MARKET SOLUTIONS

WASTEWATER TECHNOLOGY

INSPIRED. SOLUTIONS. FOR CUSTOMERS.

sera

Competence in dosing, conveying and compressing liquids and gases

The **sera Group** is an independent family-run company group with headquarters in Immenhausen in the heart of Germany.

Since the company founding in 1945, the **sera** name has stood for quality, competence, innovation, reliability and flexibility. As one of the world's leading companies in dosing and compressor technology, **sera** today offers efficient application solutions optimally tailored to customer requirements which ensure the precise dosing, conveying and compression of liquids and gases.

EXCELLENCE IN FLUID TECHNOLOGY

We create added value for people and the environment.

sera has a wide range of products, which provide the right solutions for many of your ranges of application all over the world: whether for water and wastewater treatment and disinfection, or for the precise dosing and conveying of chemicals and liquids.

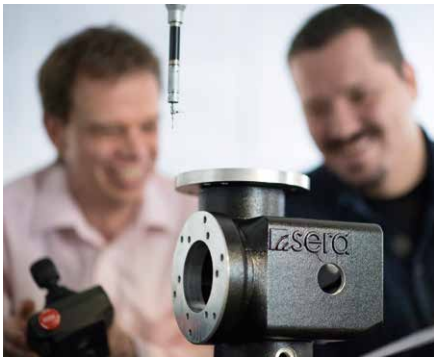
Products for system monitoring and planning as well as customised solutions round off our portfolio. Our customers all over the world also benefit from our extensive range of services: From providing support in planning and commissioning systems, to quickly and easily replacing devices all over the world, through to developing innovative technologies.

Comprehensive product portfolio

Whatever you require, we create customised solutions for your applications.
This means that you can choose from a wide range of standard products and also configure customised systems completely according to your needs.

Speed, reliability and flexibility

Our reliable and competent contacts will provide you with the best possible customer service and support throughout the entire offer, order and project realisation process.
We always respond flexibly to your requirements and process and handle everything quickly and reliably. From engineering to production, through to after-sales service, we provide high-quality products and services.



Long-lasting products and high quality

For over 75 years, the name **sera** has stood for exceptional quality and know-how.
As part of this, we develop dosing pumps and systems for extreme operating conditions and long operating times. That's why the quality and reliability of our products always comes first. You can always rely on the expertise and experience of our team.

WASTEWATER TREATMENT

Our expertise for your succes

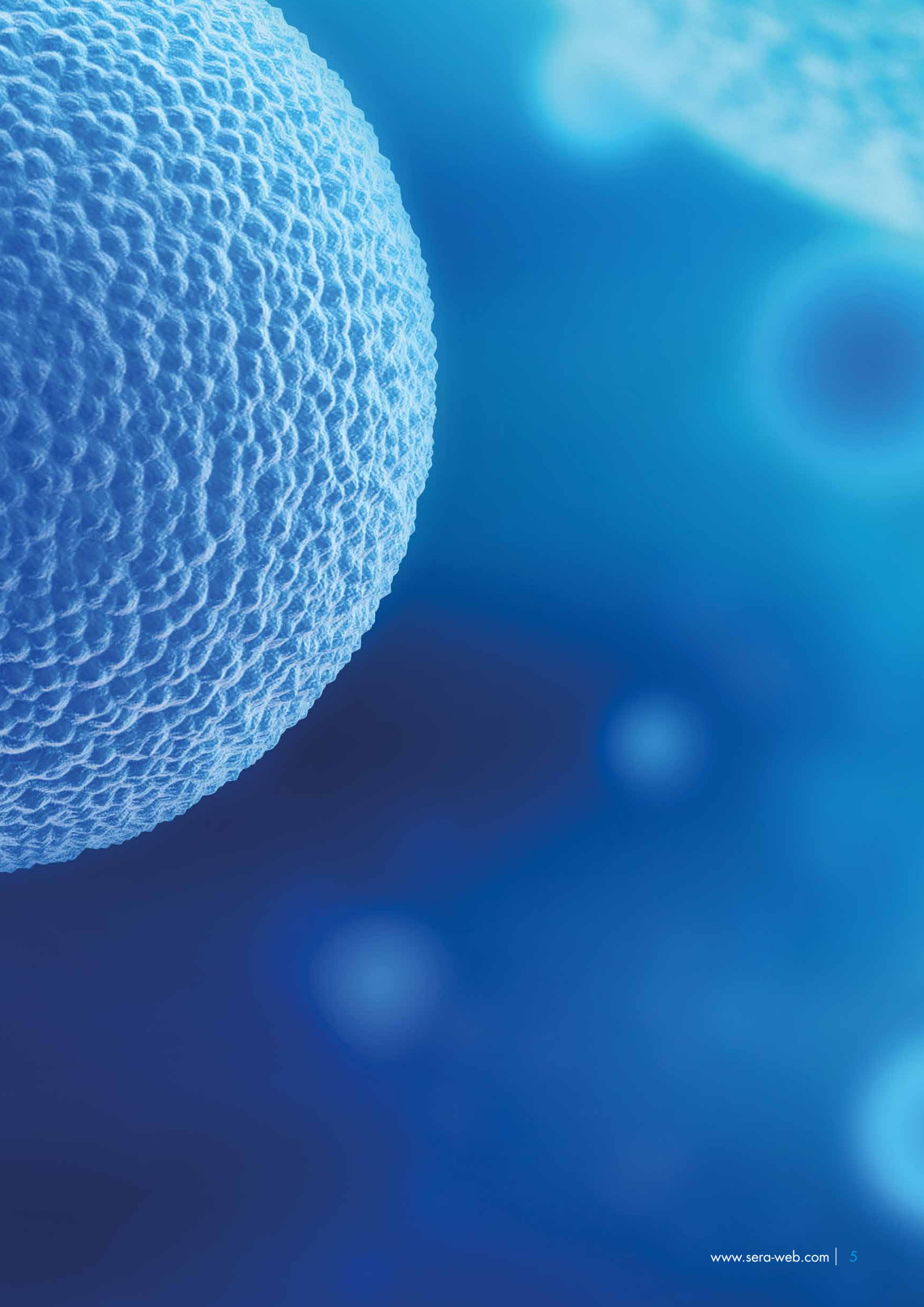
Strict statutory requirements make high-quality, state-of-the-art system and dosing technology essential in industrial and municipal wastewater treatment.

The **sera** product range for wastewater treatment comprises:

- Complete dosing units and systems
- Preparation and dosing units for polymer solutions
- System accessories
- Dosing devices for operating trials

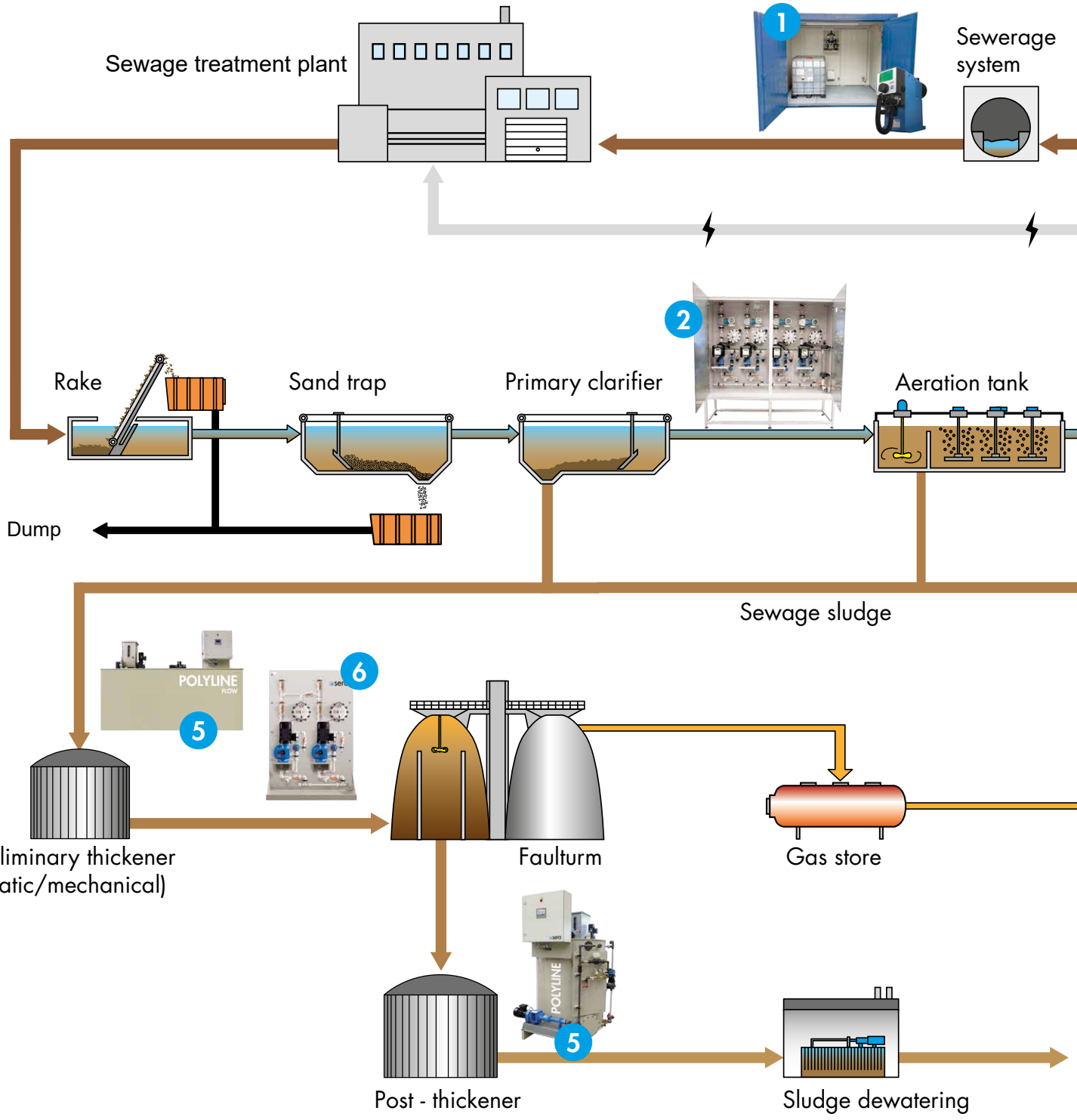
Typical applications in wastewater treatment include:

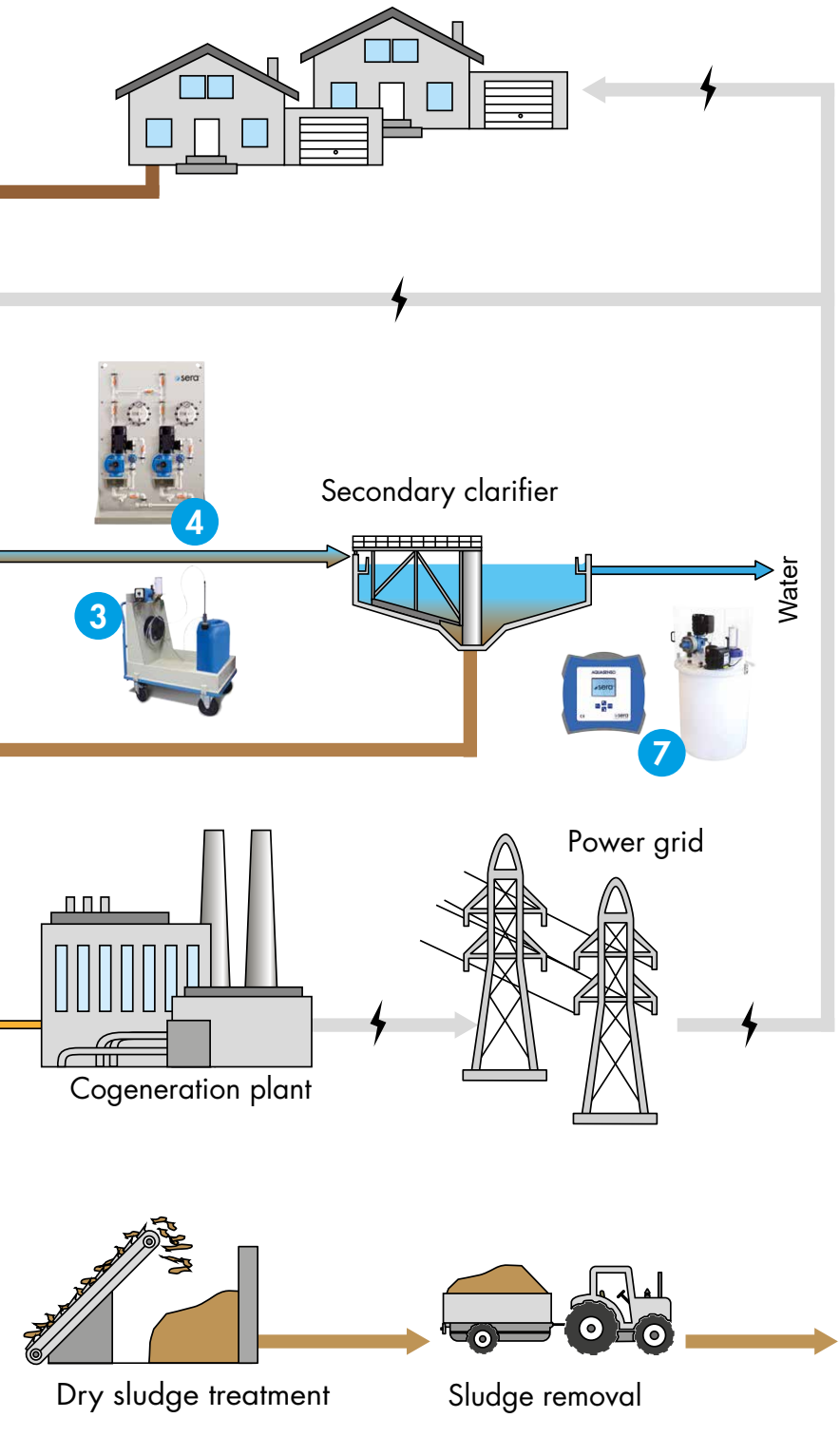
- Nutrient decomposition
- Phosphate precipitation
- Flocculation filtration
- Sewage sludge thickening
- Sludge dewatering
- Sludge conditioning
- pH value adjustment
- Defoaming
- Desulphurisation of sewage gas
- Elimination of H_2S



FOR EVERY PROCESS STEP THE PERFECT SOLUTION

The process of the wastewater technology





We offer an extensive product range so that the best possible solutions for each step of the process are always available. Here are some examples of solutions that illustrate our portfolio, based on typical processes for wastewater treatment:

1 **CONTAINER STATION**
Dosing of bivalent metal salts for elimination of hydrogen sulphide (H_2S)

2 **DOSING STATION DAV4**
Dosing of methanol, acetic acid, glycol - carbon sources for denitrification

3 **MOBILE DOSING STATION**
Dosing of formic or acetic acid to descale ventilation systems

4 **DOSING STATION CVD2**
Dosing of flocculating agents such as $FeCl_3$, $Al_2(SO_4)_3$ to eliminate phosphorus / precipitate phosphates

5 **POLYLINE**
Polymer preparation station for sludge conditioning for thickening/dewatering

6 **DOSING STATION CVD2**
Dosing of defoaming agents to reduce and prevent foam

7 **DOSING STATION CTD**
Dosing of e.g. sodium hypochlorite for downstream disinfection

1 Long holding times for wastewater in the sewage system are responsible for release of gaseous hydrogen sulphide (H_2S).
Measures to counteract the negative effects of H_2S can including 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

OPTIMUM PROPORTION OF NUTRIENTS

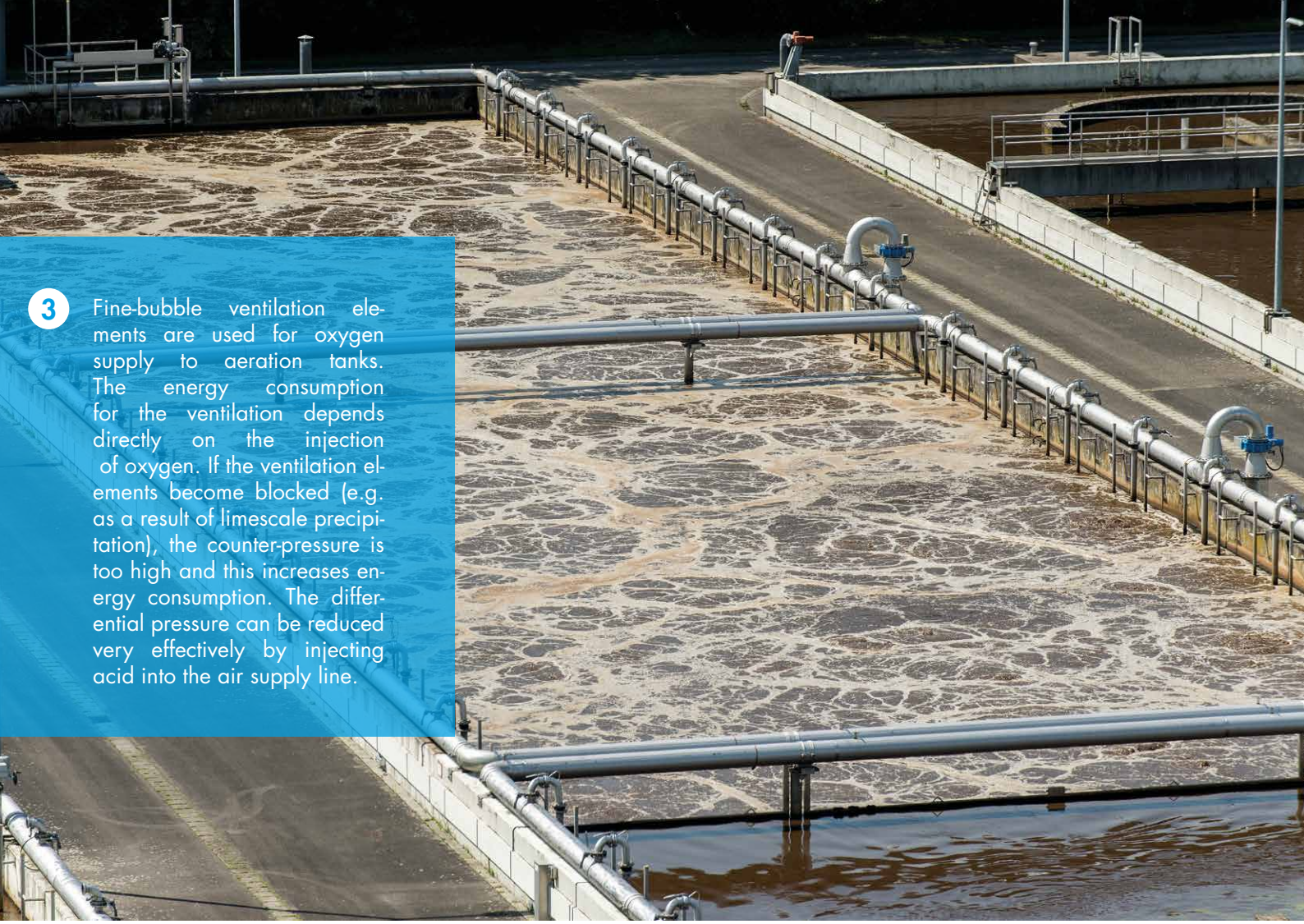
Carbon sources for denitrification

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

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.



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.

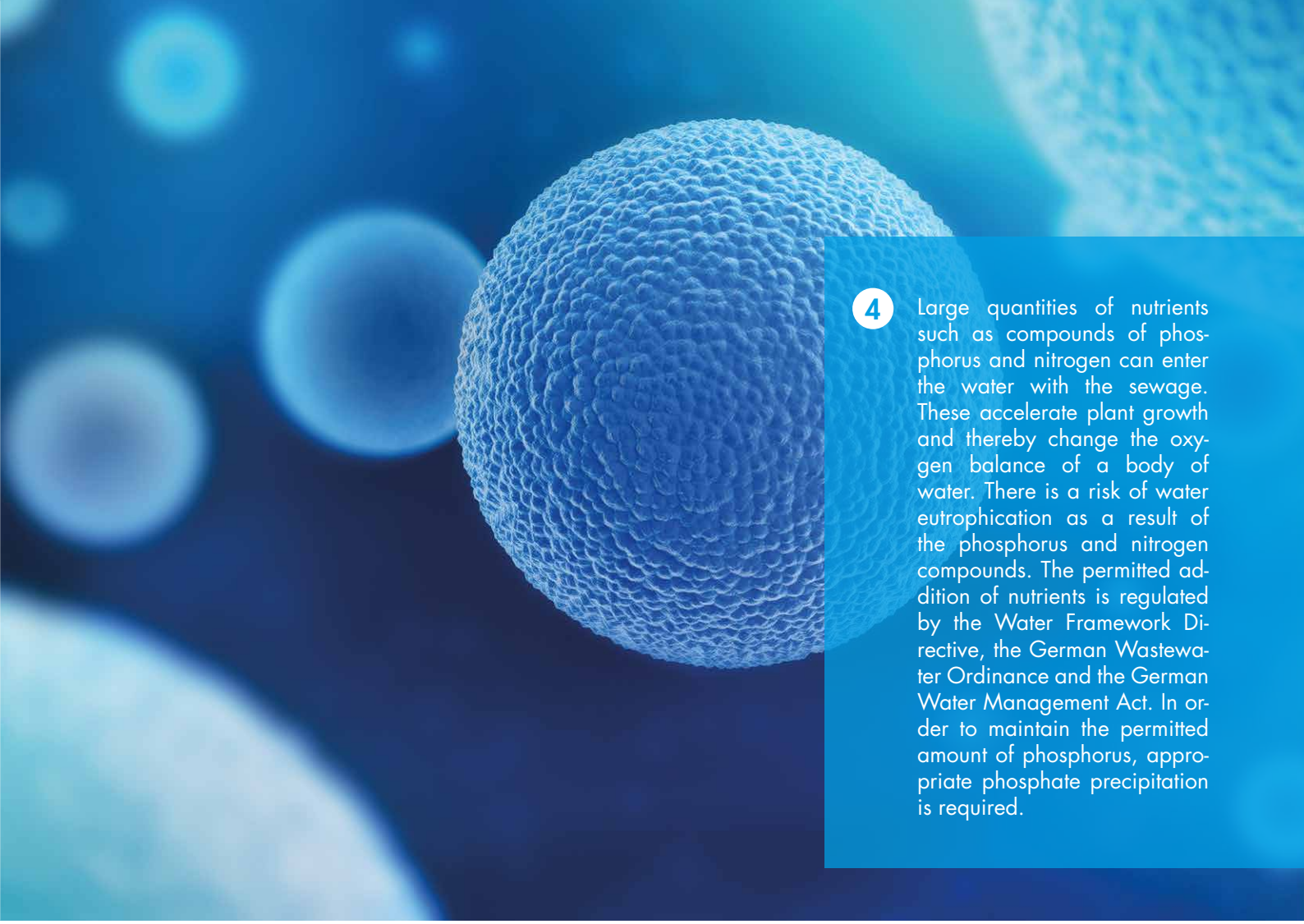
FIGHTING LIMESCALE

Descaling 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 $FeCl_3$, $Al_2(SO_4)_3$

SETUP:
Our standard CVD dosing systems are perfect for this application because of their modular design. Diaphragm pumps with an output of up to 1,450 l/h 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 up to 1,450 l/h
- 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

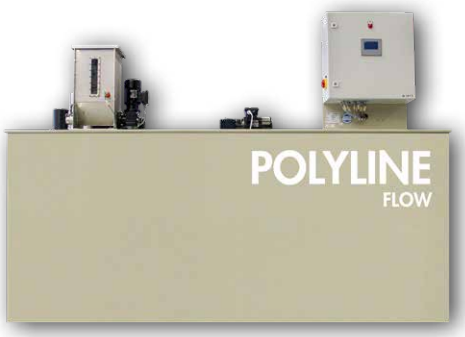
SLUDGE CONDITIONING

POLYLINE polymer preparation station

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 included certain standard options.

FEATURES:
- Cost-effective
- Efficient
- Reliable operation



5 In many wastewater 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.

GOOD PLANNING IS EVERYTHING

sera PLATO for fast configuration of dosing systems for flocculating agents

With the unique **sera** PLATO app, which is available free of charge, **sera** offers all technical managers and planners of industrial and public wastewater treatment plants an easy, cross-platform tool for configuring dosing systems and storage containers for flocculating agents.

Due to the intuitive user interface with its extensive help options, users can put together the perfect dosing solution for their individual circumstances with just a few clicks in the purely web-based application.

An animated graphic display shows the user exactly how changes in the configuration of the dosing system and storage tanks - to dosing monitoring, for example - directly affect the structure of the system.

A matching tender document, complete with a P&ID, can also be generated for the finished dosing system, and this can then be saved, printed or exported in various formats, including GAEB, PDF and Word.

Configured systems can be saved in a project folder set up by and assigned to the user. They can be opened from there at a later date.

Advantages at a glance:

- Free to use, irrespective of platform
- Intuitive user interface with extensive help options
- The perfect solution for the process you are planning with just a few mouse clicks
- Tender documents that are generated can be saved in the project folder
- Export of the tender document as TXT, PDF, Word or GAEB

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 wastewater 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 m^3 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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OUR **REFERENCES** AT A GLANCE

Around the globe customers trust in **sera** products that satisfy even highest demands. In R&D we work closely with the largest brewery suppliers of the world in order to supply the various end customers not only with a product that fulfills their demands but with a solution that excites them.

You can find an excerpt of projects in which **sera** dosing systems are used on our website:

www.sera-web.com/reference

High-quality pumps, dosing units and systems
We offer you a comprehensive portfolio of reliable, durable and precise metering pumps for output capacities from 0.4 l/h to 1,900 l/h at pressures of up to 220 bars.
Or choose from a range of feeding pumps with a pump capacity of up to 3,100 l/h.

A wide variety of versions and materials
For over 75 years, we have stood for experience and know-how. 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.

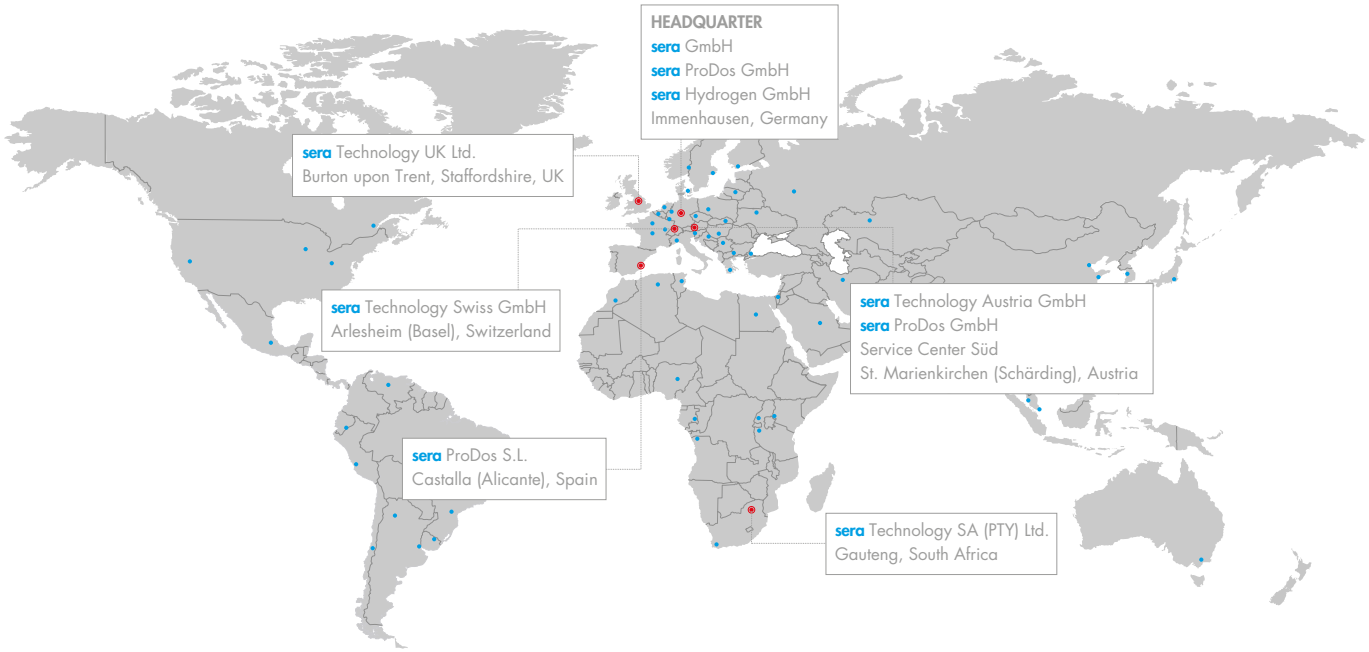
Maintenance and service
Our services include maintenance and repair services, providing spare parts, assembly and installation, technical support, and customer training.

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.

INDIVIDUAL SOLUTIONS

sera ProDos offers servicing and repairs on site and in our workshop. Our experienced service staff carries out maintenance of your installed dosing stations in your factory, so downtimes are kept at a minimum.

Worldwide our customers can rely on five **sera** branches and on our global network of trained retail partners, so quick service is guaranteed.



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