

SILICA

Verfahrenstechnik GmbH

CLEAN IT • DRY IT • GREEN IT





We are Part of the Berndorf Group

SILICA Verfahrenstechnik GmbH is proud to be a part of the renowned Berndorf Group. This affiliation enables us to draw upon a broad and extensive network of expertise. The Berndorf Group comprises 13 companies and 5 joint ventures, collectively offering an impressive range of skills and technological capabilities.

The companies within the Berndorf Group primarily operate in the high-tech metal processing segment. Based on close collaboration within the group, we can leverage synergies and develop innovative solutions that go far beyond the range of individual companies.



Learn more about the Berndorf Group and its companies:



SILICA Verfahrenstechnik GmbH

Welcome to SILICA Verfahrenstechnik GmbH, your trusted partner for innovative and sustainable solutions in plant engineering. For over 95 years, Silica stands for quality, experience and expertise. In a time where energy transition and reduction of CO₂ emissions are key issues, we are making a significant contribution with our advanced technologies and customised solutions.

In this brochure, we would like to present our latest developments and projects that are contributing to the establishment of the hydrogen infrastructure in Europe. Our focus is on the areas of purification of green hydrogen, drying of CO₂ for CCS (Carbon Capture Storage) and CCU (Carbon Capture and Utilisation) applications, as well as for energy storage. These topics are not only crucial for a sustainable future, but also for the competitiveness and innovative strength of the industry.

With decades of experience and unmatched expertise, our engineers accompany your project from the initial idea to

commissioning. Whether planning new plants or optimising existing systems – with SILICA you get everything from a single source. Our technologies are designed to ensure the highest quality and energy efficiency, thus making a significant contribution to the circular economy.

Our growth strategy is reflected in our recently opened subsidiary in Poland, which increases our manufacturing capacities. This step allows us to continuously respond to our customers' needs and to offer innovative and customised solutions.

Discover how SILICA Verfahrenstechnik GmbH, as a pioneer and reliable partner, is helping to transform the economy with renewable technologies. Together with our partners, we are creating the basis for a greener and more efficient industry.



Hydrogen Purification



The first hydrogen purification system was supplied by SILICA in 1941. Since then, our technologies have consistently guaranteed a hydrogen purity of 99.999%, and even higher upon request. Whether for electrolysis plants or CO₂-free hydrogen production by methane pyrolysis, our solutions are flexible and efficient. Our consistently modular design and patented Hy-BOOST® technology ensure minimal energy consumption with maximum plant availability.

Hydrogen: Energy Carrier of the Future

Hydrogen is the lightest element and plays a central role in the sustainable energy supply of the future. Due to its wide range of applications, it is indispensable for a CO₂-free energy future. Hydrogen can be used as a medium for energy storage, for power and heat generation or in chemical processes. The only residue left after combustion is water, which makes it particularly environmentally friendly. If hydrogen is produced by electrolysis with renewable energies, the energy cycle is completely CO₂-free.

Key Properties and Advantages:

- **Versatility:** Usable as a medium for energy storage, for power and heat generation, and in chemical processes.
- **Environmental friendliness:** Water is the only emission during combustion.
- **CO₂-free production:** Generated by electrolysis with renewable energies.
- **Alternative production method:** CO₂-free hydrogen production by methane pyrolysis.
- **Innovative technologies:** Highly specialized purification systems and customised components for the highest purity standards.



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Arcus  **DYNAMIC IN STAINLESS**

CCS Carbon Capture Storage

Carbon capture and storage (CCS) is an innovative and crucial technology for reducing greenhouse gas emissions. It plays a central role in combating global warming and contributes to achieve the goals of the Paris Agreement.



By using our innovative technologies, we make an important contribution to environmental protection and sustainable resource management. Together we can overcome the challenges of climate change and shape a greener future. Talk to us about your CCS/CCU projects – we will work together to develop the optimal solution for your application.



The Importance of CCS/CCU for Reducing Greenhouse Gas Emissions

CCS is a three-step method that involves the capture, transport, and permanent storage of CO₂. With this technology, CO₂ emissions from industrial processes, such as steel and cement production or energy generation from fossil fuels, can be avoided. If captured, CO₂ is used to produce new products like methanol or methane, it is referred to as Carbon Capture and Utilization (CCU). By capturing, storing, and utilising CO₂, we can significantly contribute to limiting global warming to 1.5°C, thereby preventing the worst effects of climate change.

SILICA offers advanced and customised systems for the purification and drying of CO₂, ensuring the highest efficiency and reliability:

- Our technologies purify and dry captured CO₂ to enable its seamless transport, storage, and further industrial use. This purification and drying step is necessary because moist CO₂ is highly corrosive and could severely damage pipelines and equipment if left untreated.
- Processed CO₂ can be catalytically synthesised with renewably produced hydrogen into methane or methanol in a further process step. Both substances are starting materials used, among other things, for the production of synthetic fuels (such as eFuels). Moreover, methanol can also be used to produce plastics, such as polyethylene.

Kelvion



Reduced effort in HAZOP and FMEA



No need for intermediate circuits and additional safety devices

SHELL & TUBE DOUBLE SAFETY HEAT EXCHANGERS FOR HYDROGEN PURIFICATION



Reduced risk of permeation and micro leakages

Double tube safety heat exchangers play an important role in applications where preventing media mixing in the event of a leak is paramount. Unlike a standard shell & tube heat exchanger with a single wall design, the tubes in double tube safety models have two walls, consisting of an inner and outer tube. They also have two tube sheets at each end. If a tube wall is damaged, the product flows through leakage channels arranged between the double tubes into a leakage collection space and triggers an alarm in the leak detection device. Because the second tube wall remains undamaged, the media are kept separate.



FOCUS HYDROGEN



www.kelvion.com

Reliable Purification and Drying Solutions for Hydrogen Storage

Hydrogen is the key energy carrier of the future. To balance the volatile renewable power or hydrogen generation with industrial hydrogen consumers, hydrogen storage plays a central role. SILICA offers a wide range of technologies for conditioning stored hydrogen, tailored precisely to the geological conditions of the storage site and the associated gas impurities.



High Storage Capacity: Underground gas storage, particularly salt caverns, can accommodate enormous amounts of gas and store it safely over long periods. These caverns reach heights of up to 700 meters, more than twice the height of the Eiffel Tower.

Seasonal Flexibility: Gas stored during the summer months is reliably available during the cold winter months to compensate for consumption peaks and ensure the stability of gas networks.

Decarbonised Future: Our purification and drying processes are applicable not only to natural gas but also to green hydrogen, making them future-proof and environmentally friendly. Hydrogen, like natural gas, can be stored in salt caverns and plays a key role for energy transition.

Safe Technology: Underground gas storage uses proven and established technologies that meet the highest safety standards and ensure a continuous supply.

With our hydrogen conditioning systems, we provide the reliability and flexibility that ensure efficient and uninterrupted storage operations. Trust in our expertise and innovative technologies to successfully realize your storage projects. Talk to us about your requirements – together we will find the optimal solution for your project.

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- Auslegung
- Fertigung
- Inbetriebnahme
- After sales Service

- Troubleshooting
- Advice
- Design
- Production
- Start-up
- After sales service

Alle aus einer Hand mit innovativen Ideen zur Lösung Ihrer Aufgabenstellung
All in one source offering innovative concepts for solving your tasks



Future-proof & efficient: Hydrogen storage with W+Z Rohrsystem-Technik GmbH

Your solution for safe, reliable hydrogen storage.

Since 1988, W+Z Rohrsystem-Technik GmbH has been synonymous with top quality and innovation. Our hydrogen storage tanks are the result of decades of experience and cutting-edge technology.

Your advantages at a glance:

- **Maximum safety:** Complies with all relevant safety regulations.
- **Durability:** High-quality materials and precise craftsmanship.
- **Customizable:** Flexible for a wide range of applications.

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Hydrogen Storage

Maximum Storage Capacity, Maximum Flexibility: Hydrogen Storage Solutions for a Sustainable and Secure Future

To make hydrogen widely usable, the gas must be stored efficiently and economically. Proven technologies already exist on the market, but the potential is still far from exhausted. Our solutions are an integral part of hydrogen storage facilities currently being planned across Europe. The demand is growing, as hydrogen storage is crucial to continuously supply-

ing industrial processes with renewable energy. They enable the seasonally independent use of green hydrogen as a raw material and energy carrier, among others, in the steel and chemical industries. SILICA's H2 conditioning systems make an important contribution to ensure the supply of high-quality hydrogen.



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Gaseous Storage

Pressure Tanks: Hydrogen can be stored under high pressure in specialized tanks. This method is particularly suitable for the transport and mobile use of hydrogen, such as in vehicles.

Underground Hydrogen Storage: Salt caverns, for example, offer a large-scale and safe way to store hydrogen deep underneath the ground. This method is ideal for long-term storage and can balance significant fluctuations in energy demand.

Liquid Storage

Cryotanks: Hydrogen is liquefied at extremely low temperatures and stored in insulated tanks. This method allows the storage of larger amounts of hydrogen in a small space and is particularly suitable for long-distance transport, such as in tankers.

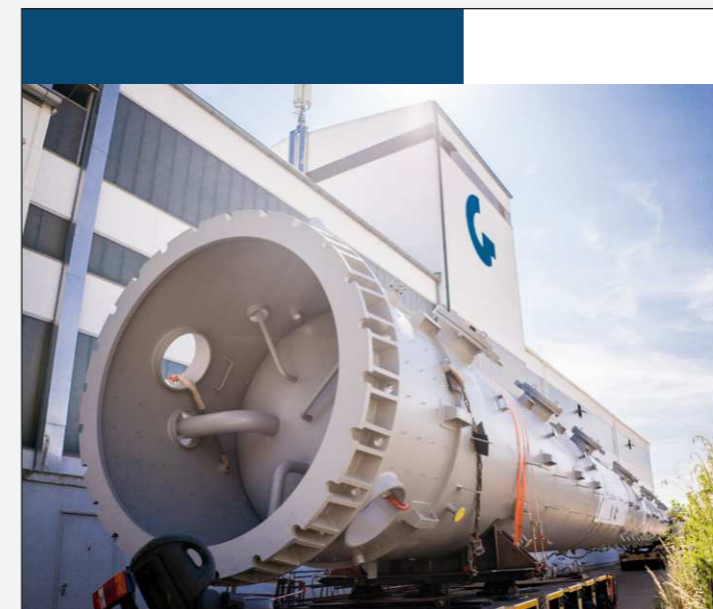
Storage in Solid Carriers

Hydrogen can be stored in suitable solid materials, such as metal hydrides. This method enables safe and dense storage at moderate pressures and temperatures.

Storage in Liquid Carriers

Hydrogen can be stored in liquid organic carriers, such as LOHC (Liquid Organic Hydrogen Carrier), or inorganically in ammonia. This method offers a high storage density and enables easy and safe transport and handling of hydrogen.

Contact us now:



[FROM CONCEPT TO PEAK PERFORMANCE]

Our pressure vessels are not only robust but also pioneering. As a preferred partner to leading companies in the chemical and energy industries as well as in pharmaceuticals and biotechnology, we deliver innovation in every form of pressure vessels and apparatus. Your success begins with our revolutionary precision



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Ready for a Green Future?

Our solutions support you in transitioning your processes to sustainable technologies:

Green Hydrogen: Rely on our highly efficient and reliable systems for hydrogen purification and drying. Regardless of the type of electrolysis, our processes always guarantee maximum hydrogen purity at minimal operating costs.

CCS/CCU: Processes that still rely on fossil fuels can be decarbonised by separating the resulting CO₂. Our technologies for the purification and drying of carbon dioxide enable the safe transport, hassle-free storage, or further processing of the separated gas.

Energy Storage: To balance fluctuations in the production and consumption of green hydrogen, large gas storage facilities are needed. Underground storage facilities are ideal for secure and large-volume storage. Our hydrogen conditioning systems always ensure the maximum purity of the stored hydrogen.

Reliable Partnership: Benefit from customised solutions and comprehensive support – from initial planning to final commissioning. We are your reliable partner, ready to meet your individual requirements.

Contact us to make your processes safer, more efficient, and more sustainable. Let's shape the next steps towards a sustainable future together.

Contact

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