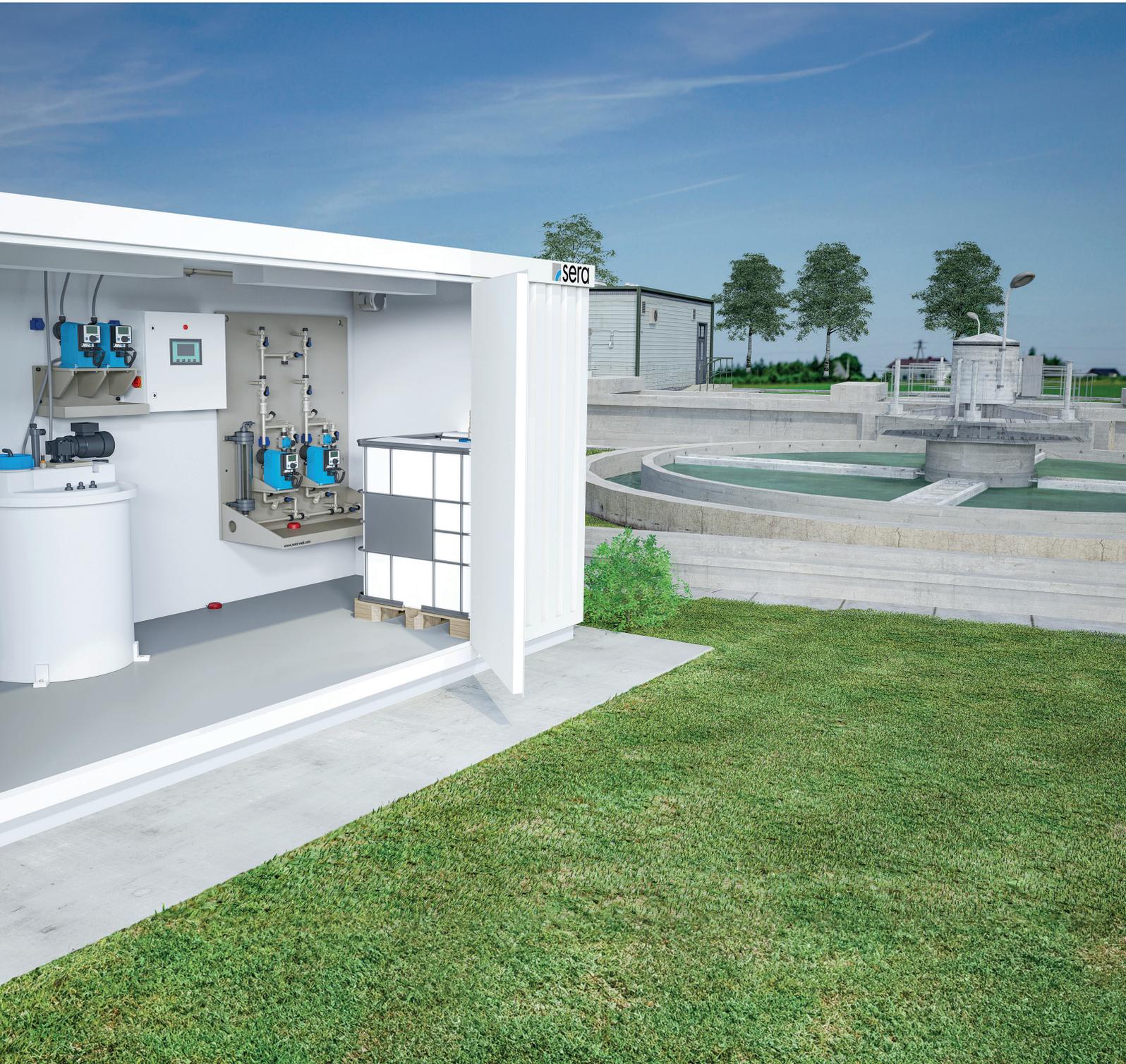


WASTE WATER TECHNOLOGY



INSPIRED. SOLUTIONS. FOR CUSTOMERS.



sera

A company of the future

sera is one of the world's leading companies in the field of dosing and compressor technology. For 80 years, the **sera Group** has been developing and producing application solutions that depend on the precise dosing, pumping and compression of liquids and gases.

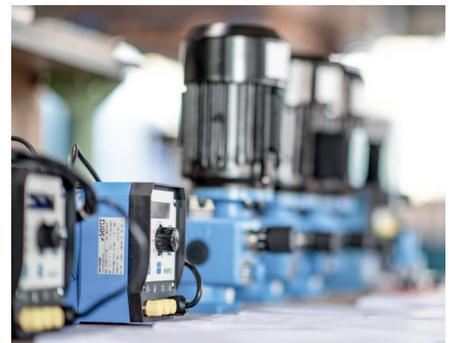
sera is an independent family-owned company headquartered in Immenhausen. In addition to subsidiaries in Great Britain, Austria, Switzerland, South Africa and Spain, **sera** also operates branches in Italy and the United Arab Emirates. More than 30 strong partners represent **sera** in over 80 countries, ensuring expert support, advice and services locally worldwide.

EXCELLENCE IN FLUID TECHNOLOGY

We create added value for people and the environment.

As an environmental technology company, **sera** offers a wide range of products that provide the right solutions for many of your applications worldwide. **sera** products are used wherever the precise dosing and pumping of chemicals and liquids is required, for example in water and waste water treatment and disinfection.

Customised solutions round off our portfolio. In addition, our customers worldwide benefit from our comprehensive services: from support in the planning and commissioning of systems, to the quick and easy replacement of devices worldwide, to the development of innovative technologies.



Comprehensive product portfolio

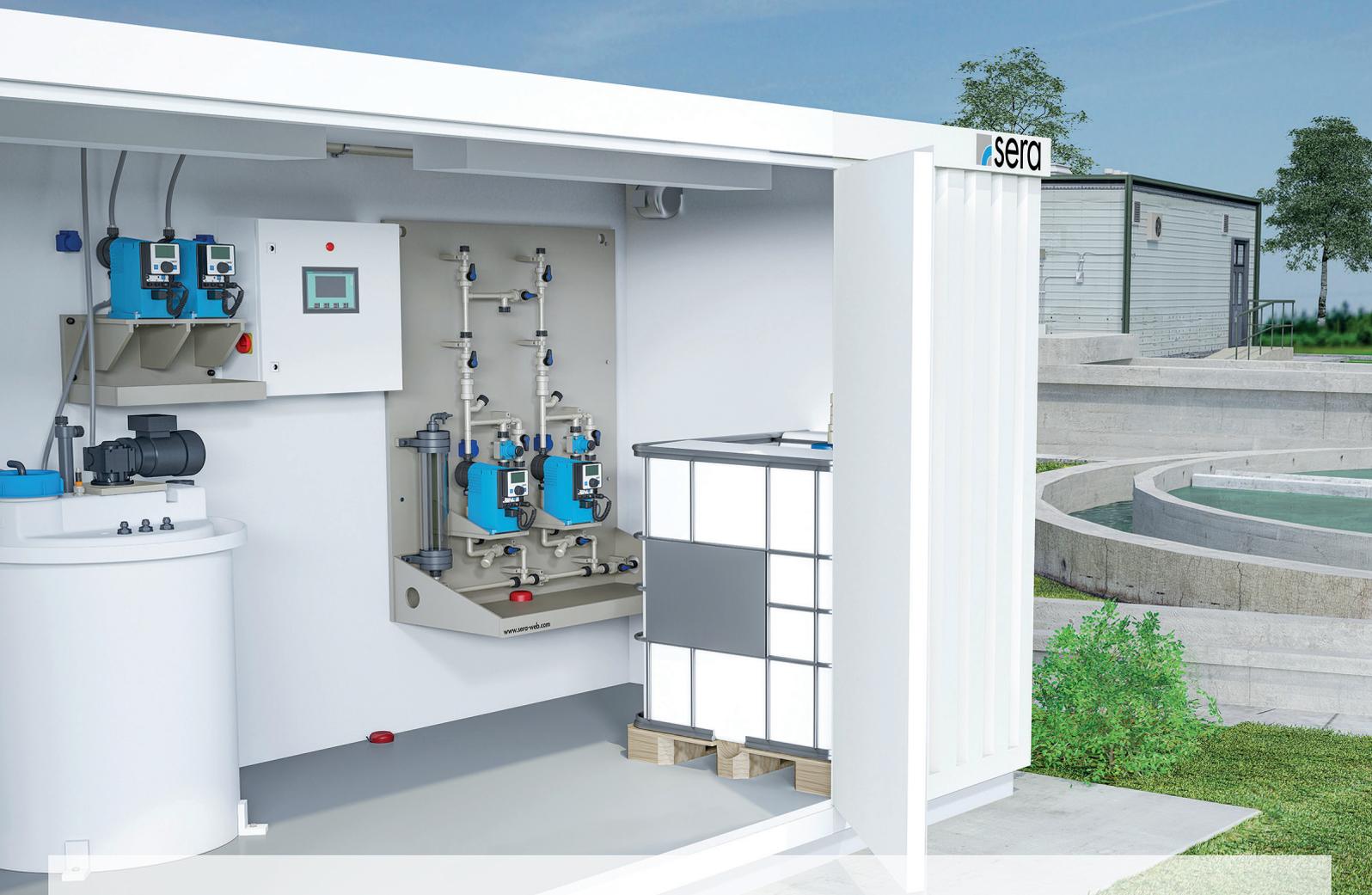
We create customised solutions for your application. Not only can you choose from a wide range of standard products and material designs, but you can also have customer-specific systems configured entirely according to your requirements.

The customer is our top priority

Assigned, expert contact persons throughout the entire offer, order and project realisation process ensure that you receive optimal customer care and advice. We respond flexibly to your needs and are quick and reliable in our processing and handling. From engineering to production and after-sales service, we offer you high-quality products and services.

Long-lasting products and high quality

For 80 years, the name **sera** has stood for exceptional quality and expertise. We develop dosing pumps and systems for extreme operating conditions and long runtimes. That is why the quality and reliability of our products are our top priority. Place your trust in the expertise and experience of our team.



WASTE WATER TREATMENT

Our expertise for your succes

Strict statutory requirements make high-quality, state-of-the-art system and dosing technology essential in industrial and municipal waste water treatment.

The **sera** product range for waste water treatment comprises:

- Complete dosing units and systems
- Preparation and dosing units for polymer solutions
- System accessories
- Dosing pumps

Typical applications in the field of waste water treatment:

- Carbon sources for a balanced nutrient ratio
- Phosphate precipitation
- Flocculation filtration
- Sewage sludge thickening
- Sludge dewatering
- Sludge conditioning
- pH value adjustment
- Defoaming
- Desulphurisation of sewage gas
- Elimination of H₂S



COMMUNAL AND INDUSTRIAL WASTE WATER TREATMENT

sera offers proven solutions for every waste water treatment

Communal waste water treatment is primarily concerned with the purification of domestic and municipal waste water. In waste water treatment plants, standard processes such as mechanical, biological and chemical purification processes are used to remove harmful substances and contaminants.

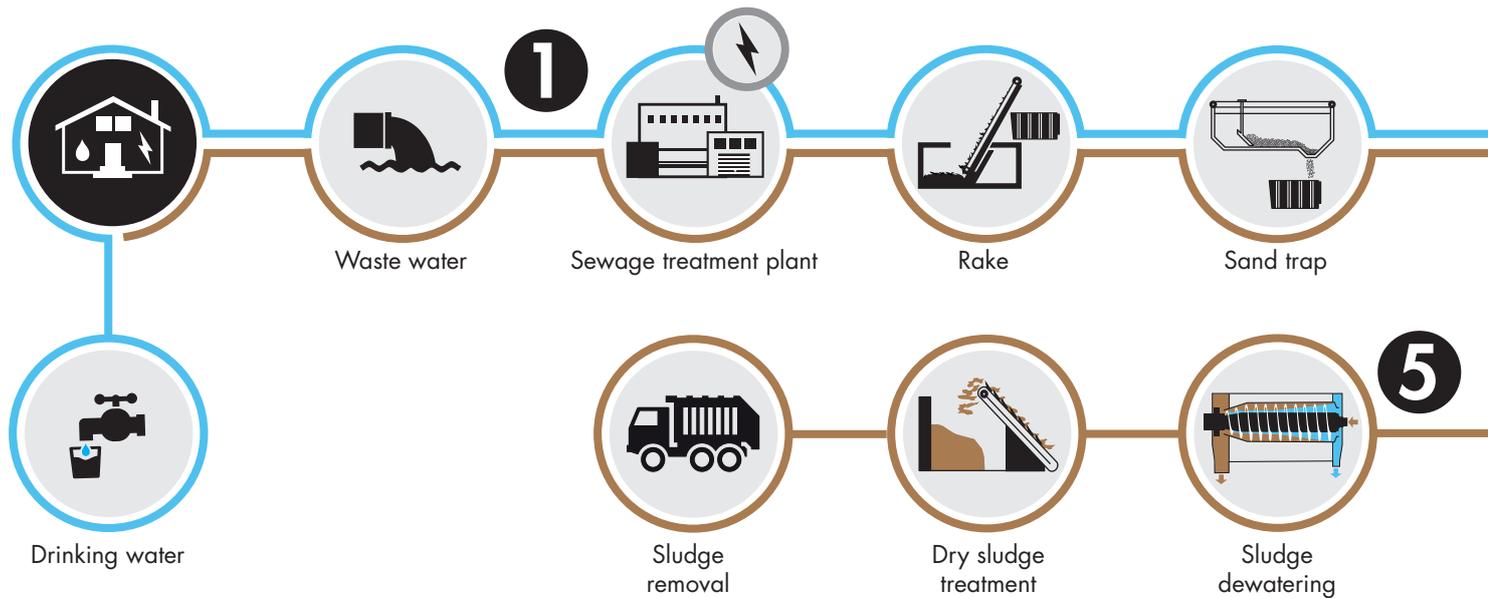
In contrast, industrial waste water treatment is geared to the specific requirements of different industries, which often contain more toxic or specialised waste materials.

Although the nature of the contaminants varies, both communal and industrial operators use similar technologies to purify the water.

Both applications require efficient solutions to meet regulatory standards. **sera** products and solutions are designed to be used effectively in both communal waste water treatment plants and industrial waste water treatment. They offer reliable technologies to support the respective purification processes and contribute significantly to compliance with environmental requirements.

Find out how **sera** products and our expertise can safely and efficiently support your waste water treatment processes and how together we can create added value for people and the environment.

THE PROCESS OF WASTE WATER TECHNOLOGY



In order to find the optimum solution for each process step, we offer an extensive product range. Based on a typical process for waste water treatment, here are some examples of solutions from our product portfolio:

1 ELIMINATION OF HYDROGEN SULPHIDE

Dosing of bivalent metal salts for hydrogen sulphide elimination (H_2S)

2 ADDITION OF CARBON SOURCES

Dosing of methanol, acetic acid, glycol as external carbon sources for a balanced nutrient ratio

3 CLEANING OF VENTILATION SYSTEMS

Dosing of formic or acetic acid for cleaning ventilation systems

4 PHOSPHATE PRECIPITATION

Dosing of precipitants such as $FeCl_3$, $Al_2(SO_4)_3$ for phosphorus elimination / phosphate precipitation

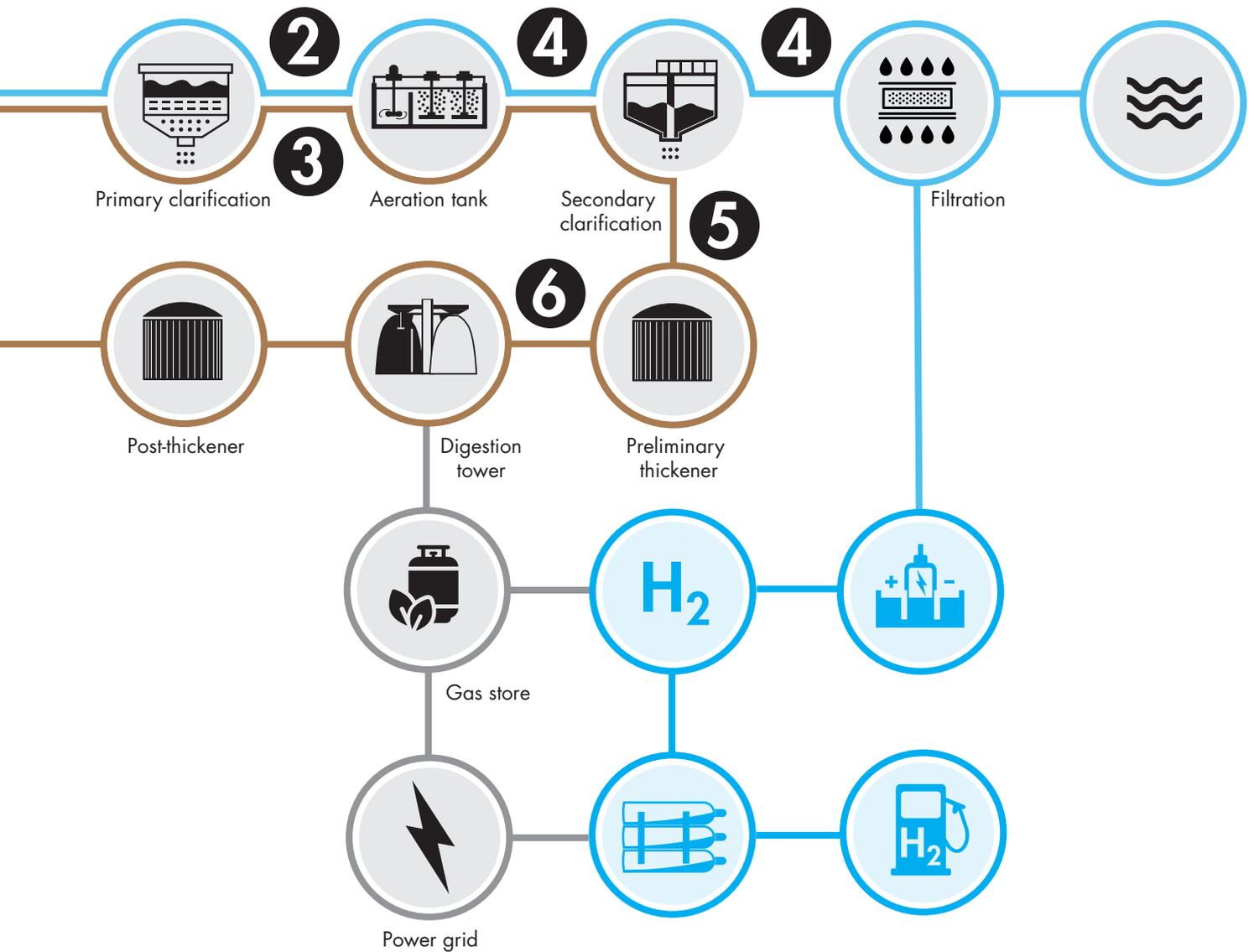
5 SLUDGE CONDITIONING

Polymer preparation system for sludge conditioning for thickening and dewatering

6 FOAM SUPPRESSION

Dosing of defoaming agents to reduce and prevent foam

THE PERFECT SOLUTION FOR EVERY PROCESS STEP





1 Long holding times for waste water in the sewage system are responsible for release of hydrogen sulphide (H_2S). The formation of H_2S can be prevented by dosing bivalent metal salts.

ODOUR-FREE

Elimination of odours in the sewage system



AREAS OF APPLICATION:

Dosing bivalent metal salts e.g. $FeCl_2$



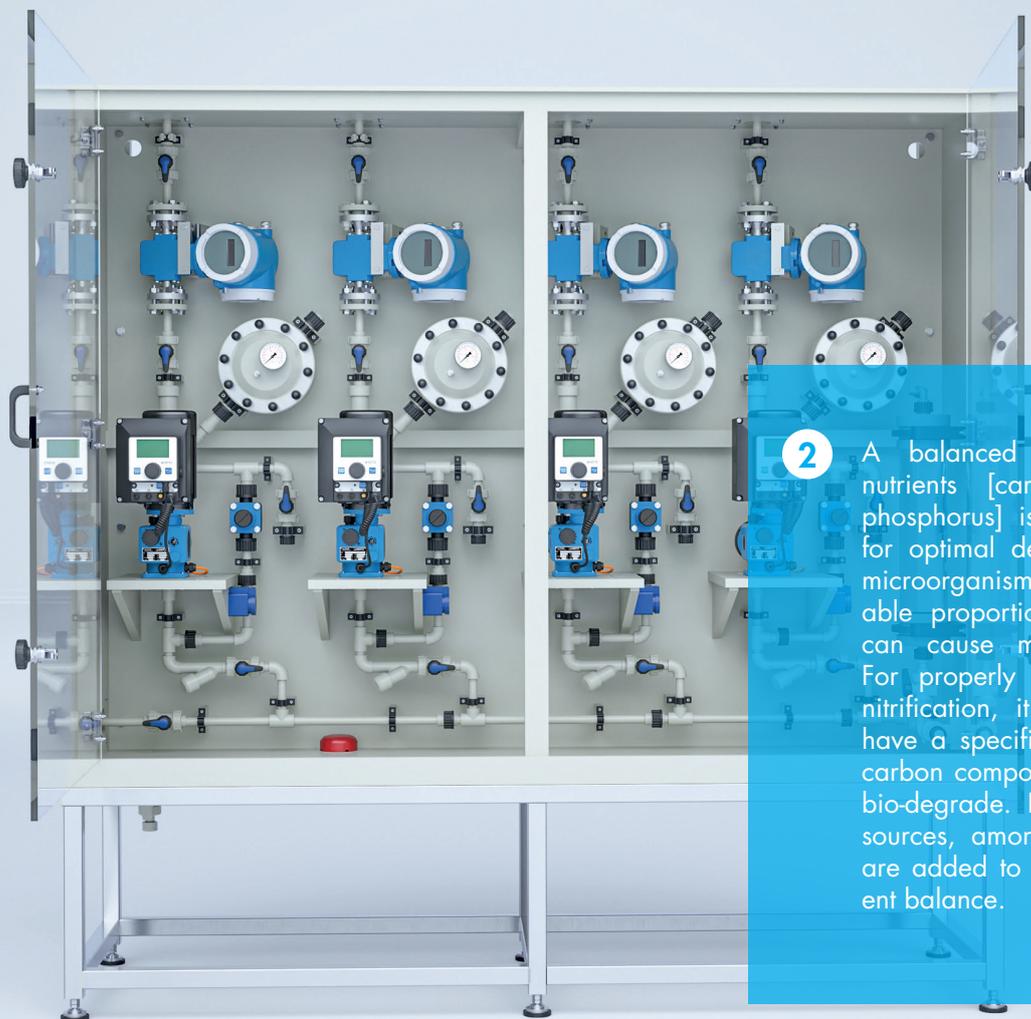
SETUP:

Application-specific dosing systems are installed in outside cabinets or hazardous material containers. Hazardous materials that pollute water can be stored in the insulated containers in accordance with regulations.



FEATURES:

- Hazardous material storage for up to 4x1,000 litre tank containers
- Ventilation and heating of the container to meet requirements
- Gridirons with a load-bearing capacity of up to 2,000 kg/m² over which lift trucks can pass
- Collecting basin with PE insert approved under building regulations
- Easy installation and commissioning - **sera** Plug & Dose



2

A balanced proportion of nutrients [carbon, nitrogen, phosphorus] is a prerequisite for optimal decomposition of microorganisms. Unfavourable proportions of nutrients can cause many problems. For properly functioning denitrification, it is essential to have a specific proportion of carbon compounds that easily bio-degrade. External carbon sources, among other things, are added to achieve a nutrient balance.

OPTIMUM PROPORTION OF NUTRIENTS

Carbon sources for denitrification



AREAS OF APPLICATION:

Dosing of methanol, ethanol, acetic acid, glycol



SETUP:

The completely modular design of our dosing systems facilitates simple adaptation to individual dosing requirements.

The system is designed in accordance with the ATEX directive, as required for handling flammable liquids such as methanol.



FEATURES:

- Compact, space-saving design
- Pump type and size to meet requirements
- Pipes made of PVC, PP, PVDF, stainless steel
- Assembly panel with collecting basin and drain
- Assembly panel - with base frame as an option
- Leakage sensor with building regulation approval

3 Fine-bubble ventilation elements are used for oxygen supply to aeration tanks. The energy consumption for the ventilation depends directly on the injection of oxygen. If the ventilation elements become blocked (e.g. as a result of limescale precipitation), the counter-pressure is too high and this increases energy consumption. The differential pressure can be reduced very effectively by injecting acid into the air supply line.



FIGHTING LIMESCALE

Descaling and cleaning of ventilation systems



AREAS OF APPLICATION:

Dosing of formic and acetic acid



SETUP:

The dosing system is installed on a mobile platform truck. A collecting device offers space for several small containers. In addition, the system is supplied with a suction lance, hose, dosing valve and, as an option, with a chemical steam lock



FEATURES:

- Compact, mobile dosing equipment
- High-quality, robust platform truck
- Collecting basin with a volume of 90L
- Chemical steam lock with binder
- Hard-wearing dosing valve in stainless steel 1.4571



4

Large quantities of nutrients such as compounds of phosphorus and nitrogen can enter the water with the sewage. These accelerate plant growth and thereby change the oxygen balance of a body of water. There is a risk of water eutrophication as a result of the phosphorus and nitrogen compounds. The permitted addition of nutrients is regulated by the Water Framework Directive, the German Wastewater Ordinance and the German Water Management Act. In order to maintain the permitted amount of phosphorus, appropriate phosphate precipitation is required.

PHOSPHATE PRECIPITATION

Precipitation by metal salts



AREAS OF APPLICATION:

Dosing of flocculating agents such as FeCl_3 , $\text{Al}_2(\text{SO}_4)_3$



SETUP:

Our standard CVD dosing systems are perfect for this application because of their modular design. Diaphragm pumps are freely configurable in combination with standard modules. The CVD dosing system is versatile and suitable for pumping out small containers, IBCs and storage tanks.



FEATURES:

- Compact, space-saving design
- Pump type and size according to requirements
- Pipes made of PVC-U and PP
- Assembly panel with collecting basin and drain
- Assembly panel - with base frame as an option
- Accessories such as spray protection, leakage sensor

SLUDGE CONDITIONING

POLYLINE polymer preparation system



AREAS OF APPLICATION:

Preparation of polymer flocculating agents



SETUP:

The standard POLYLINE polymer preparation stations are available as a 3-chamber POLYLINE FLOW pass-through system, a 2-chamber POLYLINE DOUBLE double-deck system and as a 2-chamber POLYLINE SWING pendulum system. Our carefully thought-out and well-designed system can be extended to include certain standard options.



FEATURES:

- Cost-effective
- Efficient
- Reliable operation
- Optionally available with sloping base for complete emptying
- Easy cleaning due to large openings
- Versatile use with solid and/or liquid polymer
- Perfect solution for limited space - very compact variants possible

5

In many waste water cleaning processes, sewage sludge is created and its disposal and re-use is the responsibility of the plant operator. The smaller the volume of sludge and the higher the amount of dry substance, the more effectively recycling and disposal can be carried out. In order to improve dewatering properties of the sewage sludge, the sludge is chemically conditioned with flocculant aids.



CLEAN WATER FOR PRAGUE

At European level, the Water Framework Directive (WFD, Directive 2000/60/EC) of 23 October 2000 made the environmental objectives binding for all member states. One of the intentions described there was to achieve good status for all surface waters and groundwater by the end of 2015.

In no EU member state, including Germany, has the goal of cleaning polluted waste water to protect water from harmful discharges been achieved. A new deadline for this target has been set for 22 December 2021. The need to treat polluted wastewater in order to maintain the quality of European waters requires the rapid implementation of measures. Expansions, conversions and new builds of waste water treatment plants are essential to fulfil these requirements. Here, **sera** plays a decisive role by providing state-of-the-art dosing systems and technology and making its expertise available to both municipal and industrial wastewater treatment plants and partners in order to achieve the desired goals.

One of the most remarkable challenges in this context was the construction of the Prague wastewater treatment plant on the Vltava island of Císa ský.

Prague, as one of the most beautiful and most visited cities in Europe, was faced with the challenge of dealing with the waste water volumes of a busy tourist destination. After a devastating flood in 2002, which destroyed parts of the existing waste water treatment plant, it was obvious that a new plant was needed to not only meet the needs of the growing population, but also to comply with the strict European Union guidelines regarding water quality. In response, the tendering process for the construction of the new waste water treatment plant was initiated at an early stage. In 2011, a consortium consisting of WTE, Suez/

Degremont, SMP and Hochtief was awarded the contract for the construction of the new plant, which was to be built on Císa ský Island on the Vltava River, opposite Prague Zoo. The challenge was not only to build a modern and efficient waste water treatment plant, but also to integrate it harmoniously into the surrounding landscape.

A decisive step in the realisation of this project was the cooperation with Hennlich s.r.o. from Litomerice/Czech Republic, a long-standing partner of **sera**. They were commissioned to supply polymer preparation units that meet the high requirements of the new waste water treatment plant. Thanks to extensive adaptations and customised solutions, **sera** was able to supply the required units and thus make an important contribution to the successful implementation of the project.

After years of planning and preparation, the PolyLines from **sera** finally left the factory premises. The successful commissioning took place in autumn 2018 and since the start of the new waste water treatment plant, four PolyLine Flow 23000 S, two PolyLine Flow 16000 S and five PolyLine Flow 4000 S including big bag racks, dry material feeders and post-dilution units have been working reliably, helping to treat more than 4.1 m³ of waste water per second in the largest wastewater treatment plant in the Czech Republic. The total cost of the sewage treatment plant was 250 million euros and the integration into the landscape was successful: the architects placed large parts of the plant underground and laid a park above it, which serves as a retreat for the citizens of Prague on the island of Císa ský.

The successful realisation of the project did not go unnoticed: it was nominated for the 'Global Water Award 2019' as the best wastewater treatment project in the world. **sera** is proud to have been part of this ground-breaking project and looks forward to the opportunity to apply the knowledge and experience gained to future projects and continue to exceed the expectations of its customers.



STADTWERKE WINTERBERG

Winterberg, a centre of tourism in the Sauerland region with 13,000 inhabitants in 15 districts, has experienced a development boom in recent years and - from the point of view of tourism - has all the features of a typical destination in the central German uplands.

In order to give winter sports enthusiasts 80 days of guaranteed snow a year, a plan was drawn up in the 1990s to make snow. The scheme worked: in 2012, Winterberg recorded more than 1 million overnight stays for the first time - and that was in commercial hotels alone. Unrecorded stays with small and private accommodation providers and about 1.5 million day visitors a year should be added to this. Of course, this has consequences for the local sewage system. Stadtwerke Winterberg AöR (Winterberg Public Utilities) operates two sewage treatment plants which struggle especially in winter with sudden additional loads because of the increase in tourism.

The operator built on our expertise to overcome two particular challenges in this connection: the large number of day visitors has changed WC usage and the quantity of urea in the sewage has increased significantly. As a result, the amounts of carbon and nitrogen in the sewage are out of proportion. In normal public sewage, the ratio of carbon to nitrogen is 5:1, while in Winterberg it hovers around 2:1. This disproportionate ratio leads to a shortage of carbon in the denitrification period. Acetic acid is added to the sewage as a source of carbon to compensate for this. This supports breakdown of nitrates into elemental nitrogen and the ratio of carbon to nitrogen is restored to the level required.

As a result of weeks of snow melting in Winterberg, the sewage also has very low temperatures, which causes poor settling behaviour of sewage sludge in the secondary clarification process. Addition of polymer flocculating agents improves the bonding and

settling behaviour.

sera provided a solution for both challenges: the two sewage treatment plants were each supplied with a complete solution in an insulated hazardous material container with ventilation and heating. A DAV2 dosing system with spray protection doses the acetic acid from a 1,000 litre IBC into the denitrification system. Two iSTEP S50 multiphase motor pumps with a very large adjustment range of 50 ml/h to 50 l/h, supported by a controller, ensure that very large quantities of acetic acid can be added if necessary, but it is also possible to add small quantities of acetic acid continuously in the denitrification process.

Both turn-key containers also have a smart CTD small quantity dosing system to prepare and dose polymer flocculating agents. The polymer is prepared from a concentrate and water, and is added to the feed for the secondary clarification system. The polymer is added automatically, depending on the turbidity in the secondary clarification system. Here, too, we used two iSTEP S50 pumps in order to offset fluctuations as effectively as possible. And this also facilitates easy maintenance and parts supply.

We are delighted that we were able to work with Stadtwerke Winterberg to develop and supply the right solution.



STADTWERKE FLENSBURG

We at sera are experts in the field of sewage sludge conditioning. That's why we were awarded the contract to build and supply a preparation unit for polymer flocculating agents as part of the reconstruction of the mechanical sludge thickening plant of Flensburg sewage works.

In the course of waste water treatment, sewage sludge is created and its disposal and reuse is the responsibility of the plant operator. The aim here is to reduce the volume of sludge and increase the amount of dry material to simplify its reuse and minimise operating costs.

During mechanical sludge thickening in the belt thickener, the thin sludge is conditioned and filtered by adding polymer flocculating agents. Between the flocks, sludge water that has been released runs off through the filter material of the belt thickener as filtrate, while the flocculated solids are held back by it.

sera supplied a customised 2-chamber pendulum system for preparation and addition of the polymer flocculating agents. The system is made entirely of stainless steel and has two batching tanks with a usable volume of 2 m³ each. While water and polymer concentrate is prepared in one chamber in the predefined concentration and then mature, the other chamber is ready for removal. Our system ensures that the polymer flocculating agent is always prepared in the right proportions and with consistent quality, and is released as a stable solution.

Two eccentric worm pumps with dry running protection devices and overpressure protection convey the optimally prepared polymer solution into the belt thickener and the process for mechanical sludge thickening.

Simple operation, maintenance and servicing were very important to the customer. The tanks were therefore supplied with covers of a special size to ensure easy access. The preparation system was also equipped with a customised controller with large 9" colour panel and integrated into the automation and control equipment of the mechanical sludge thickening unit in the central process control system of the sewage treatment plant. Decentralised monitoring and control of the polymer preparation unit is therefore possible.

With the installation of the new mechanical sludge thickening system, operational reliability and the throughput capacity were extended and optimised significantly. In addition, it was possible to reduce the consumption of flocculant aids significantly and simultaneously increase the end dry material content of the thick sludge to 6 - 8%.

The new mechanical sludge thickening system will make a significant contribution to reducing the energy and operating material costs of Flensburg sewage treatment plant in future - due also to the polymer preparation unit supplied by **sera**.



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The Chemical Company

OVIVO Worldwide Experts
in Water Treatment



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sas

WASSER BAU GESELLSCHAFT

WBG

suez
environnement

Degrémont

VEOLIA





OUR REFERENCES AT A GLANCE

sera dosing technology has been in use in a wide variety of industries worldwide for 80 years. Dosing pumps and systems ensure the precise dosing of relevant chemicals and other liquids in many industrial processes.

sera products create added value worldwide for people and the environment.



High-quality pumps, dosing units and systems

We offer you a comprehensive product portfolio of reliable, durable and precise dosing pumps for flow rates from 7 ml/h to 1,900 l/h at pressures up to 220 bar. Or you can choose from a variety of transfer pumps with flow rates up to 54 m³/h.



A wide variety of versions and materials

For over 80 years, we have stood for experience and knowhow. That way, we are able to quickly and flexibly modify your designs or realise the designs you require.



Individual customised solutions

Developing and implementing customised solutions perfectly tailored to meet the needs of each specific application.



Economical solutions

Short delivery times and high availability at great price without compromising on performance. Sophisticated product lines for a wide range of applications with extensive upgrading options and accessories.



Commissioning, maintenance and service

Professional commissioning is the basis for reliable operation of your system. Our maintenance and repair services ensure availability and avoid failures. Supplemented by spare parts service, installation, support and training – for smooth operation of your processes.



Fittings and Accessories

We provide an extensive range of fittings and accessories, thanks to our dosing systems and metering pumps. Feel free to contact us.

POWERFUL SERVICE DIRECTLY FROM THE MANUFACTURER

Technical equipment, systems and components are the heart of many production and work processes. They often work under extreme conditions, have to meet high standards and function reliably to ensure your operational processes. However, like any technical facility, they are subject to natural wear and tear, which can become a significant risk without regular maintenance.

The consequences of inadequate service range from a gradual loss of efficiency and higher energy and operating costs to sudden, unplanned outages. Such disruptions can cause production downtime, jeopardise delivery times and significantly increase your operating costs. In the worst case, there is a risk of damage that would require the complete renewal of components or systems.

Regular servicing is the key to avoiding such scenarios. It guarantees the long-term reliability and durability of your systems, minimises downtime and protects your investments. In addition, professional maintenance helps to increase the safety of your processes and to comply with legal requirements.

Your added value with sera service

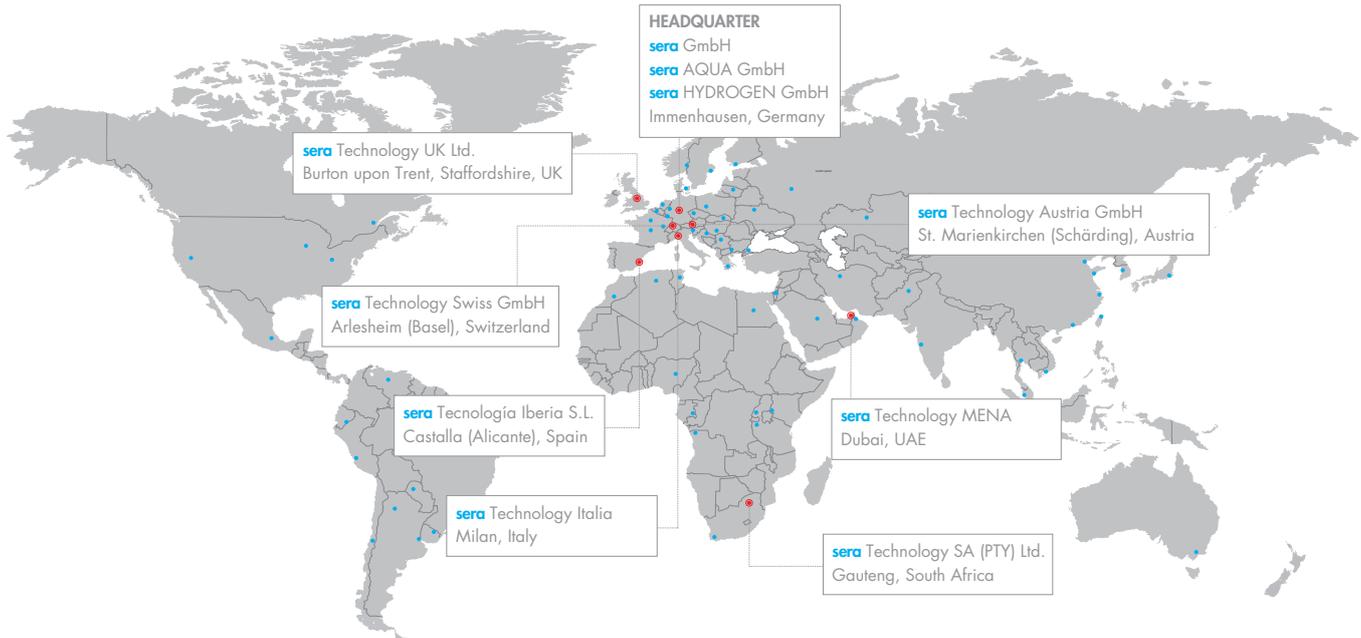
- **Reliable maintenance**
Regular inspections and preventive maintenance by our experts ensure a high level of availability and extend the service life of your systems.
- **Fast assistance worldwide**
With eight of our own locations and over 30 trained trade partners, we offer you service in more than 80 countries – quickly, flexibly and with a focus on solutions.
- **Efficient device replacement**
Should a device fail, our worldwide replacement service ensures minimal disruption to your operations.
- **Customised support**
Whether complete systems or individual components – our service adapts to your specific requirements.
- **Expertise on the ground**
Our technicians are always up to date with the latest technology and work efficiently to minimise downtime.

Our services support you in all areas – from installation and regular maintenance to repairs and the replacement of defective devices. With **sera** service, you have a partner at your side that not only offers quick solutions but also guarantees long-term reliability. This is how we ensure that your plants, systems and components always work optimally.



SERVICE





WORKING FOR YOU ALL OVER THE WORLD

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