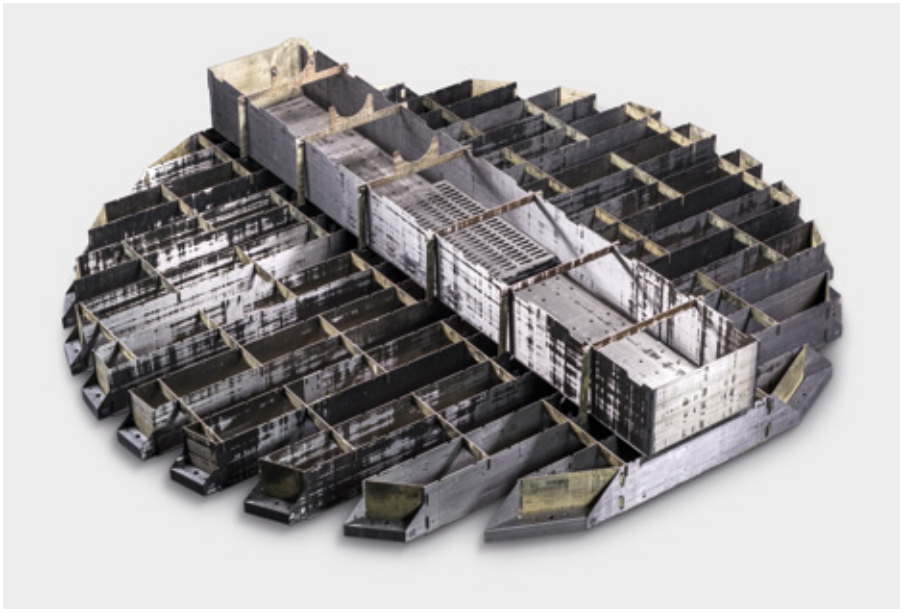
As supplier of large-capacity steel components such as columns, reactors, and vessels with a POLYFLURON lining, we can line components of virtually any shape or size – even complex geometries. Our portfolio leads from seamless to welded linings, depending on the shape and size of the component.

Your key benefits

- **Tested**
  Performance parameters at specific design temperatures are simulated and confirmed by tests,no extrapolation
- **Safe**
  Superior POLYFLURON quality enables high fibrillation, low void content and optimum crystalinity
- **Flexible**
  Up to 10 convolutions, up to 1800mm diameter, vacuum support rings made of CFRC

SIGRABOND® Chemical carbon fiber reinforced column internals

↑ SIGRABOND Chemical feed tubes DN50 and DN125



↑ SIGRABOND Chemical liquid distributor DN3200

Your key benefits

- **Freedom in operation**
  - Performance warranty for mechanical and hydraulic design
  - Third-party certification of mechanical design by FEM on request
  - Hydraulic design confirmed by distributor test at test bench
  - Design and materials ensure high tolerance to process fluctuations
- **No material mix in internals**
  - Full portfolio of column internals made of carbon fiber composites (CFC) available
  - Portfolio covers the whole range of applications regarding volume flow, temperature and corrosion resistance
- **Easy handling and installation**
  - Lightweight design of all components
  - Segmented versions for installation via manhole
  - Exclusive use of materials with non-ceramic properties

SIGRABOND Chemical is a modern, high-strength, temperature resistant composite material made of carbon fibers within a plastic or carbon matrix. It outperforms most other conventional materials and provides significant technological, as well as economic, benefits.

Our internals are designed both for new column installations and upgrades of existing installations utilizing traditional corrosion-resistant materials (exotic metals, ceramics, plastics, glass linings, etc.) in the chemical, fine chemical and petrochemical industry, as well as in the food and fertilizer industry.

Combined competencies
We have set up a cooperation with the global leading internal supplier, thus combining our material expertise with their mass transfer know-how. This results in innovative and economic solutions for your demanding applications.

Full range
Our innovative column internals include:

- Liquid distributors
- Liquid collectors
- Structured packing
- Support grids
- Retaining grids
- Feed tubes for liquids and gases
- Column plates (e.g. sieve plates)

DIABON® rupture disks

More control – more reliability
Our rupture disks, made of high-grade graphite for process equipment, steadily burst at the rated pressure. Due to the homogenous structure of the material, constant strength is maintained all over the disk, only rupturing when pressure reaches the critical value.

Ring flanges for additional safety
On request, our disks (series N, F and HT) can be supplied with a carbon fiber-reinforced ring flange. This reduces the risk of rupture due to assembly errors and minimizes the likelihood of media escaping after the safety disk is released.

Instant release of pressure
A further major advantage lies in the optimized brittleness of the material. Thanks to this, our DIABON graphite rupture disks instantly free the entire pressure release aperture on bursting.

Resisting temperature rises
While the conformity to rated bursting pressures in metal rupture disks generally declines as temperature rises, our disk series F and HT remain unaffected by heat. The mechanical strength of the disks doesn't alter over the entire permissible temperature range.

Your key benefits

- **Independant**
  Bursting pressure remains constant across the full temperature range
- **Variable**
  Available in many designs and material options for multiple process conditions (e.g. vacuum, food and pharma application)
- **Safe**
  Pressure release across the entire aperture due to cermic properties of DIABON graphite; visual and acustic alarm systems are available
- **On short call**
  Rupture disks are available from stock in many sizes and designs

Conversely, our rupture disks made of synthetic resin-impregnated graphite (series N, D and DV) do show influence of temperature, but this occurs only above 50 °C. Yet their reliability is clearly higher in comparison to metal disks, as DIABON graphite rupture disks exhibit a much smaller drop in bursting pressure with a rise in temperature.

↑ DIABON rupture disk DN300

Missing something? Contact us!

Services

We provide first class services throughout the lifecycle of our products to enhance your benefits.

Customer needs come first. Based on this philosophy we offer a comprehensive service portfolio for:

- Start-up
- Operation/Maintenance
- Upgrade
- End of use

Among others, our extensive services include material expertise, engineering support, installation, commissioning, maintenance, repairs, emergency supplies, upgrading, revamping and, finally, disposal of equipment.

Heightening safety and minimizing costs
Our experienced fitters, supervisors and service specialists work regionally within a global network and to the high quality standards of SGL Carbon. Through our competent support and reliable partnership we translate your needs into solutions that provide highest safety standards and minimize cost of ownership.

Expertise for your success
Beyond our comprehensive services, the proximity to our customers is an essential factor for success. We share our expertise in materials and technology and our market knowledge in order to develop solutions that meet your needs precisely. Moreover, we offer individual training and workshops to impart specific know-how for every phase of the lifecycle, and to strengthen your competencies.

Thus, our services enable customers to fully benefit from our high quality materials, products and solutions. We give you support to adapt your processes to fast-changing market demands and to master the challenges of cost reduction and efficient operations – the key to business success.

↑ Initial assembly of chlorine feed pipe at a HCl synthesis unit

Start-up

The art of commissioning
Initial operation of complex systems and valuable equipment requires detailed preparation to avoid damages due to improper handling or installation. Being the original equipment manufacturer, we have detailed knowledge of delivery and assembly, and our long-term experience ensures professional and safe installation.

Safe start
Only fine-tuned systems operate according to design specifications and fulfill the highest safety standards that you demand. In addition, our performance tests verify full operational capability and high product quality during commissioning.

Your options

- Unpacking and inspection'
- Assembly and installation
- Commissioning
- Performance tests
- Consulting and operator training

↑ Final inspection of a flange connection before start-up

Operation / Maintenance

Advantage through maintenance
Standard maintenance often is carried out by the companies that run the plants. Yet complex demands and special materials, such as graphite, require the support of a specialized partner. Our experience enables us to provide a full scope of services covering everything: from general assistance right up to intricate tasks. We can set up customer-specific maintenance approaches to ensure uninterrupted high performance of your systems and equipment; a crucial issue in increasing market competition.

↑ Field service with respiratory protection – nothing special for our trained fitters.

Fit for emergency
However, as unexpected equipment failure cannot be avoided completely, a reliable service partner is vital. We offer a high quality trouble-shooting service combining fast response and in-depth competence, which enables our experienced fitters to restart your system or equipment with minimal downtime.

Spare parts
As a fully integrated original equipment manufacturer, we are able to supply genuine spare parts of high quality material and maximum operational reliability – readily available and with minimum lead times. Moreover, we offer comprehensive prevention concepts for systems and complex production lines on site.

Your options

- Emergency procedures and trouble-shooting
- Investigation and failure analysis
- Maintenance and repair (on-site and off-site)
- Equipment cleaning services
- Genuine (OEM) spare parts
- Inspection, diagnosis and expert advice

Upgrade

Keeping up with changing markets
New challenges can arise during the service life of equipment and systems. For example, a competitive market environment may require more energy savings, or production capacity may need to be increased. Safety and legislation standards may change as well. In such situations, we give you support as an experienced supplier in order to get the maximum out of your facilities, or introduce installation modifications.

Comprehensive enhancement
Our upgrade services go far beyond maintenance and incident management. We are continuously developing new solutions to enable you to be one step ahead of your competitors. Operating in close partnership with you, we provide an insight into your production process and individual needs, and set up specific individual concepts that ensure the best performance of your systems and equipment. Therefore we are using our inhouse modeling capbilities (e.g. Aspen+, FEM, CFD) to optimize for instance thermal designs.

Your options

- Upgrade and modification
- Equipment standardization
- Spare part concepts
- Process simulation
- Laboratory services
- Workshops and training

End-of-use

Interim solutions
End-of-use does not necessarily mean end of life. Changing market conditions may require the adjustment of existing installations to new operation conditions, or even the temporary shutdown of a plant. Based on our broad operational know-how, we support you to implement the best solution in this kind of situation.

Lasting disposal
When your equipment reaches its end of operating life, we consider it our responsibility as a manufacturer to provide solutions for the closing of the product's life cycle. Our end-of-life (EoL) service offers individually tailored solutions adapted to your requirements. Our offer is based on years of experience, detailed know-how and in-depth knowledge of materials and the certified, lasting disposal of them.

Your options

- Conservation for temporary shut-down periods
- Certification and revamp of used equipment
- Adjustment to new applications
- End-of-life service

↑ Disassembly of a used DIABON heat exchanger

Missing something? Contact us!

Successful together

In addition to manufacturing products, we offer you smart, sustainable solutions based on our extensive expertise in a wide range of applications. We intend a close working relationship with you and clearly understand your specific requirements. This puts us in a position to develop new, forward-looking solutions and respond effectively to challenges as they arise. This is how we innovate. An example - the first entire family of CFC-based column internals.

Setting the benchmark

Whenever materials like stainless steel or plastics do not cope with aggressive environments (such as corrosive or high temperature situations), carbon fiber composites (CFC) provide a highly resistant alternative.

Our SIGRABOND Chemical carbon-fiber reinforced carbon for column internals excels in lightness, stiffness and strength, resists much higher temperatures than plastic and is at a lower cost level than special metals.

For these reasons, a leading company for separation and mixing technology decided to extend their cooperation with us in the field of column internals. As a result, we deliver a unique and complete portfolio that includes support grids, packing, liquid distributors, collectors and feed pipes made of SIGRABOND Chemical.

For the first time, an entire family of CFC-based column internals is available, allowing for the often difficult combination of different materials to be avoided. Moreover, an innovative connection system enables the realization of larger diameters and allows for cost-efficient production.

Smart Solutions

Be it materials, components or production processes, we focus our thinking and actions on the customer and keep an eye on the big picture. Our solutions already anticipate the future today.

The following examples show a selection of our unique product range.

Mobility

- Lightweight components and structural parts based on fiber-reinforced composites for automotive and aerospace manufacture
- Graphite anode material for lithium-ion batteries in electric vehicles
- Carbon-ceramic brake disks for sports cars and luxury sedans

Energy

- High-temperature solutions based on specialty graphites and fiber materials for the photovoltaic industry
- Carbon fiber materials for rotor blades
- Gas diffusion layers for fuel cells
- Systems for more efficient heat exchange and heat recovery
- Carbon fibers for pressurized gas containers

Digitization

- Carbon, graphite, and CFC components for polysilicon and monocrystal pulling in the semiconductor industry
- High precision, coated graphite carriers for the production of LEDs

→ State-of-the-art green production with the world's largest isostatic press

SGL Carbon

We are leaders in the development and manufacture of products based on carbon, graphite, carbon fibers, and fiber-reinforced composites. In partnership with our customers, we develop intelligent, trendsetting, and sustainable solutions that deliver a clear benefit.

With our in-depth material, engineering, and application know-how, we make a substantial contribution to the major future topics mobility, energy, and digitization.

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