



**sera ProDos**

A company of the **sera** group

# Dosing Technology

Fluid Technology is our Passion

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## sera ProDos

### Water is Life.

A clean environment is the basis of our existence.

Fluid Technology has been our passion for decades. We strive for excellence in the engineering and manufacturing of products and systems for precise dosing and feeding of fluids.

Everyday we create added value for people and nature by promoting a clean and better environment.

Our customers' and partners' individual needs are at the centre of our interest at all times. We inspire them with our products and service and convince them with our quality, expertise, speed and reliability.

Since 1945, **sera** has been one of the leading global system providers of dosing and feeding technology that handles a wide range of fluids.

In order to meet and improve the growing demands of our customers for holistic and industrial-sector-specific solutions, **sera**'s core expertise in dosing technology was concentrated and outsourced in the international subsidiaries **sera ProDos** in 2010.

This concentration of experience and technological know-how enables us to place optimum focus on the different industrial sectors and business areas of our customers.

Thanks to new structures and processes within our company and the expansion of our range of services as a system and full-service provider, we are now able to advise and support you even better and, furthermore, inspire you with our high product quality, expertise, speed and reliability.

In many industrial sectors such as water and wastewater treatment, food and beverage, chemical and petrochemical, power plant technology and power generation, **sera ProDos** develops solutions that are economically, technologically and ecologically trendsetting.

Our extensive product and service portfolio includes:

- Complex system solutions
- Pumps and fittings
- Measurement, analysis and control technology (MSR), and analytical measurement technology
- Global assembly and commissioning
- Extensive service before, during and after the sale
- Extensive technical support
- Spare parts and repair service
- Individual customer training



# Dosing pumps

## General overview

### Performance features of all sera dosing pumps:

- High dosing accuracy
- Leakage free
- Robust and durable
- Low maintenance
- Long service life of diaphragms
- Dry running safe
- Low operating costs
- High-quality materials
- Linear control characteristics
- Easy to operate
- Low weight
- Wide range of applications due to an extensive range of material combinations and accessories

Nearly all of our pump models are designed with intelligent control electronics, which are characterised by the following features:

- Future-orientated pump design with integral multi-functional control electronics offering direct controllability via analogue signal or pulse signal, charge dosing, level indicators and many more features
- High operational safety via permanent and automatic diaphragm monitoring
- Flexibility and high application security for viscous media due to slow-mode-technology
- Optional self-ventilation
- Optional Profibus-DP-Interface

### Solenoid pumps

The operating principle of the **sera** solenoid pumps is as follows: The drive unit consists of a strong stroke solenoid in a robust housing made of plastic, equipped with a thermal overload protection. The stroke solenoid drives a diaphragm in a pump head mechanically while oscillating, thereby precisely feeding and dosing the medium.

### Motor-driven pumps

The operating principle of the **sera** motor-driven pumps has shown its effectiveness over decades and is as follows:

A proven motor coupled with a stroke mechanism drives a diaphragm in a pump head mechanically while oscillating, thereby precisely feeding and dosing the medium.

The robust cast housing of the motor-driven pumps can cope with even extreme operating conditions due to the thickness of the material and the surface treatment.

All **sera** motor-driven pumps are available as multi-headed or combination pumps with a single drive. Each pump head can be sized individually according to requirements with respect to material, size and control of these reasonably priced twin head or multi-headed pumps.







# Dosing pumps

## Solenoid Diaphragm Pumps 2 series

- Performance range between **0.4 l/h** and **35 l/h**, counter pressures up to max. **10 bar**
- Very simple commissioning thanks to **sera's** "plug & dose" (standard configuration)

The solenoid diaphragm pumps of the 2 series are available with simple (R204.1) and extensive (C204.1) control electronics.

For special dosing problems and to meet nearly all of our customers' needs, we offer individual solutions, e.g.:

- RS/CS design for outgassing media
- Multi-function valves
- Available complete with dosing kits ("plug & dose")
- Design with Profibus DP-Interface



**R204.1** Flow rate: 0,4 - 35 l/h  
Counterpressure up to 10 bar



**C204.1** Flow rate: 0,4 - 35 l/h  
Counterpressure up to 10 bar



**C204.1 PROFIBUS** Flow rate: 0,4 - 35 l/h  
Counterpressure up to 10 bar



**RS204.1** Flow rate: 0,4 - 35 l/h  
Counterpressure up to 10 bar



**CS204.1** PROFIBUS Flow rate: 0,4 - 35 l/h  
Counterpressure up to 10 bar



**CS204.1** Example: mounted on dosing tank  
with level input

# Dosing pumps

## Solenoid diaphragm pump EcoBlue®

- Performance range from **2 l/h** up to **15 l/h** at counter pressures up to **10 bar**
- Linear control characteristic
- Low maintenance
- Low investment cost and reliable in operation
- Quick assembly via hose connection
- Unlimitedly safe to run dry
- Complete dosing set included
- Pulse input
- Level input

The EcoBlue® solves dosing tasks economical and impresses with the usual quality, reliability and very low cost.

The compact design allows a simple solution for manual START/ STOP or pulse mode proportional dosing to the flow.



**EcoBlue®** Flow rate: 2 - 15 l/h  
Counterpressure up to 10 bar



**EcoBlue®** with option  
"external control"





**EcoBlue®** Compact box for each pump



**EcoBlue®** Operating principle

# Dosing pumps

## Motor-driven Diaphragm Pumps 4 series

- Performance range between **0.4 l/h** and **1450 l/h**, counter pressures up to max. **10 bar**
- Applicable to explosion-hazard areas via optional equipment components
- Very simple commissioning thanks to **sera's** "plug & dose" (standard configuration)

For special dosing tasks and to meet nearly all of our customers' needs, we offer individual solutions, e.g.:

- Designs according to ATEX standards
  - Pump heads with special nominal widths
  - Heating devices
  - Double valve assemblies
  - Electric actuators
  - Valves with elastic seals
  - Stroke transmitting devices
  - Diaphragm monitoring
- and many more

All motor-driven diaphragm pumps of the 4 series are available with variable, intelligent control electronics (C-design).



**C409.2** Flow rate: 0,8 - 350 l/h  
Counterpressure up to 10 bar



**C409.2** Example in CIP-design  
with dairy pipe connections



**C410.2** Flow rate: 260 - 1450 l/h  
Counterpressure up to 8 bar



**R409.2** Flow rate: 0,8 - 350 l/h  
Counterpressure up to 10 bar



**R410.2** Flow rate: 260 - 1450 l/h  
Counterpressure up to 8 bar



**RK409.2** Combination pump



**RK410.2** Combination pump

# Dosing pumps

## Stepper motor pumps iSTEP®

- Performance range from **0,015 l/h** up to **50 l/h** at counterpressures up to **10 bar**
- Adjustment range 1:1000, thus optimally adaptable

The dosing pump iSTEP® combines an intelligent drive concept with the accuracy of a diaphragm pump. It sets new standards in terms of reproducibility and reliability.

- Low pulsation dosage
- Drive controlled by microprocessor
- Flexible remote control
- Slow mode for viscous media
- Energy-efficient drive technology
- (annual energy consumption lower 100 €)
- Batch dosing with recipe memory
- Intuitive menu navigation incl. parameterization and control via clickwheel
- Pulse division or multiplication
- Weekly/daily timer operation with 10 program memories
- 8 languages for the menu (de, en, es, fr, nl, cs, fi, tr)
- Certified accord. to UL/CSA and TR

### Additional Features:

- Removeable graphic display with back light
- Visualisation of of operating modes incl. service information by colour display
- Only one product for a wide power range
- Used world wide thanks to a various range of power plugs)
- SD-Card Slot
- USB Adapter (8-pole, M12)
- 3 Inputs
  1. 3x programmable as digital inputs or
  2. 2x programmable as analogue inputs 0/4...20mA
- 2 Digital outputs
- 1 Analogue output for 0/4...20mA signal
- All inputs are free programmable
- Profibus/ Profinet
- Operation without control panel possible



iSTEP®  
Graphic display (left)



iSTEP®  
Graphic display (centred)



iSTEP®  
Graphic display (right)



iSTEP® Capacity range 0,015 - 50 l/h  
Counterpressure up to 10 bar





iNTELLIGENT • iNNOVATIV • iNTUITIV



iSTEP®  
SD-Card Slot



iSTEP® transmitting the data  
to another iSTEP®

# Dosing pumps

## Multi-layer Diaphragm Pumps 4 series ML

- Performance range between **11 l/h** and **1200 l/h**, counter pressures up to max. **20 bar**
- High operational safety via multi-layer diaphragm technology and integrated diaphragm monitoring
- Up to ten times higher lifetime of multi-layer diaphragms in comparison to single layer diaphragms
- Excellent priming characteristics without additional equipment
- Applicable to explosion-hazardous areas via optional equipment components
- Simple commissioning thanks to **sera's** "plug & dose" (standard configuration)

These pumps can handle dosing tasks with higher requirements in terms of safety by using the multi-layer diaphragm and diaphragm monitoring.

Each multi-layer diaphragm consists of three layers:

- Working diaphragm
- Signal diaphragm
- Protective diaphragm

For special dosing tasks and to meet nearly all of our customers' needs, we offer individual solutions, e.g.:

- Designs according to ATEX standards
- Pump heads with special nominal widths
- Heating devices
- Double valve assemblies
- Electric actuators
- Valves with elastic seals
- Stroke transmitting devices
- Diaphragm monitoring and many more

All multi-layer diaphragm pumps of the 4 series ML are available with variable, intelligent control electronics (C-design).



**C409.2 ML** Flow rate: 11 - 220 l/h  
Counterpressure up to 20 bar



**C410.2 ML** Flow rate: 70 - 1200 l/h  
Counterpressure up to 16 bar

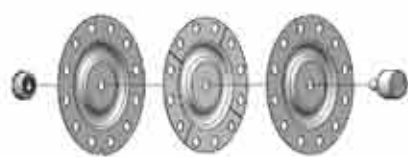


**R409.2 ML** Flow rate: 11 - 220 l/h  
Counterpressure up to 20 bar



**R410.2 ML** Flow rate: 70 - 1200 l/h  
Counterpressure up to 16 bar

*Multi-layer diaphragm package*



Protection diaphragm      Signal diaphragm      Working diaphragm

*Designs of diaphragm monitoring*



Manometer



Pressure switch



Pressure switch (Ex-design)

# Dosing pumps

## Piston Diaphragm Pumps 4 series KM

- Performance range between **7.5 l/h** and **850 l/h**, counter pressures up to max. **80 bar**
- High operational safety via multi-layer diaphragm technology and integrated diaphragm monitoring
- Up to ten times higher lifetime of multi-layer diaphragms in comparison to single layer diaphragms
- Excellent priming characteristics without additional equipment
- Applicable to explosion-hazard areas via optional equipment components

These pumps can handle dosing tasks with higher requirements in terms of safety by using the multi-layer diaphragm and diaphragm monitoring.

Each drive unit of the piston diaphragm pumps consists of a proven motor that is coupled to a stroke mechanism in a robust cast housing and that drives a diaphragm in a pump head mechanically while oscillating, thereby precisely feeding and dosing the medium.

For special dosing tasks and to meet nearly all of our customers' needs, we offer individual solutions, e.g.:

- Designs according to ATEX standards
- Pump heads with special nominal widths
- Heating devices
- Double valve assemblies
- Electric actuators
- Valves with elastic seals
- Stroke transmitting devices
- Diaphragm monitoring and many more

All piston diaphragm pumps of the 4 series KM are available with variable, intelligent control electronics (C-design).



**C409.2 KM** Flow rate: 7,5 - 190 l/h  
Counterpressure up to 80 bar

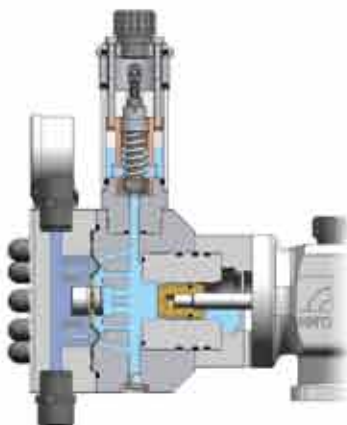


**R409.2 KM** Flow rate: 7,5 - 190 l/h  
Counterpressure up to 80 bar



**R410.2 KM** Flow rate: 30 - 850 l/h  
Counterpressure up to 80 bar





*Designs of diaphragm monitoring*



*Manometer*



*Pressure switch*



*Pressure switch (Ex-design)*

# Dosing pumps

## Air-driven Diaphragm Pumps APB/APE series, Motor-driven Feeding Pumps 4 series ZX

### Air-driven Pumps APB/APE series

- Performance range between **5 l/min** and **850 l/min (ca. 51 m<sup>3</sup>/h)**, counter pressures up to **7 bar**
- Cost effective
- Leakage free
- Easy to operate
- Low weight
- High operational safety
- Applicable in explosion-hazard areas via optional equipment components

#### Accessories:

- Pulsation dampers
  - Compressed air supply units
  - Stroke transmitting devices
- and many more

The air control valve alternately supplies the air chambers behind the diaphragm with compressed air. One diaphragm is pressed to the front (= pressure stroke) while the other one is pulled backwards (= suction stroke).

The special design of the air control valve ensures that the pumps can always be approached safely, i.e. that there are no undesirable standstills.

### Motor-driven feeding pumps 4 series ZX...

- Performance range between **2200 l/h** and **3100 l/h**, counter pressures up to **4 bar**

The feeding pumps of the series ZXM 411.3 and ZXR 411.3 are oscillating displacement pumps with two pump heads for the feeding and dosing of fluids in a wide range of industries.

The ZX series is not equipped with stroke length adjustment. The ZXM pumps run with constant stroke frequency. The flow rate of the ZXR pumps can be controlled via an external frequency converter, if necessary.

Each drive unit consists of a high-quality motor coupled to a stroke mechanism in a robust grey cast housing that can cope with even extreme operating conditions due to the thickness of the material and the surface treatment.

For special dosing and feeding tasks and to meet nearly all of our customers' needs, we offer individual solutions, e.g.:

- Designs according to ATEX standards
  - Pump heads with special nominal widths
  - Double valve assemblies
  - Valves with elastic seals
  - Stroke transmitting devices
  - Diaphragm monitoring
- and many more



**APB/APE 5** Flow rate: 5 l/min  
Counterpressure up to 7 bar



**APB/APE 15** Flow rate: 15 l/min  
Counterpressure up to 7 bar



**APB/APE 45** Flow rate: 45 l/min  
Counterpressure up to 7 bar



**APB/APE 200** Flow rate : 200 l/min  
Counterpressure up to 7 bar



**APB/APE ...** Flow rate: up to 850 l/min  
Counterpressure up to 7 bar



**ZX.. 411.3** Flow rate: 2200 - 3100 l/h  
Counterpressure up to 4 bar

# Process Pumps

## Piston Diaphragm Pumps 5 series KM

- Performance range between **6,5 l/h** and **1650 l/h**, counter pressures up to max. **300 bar**
- High dosing accuracy and precise flow with respect to dosing rates
- High operational safety via multi-layer diaphragm technology and integrated diaphragm monitoring
- Up to ten times higher lifetime of multi-layer diaphragms in comparison to single layer diaphragms
- Safe against overpressure via an internal pressure relief valve
- Excellent priming characteristics without additional equipment
- Optional design in accordance with **API Standard 674/675**

Each drive unit of the 5 series piston diaphragm pump consists of a high-quality motor that is coupled to an adjustable eccentric stroke mechanism in a very robust cast housing, which can cope with the most extreme operating conditions due to the thickness of the material and the surface treatment.

The stroke of the mechanically linked piston is transferred to the multi-layer diaphragm. The integrated compensating valve ensures excellent dosing accuracy and provides optimum protection against overstress. In case of an inadmissible higher counter pressure, the hydraulic fluid can escape via the compensating valve into the reservoir.

For special dosing tasks and to meet nearly all of our customers' needs, we offer individual solutions, e.g.:

- Design in accordance with API Standard 674/675
- Designs according to ATEX standards
- Wide range of applications with an extensive range of material combinations and accessories
- Electric actuators
- Stroke transmitting device and many more



**R309.1 KM** Flow rate: 6,5 - 24 l/h  
Counterpressure up to 300 bar

**R510.1 KM** Flow rate: 25 - 1100 l/h  
Counterpressure up to 180 bar

**R511.1 KM** Flow rate: 100 - 1650 l/h  
Counterpressure up to 220 bar





Operating principle



**MK511.1 KM/M511.1 KM**

Flow rate: 2x100 - 2x1650 l/h  
Counterpressure up to 220 bar



**XM511.1 KM**

Flow rate: 2x100 - 2x1650 l/h  
Counterpressure up to 220 bar

# Fittings and Accessories

**sera ProDos** has an extensive offering of dosing fittings and accessories in different materials and configurations for a wide range of processes and systems in order to maximise the operational safety and the reliability of the dosing systems for each respective application.

The **sera** pulsation dampers are certified according to the Pressure Equipment Directive.

The **sera** dosing fittings and accessories range includes:

- Dosing valves, check valves and foot valves
- Relief valves and pressure-keeping valves
- Multi-function valves
- Suction lances
- Pulsation dampers
- Shut-off valves
- Priming aids/siphon vessels
- Calibration pots
- Injection fittings
- Line strainers
- Connection pieces
- Dosing hoses
- Dosing tanks
- Collecting basins
- Mixers and agitators
- Magnetic level switches
- Dry material feeders
- Absorbers

*Pulsation damper and diaphragm pulsation damper*



*Dosing tanks and collecting basins*



*Dry material feeders*



*Suction lances with/without level switches as well as different foot valves*



*Diaphragm pressure-keeping- and diaphragm-relief valves*



*(controllable) electric agitators*



*Multi-function valves*



*Priming aids and  
siphon vessels*



*Connection pieces, dosing hoses  
as well as different accessories*

# Analytical measurement technology

## AQUASENSO®

- Reduced consumption of chemicals due to AQUASENSO® analytical measurement technology
- Precise measurement of pH, chlorine and conductivity by temperature compensation as well as chlorine by pH-compensation
- Adjustable direction of control "Upward measurement" or "Downward measurement"
- Frequency relay for the direct control of dosing pumps
- Performance relay configurable as alert, limit value, control output for pumps and solenoid valves
- 2 analogue outputs 0/4 ...20mA
- 5 digital inputs for measuring water-fault detection, external release, warning of minimum level of chemicals
- 1 or 2 channels available
- Capture several measurements simultaneously

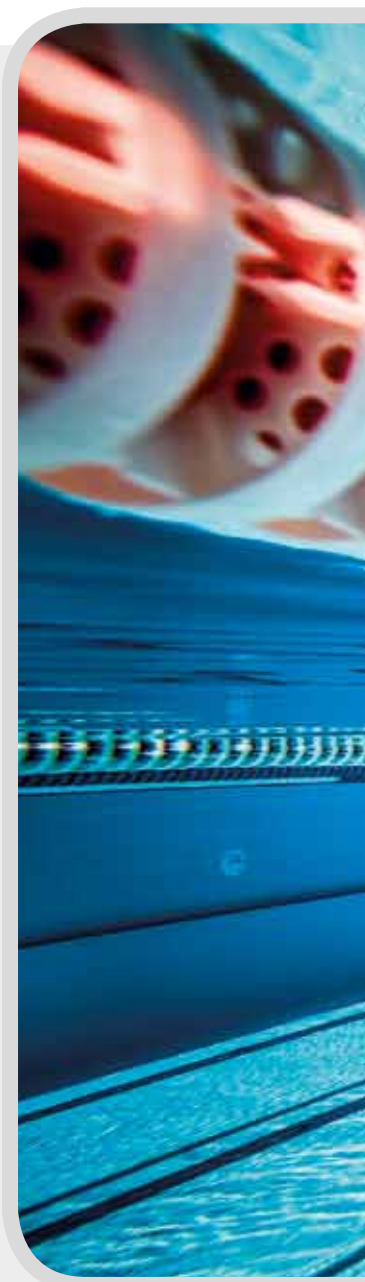
The precise interaction of sensors, controllers and dosing pumps plays an important role, particularly in the area of chemical dosing.

The modules are used in the analysis of the water in a wide field of applications such as drinking water, swimming pool water, sewage and wastewater treatment, process chemistry and in the beverage industry. Therefore, the applications are tailored to the individual requirements.

The matching AQUASENSO® sensors feature a high level of accuracy for the detection of analysis parameters.

The following measurement parameters are available for the analysis of:

- pH
- Redox
- Conductivity
- Chlorine
- Temperature



Controller AQUASENSO®



Sensors for measuring of  
pH - Values





*Redox* Sensors



*Chlorine* Sensors



Sensor for measuring of  
*Conductivity*



Sensor for measuring of  
*Temperature*

# Measurement, analysis and control technology MSR

As a system provider and further to standardised dosing systems and components, **sera** customised complete solutions for dosing systems ("turn key plants"), which are optimally tailored to the respective customer demands and application cases using extensive measurement, analysis and control technology.

From the planning, engineering and documentation to the total assembly and commissioning worldwide - Everything from a single source!

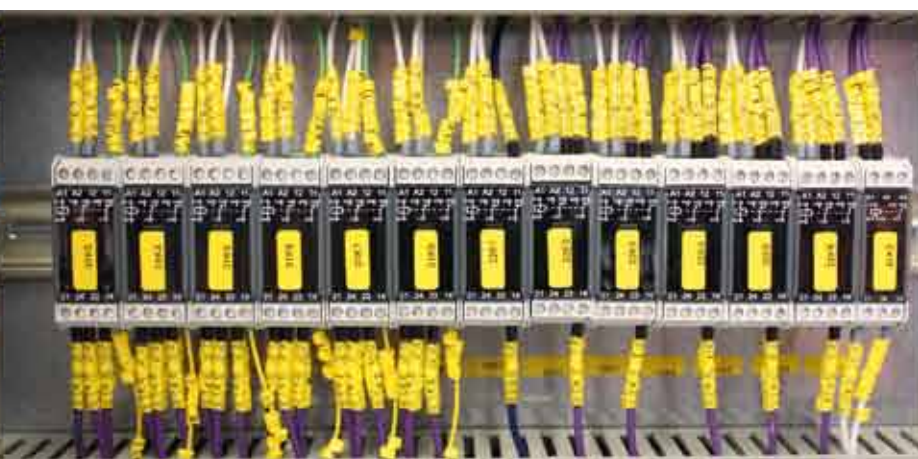
With to the application of modern flow and level measuring systems as well as control and regulating technology, **sera** monitors and controls the dosing, thereby ensuring an effective use of chemicals. Furthermore, controllers are used for mixing and preparing chemicals. All process parameters are monitored and, if so required, evaluated directly in the dosing system or controlled via central control units.

The communication between the controller and the central control unit may take place in a conventional way, i.e. via analogue signals or potential-free contacts or via local PLC and BUS when it comes to complex and demanding systems. All systems meet the currently applicable VDI-Directives and European standards. If necessary, project-specific specifications are applied.

Depending on the dosing system and the local circumstances, **sera** develops the appropriate control system for the operating company. The service includes the entire engineering process, circuit diagram creation, programming, correct installation and testing as well as the commissioning of the complete dosing system.







# Standardised dosing systems

- Highest accuracy and safety thanks to the use of the latest dosing and pump technology
- High-quality materials can be applied and integrated flexibly and variably
- Little space requirement on site due to compact design
- Low parts diversity due to the use of standard components
- Shortest delivery times and availability
- Minimal effort in installation and commissioning thanks to **sera**'s standard configuration "Plug&Dose"

The standardised dosing systems are multiple useable. Their main features are the controlled and precise quantity dosing of liquids in processes or other mediums.

The completely modular design makes it possible to adapt the functions of the system to individual dosing requirements with standardised components - like those of a construction kit. Many optionally available accessories boost the range of applications and performance.

These systems combine quick availability and short delivery times, efficiency through cost-effective construction-kit configuration and high quality and technically optimum solutions, matching many customer applications. Everything from a single source – made by **sera**!

The portfolio of standardised dosing systems includes:

- CVD1, CVD1s, CVD2
- PolyLine®
- CTD
- CDG
- PDS



**CTD-...** Compact Tank Dosing  
Tank volume: 40-1000 Litres, Flow rate: 0,4 - 570 l/h, Pressure: up to 10 bar



**CDG-...** Chlorine dioxide plant  
Performance: up to 1000 g ClO<sub>2</sub> /h





*PolyLine® Polymere Preparation- and Dosing unit  
Preparation: 500-3000 l/h*



**PDS** Proportional Dosing System  
Flow rate: up to 10 l/h, Pressure: up to 10 bar



**CVD2-...** Compact Dosing System, vertical  
Flow rate: up to 2x 1450 l/h, Pressure: up to 10 bar



**CVD1-...** Compact Dosing System, vertical  
Flow rate: up to 1450 l/h, Pressure: up to 10 bar

# Fluid Technology is our Passion

## Industrial-sector solutions

**sera's** dosing pumps and systems are applied globally in many different industrial sectors. They create added value and yield high-quality products for the consumers.

- Food and beverage
- Dairy
- Brewing industry
- Agricultural industry
- Drinking-water treatment
- Wastewater treatment
- Chemical/Petrochemical
- Gas industry
- Laboratory technology
- Pharmaceutical industry
- Power plant technology
- Renewable energy
- Conventional energy
- Metal processing
- Pulp and paper
- Textile industry
- Color & printing industry
- Ship building
- Building engineering
- Mining







# Food & Beverage

## Industrial-sector solutions for the brewing industry

### Utilising sera dosing systems in the CIP processes of a brewery

Wherever food products are handled, the workplace must be cleaned and kept clean. Not only the visible soiling but also the "invisible" contamination must be removed here because a food product can be altered through innumerable micro-organisms. This particularly applies to beer in breweries.

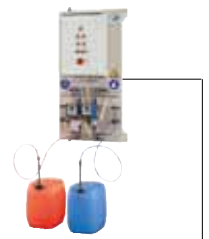
For precisely this purpose, **sera** pumps and dosing units have been important and reliable components of production lines in numerous breweries worldwide for many decades.

The **sera** dosing systems treat the brewing water with calcium chloride ( $\text{CaCl}_2$ ) and calcium sulphate ( $\text{CaSO}_4$ ). High water quality is essential for the brewing process and to ensure the best tasting beer.

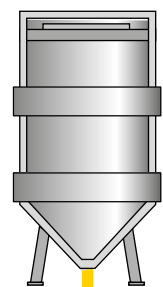
To avoid having to dismantle all individual parts for the cleaning process in the lines, there is the option of CIP (Cleaning In Place).

The dosing units of the CVD-type are designed for the dosing of a 50% nitric acid, sodium hypochlorite, 50% soda lye and anolyte solution.

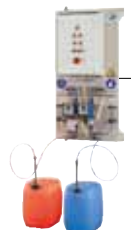
The CVDs are mounted in a compact configuration on a wall mounting board. A pressure relief valve is provided to safeguard against excess pressure. As long pipelines may present the risk of pulsations, the system may also be furnished with pulsation dampers. Suction lances, dosing hoses and matching connection fittings complete the installation.



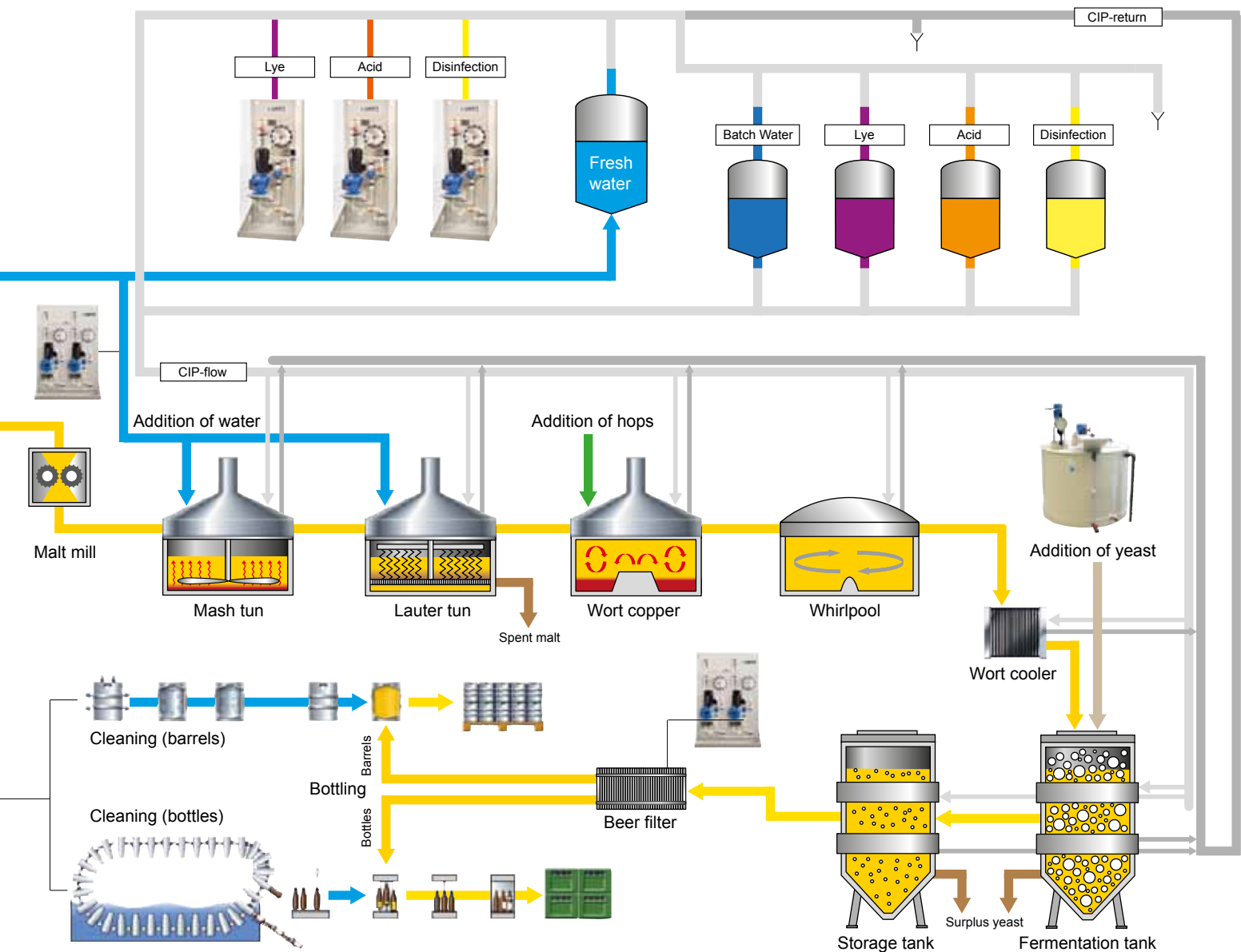
Fresh water supply



Malt-Silo







# Food & Beverage

## Industrial-sector solutions for food & beverage industry

### Ideal quality and hygiene in the food industry

**sera** uses dosing pumps, dosing units and sensors to take care of hygiene and quality requirements in single process operations in the food industry.

Hygiene, of course, plays a significant role in the processing or manufacturing of food products, if not the most important role.

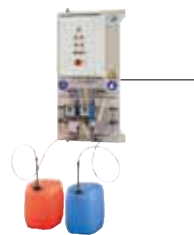
There is the option of CIP (Cleaning In Place). In addition, dosing units for acid and alkaline can be supplied which will be used for CIP (Cleaning in Place) processes.

The dosing systems are equipped with the latest selectable pump generation of model series C409.2 with integrated Profibus DP interface. This permits the optimal integration into the higher level control process. The dosing pumps are controlled according to volume.

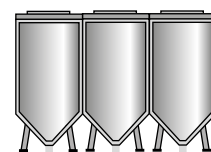
The dosing systems are used in the following areas:

- Tank cleaning
- Pipe cleaning
- Heater cleaning
- Freezer cleaning

Also, the **sera** products are installed in the food industry for the dosing of lactase, as more and more companies of the dairy industry produce lactose-free products.

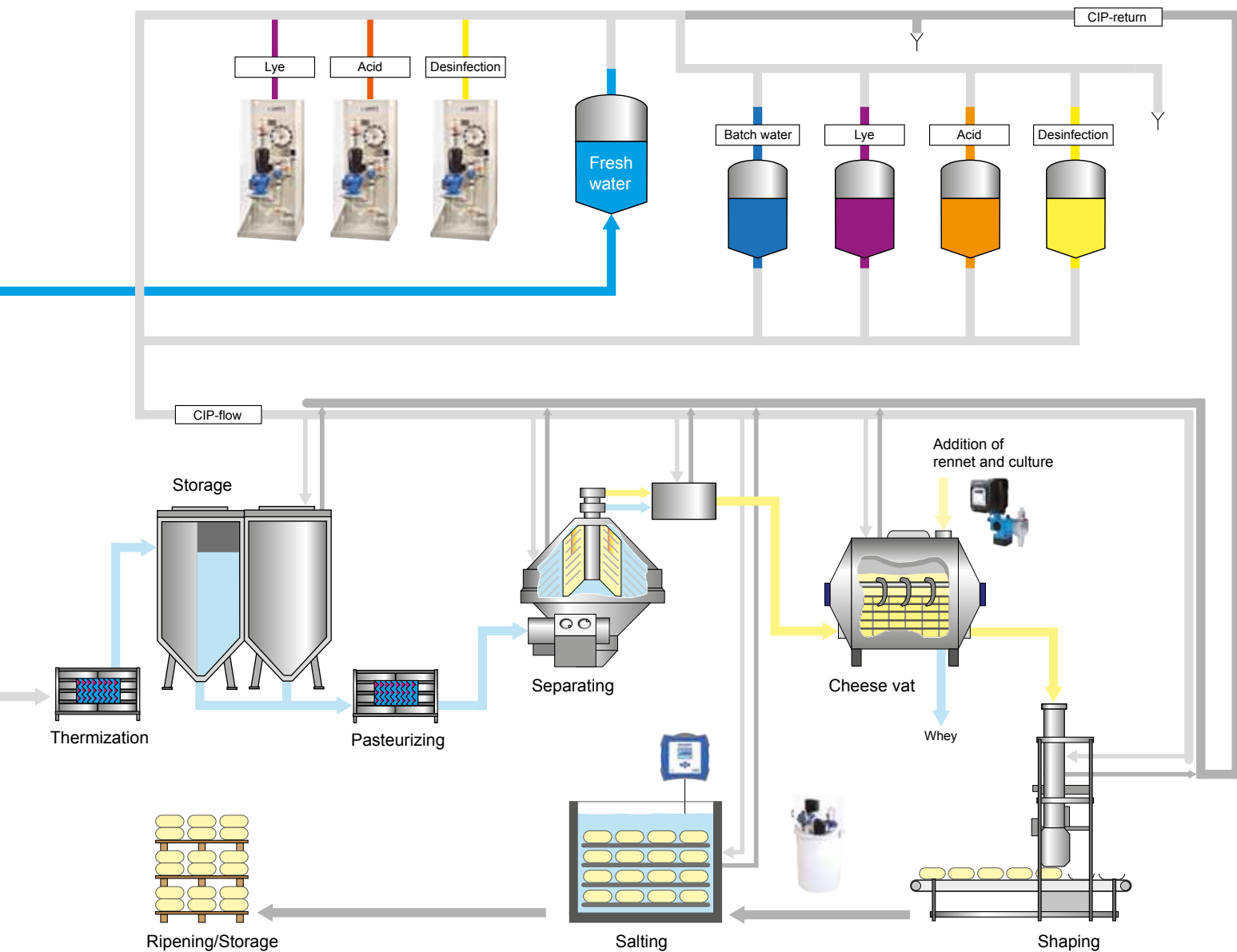


Fresh water supply



(Dairy)





# Water and Wastewater treatment

## Industrial-sector solutions for water treatment

The compliance with legal provisions applicable to the municipal or industrial wastewater treatment requires the use of high-quality and reliable system engineering and dosing technology.

**The sera product range for sewage technology includes:**

- Dosing devices for field tests with miscellaneous fluids
- Small dosing units and systems for water chemicals
- Dosing systems for precipitants with dosing pumps
- Polymer solutions preparation and dosing units
- Dosing units for lime milk
- Components for units applying modern chemical thermal sludge treatment methods

for

- Nutrient degradation / phosphorus elimination (pre-precipitation)
- Flocculation filtration
- Sewage sludge thickening
- Sludge dewatering
- Charging of chamber filter presses
- pH-value adjustment
- Defoaming
- Desulphurisation of sewage gas
- Neutralisation of hydrogen sulphide in sewer systems

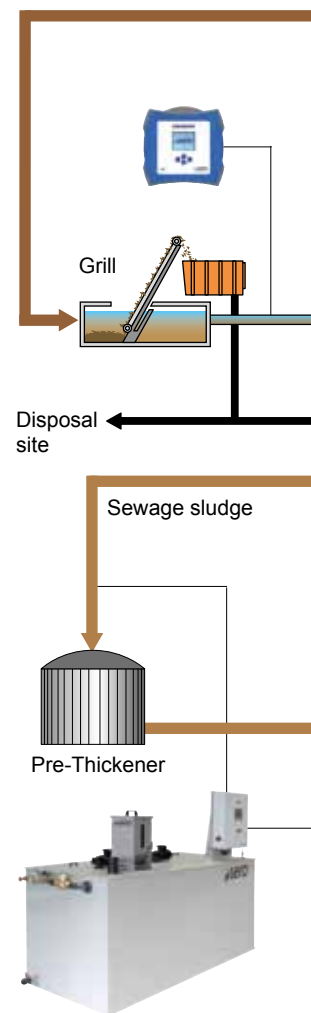
To improve the waste water quality, precipitation methods are very often combined with flocculation processes. In case of the sewage pre-treatment by flotation, for example, **sera** pumps are used to dose sodium hydroxide in order to adjust the pH-value, a metallic salt solution as a primary precipitation agent and a polymer solution as a flocculation aid.

The wastewater treatment by means of decolourisation, neutralisation and heavy metal precipitation is linked with reliable **sera** technology as well as the water treatment.

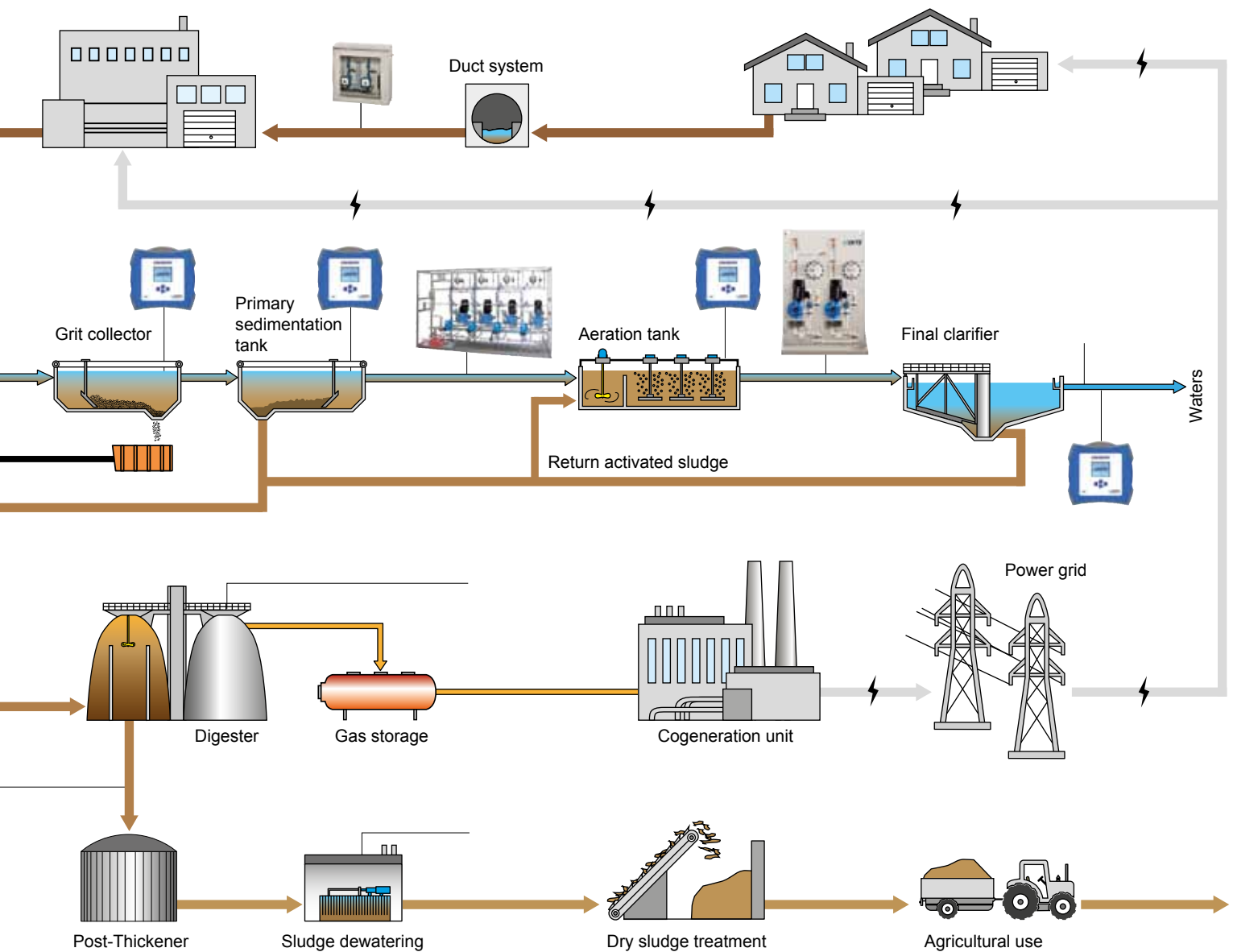
Readily soluble solids such as aluminium sulphate or polymer can be efficiently prepared and added in a small dosing unit.

In order to prevent hydrogen sulphate from developing in sewers, **sera** has developed a number of dosing systems with which metallic salt solutions, such as iron (II) chloride ( $\text{FeCl}_2$ ) and iron (III) chloride ( $\text{FeCl}_3$ ) or combination products, can be fed into the sewer.

Waste water treatment plant







# Water and Wastewater treatment

## Industrial-sector solutions for drinking water treatment

### Extensive sera expertise in the drinking water treatment

Drinking water treatment has to fulfill high standards worldwide. The natural water reserves and resources that can be used as drinking water without any treatment are increasingly disappearing. Therefore the provision of clean drinking water has become a global challenge.

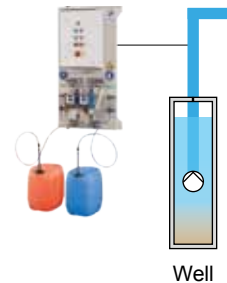
The extensive **sera** product range and technological know-how enables us to procedurally treat water to suitable drinking water quality. In each step of the treatment process **sera** products are applied.

The **sera** chlorine dioxide preparation and CDG dosing unit is applied for the elimination of algae and microorganisms. The sensors of **sera**'s analysis technology product range accurately analyse the chlorine and pH-value of the water to be treated.

Compact vertical dosing systems (CVD) can be used for the efficient and precise dosing of the chemical iron (III) chloride. After the flocculation, particles like heavy metals or microorganisms are absorbed and turned into sediment. With the help of the **sera** PolyLine® polymere preparation units and flocculation aids, the sludge is thickened. After the sludge dewatering process that is supported by **sera** piston diaphragm pumps (as of type C409.2 KM), the sludge can be applied.

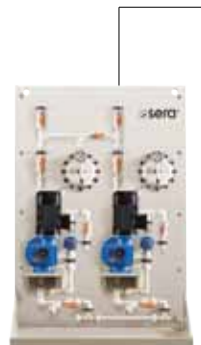
The water that has been cleaned in the flocculation process is collected in an untreated water basin and reaches the ion exchanger, where the **sera** DAV vertical dosing system doses hydrogen chloride (HCl).

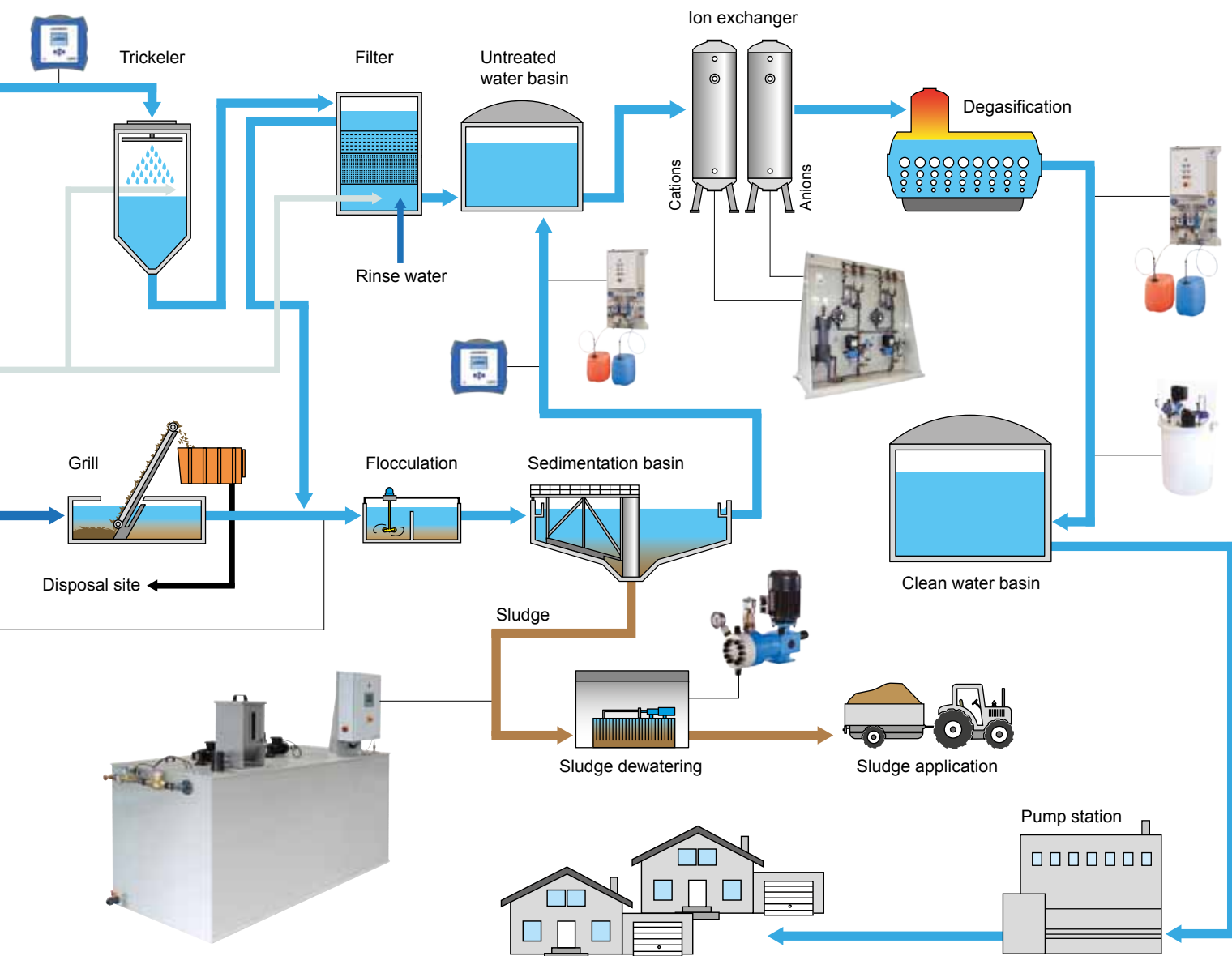
Finally, **sera**'s CTD compact dosing systems support the water treatment for cleaning drinking water by setting the residual hardness and remaining oxygen.



Air

Streamt water







# Renewable Energy + Power plant technology

## Industrial-sector solutions for the power plant technology industry

### sera pump technology for perfectly treated cooling water

To guarantee the trouble-free operation of power plant facilities, the quality of the cooling water is of fundamental importance.

Many **sera** pumps that are applied in a cooling water circuit are equipped with selection via Profibus as well as a frequency converter for speed control.

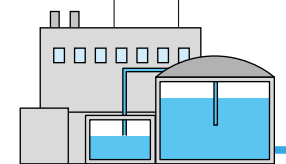
In addition, the proven diaphragm monitoring installed at each pump, significantly contributes to the reliability of the systems.

### sera measuring and dosing technology in the boiler feed-water conditioning

Furthermore, **sera** dosing technology is used for the cleaning and measuring of the boiler feed water. So that the highly sensitive sensors always provide accurate results, the proper functioning of the sensors at all times is of utmost importance. Due to constant contact with the boiler feed water, the sensors, which are built in protective tubes, tend to accumulate grime over time.

With the help of the specific dilution system developed by **sera**, hard incrustations can be regularly cleaned.

The prepared cleaning solution is injected through special nozzles onto the sensors, dissolving the grime.



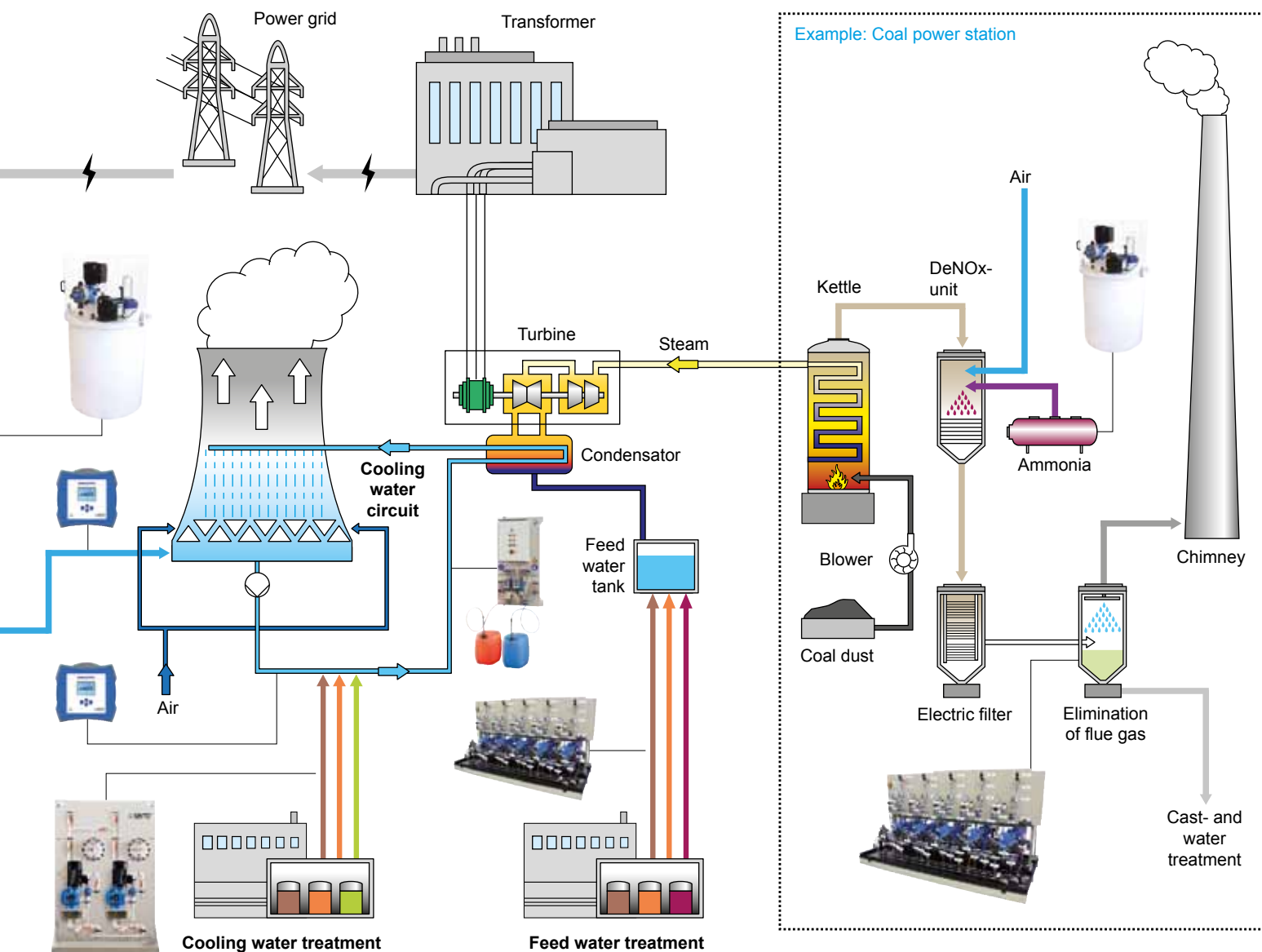
Additional  
water  
treatment



Water inlet







# Renewable Energy + Power plant technology

## Industrial-sector solutions for biogas plants

### Hydrogen sulphide elimination in modern biogas plants

Dosing with iron-(II)-chloride using a compact dosing system is much better. Dosing simply takes place by injecting the iron-(II)-chloride into the liquid phase of the substrate. **sera**'s modern and precise dosing pumps permit the exact dosing of the preselected quantities and, in some plants, can also be run by the process control system (PCS) directly via the measured sulphur content.

According to demand and hydrogen sulphide content, more-or-less dosing through optimal process control takes place. The dosing pumps are installed in a dosing cabinet and they signal diaphragm breakages and leaks in the pressure system directly to the PCS. The pump then stops dosing immediately. The dosing cabinet protects the user from the chemicals at all times.

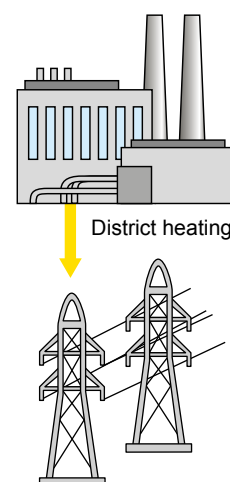
The pipe assemblies on the suction and pressure sides may consist of hoses. The connection to the iron-II-chloride tank is usually made via suction lance.

This allows the simple exchange of the chemical drums and prevents the suction line from running empty.

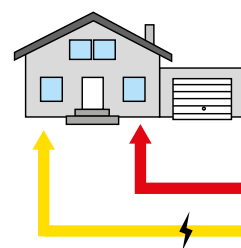
Another advantage of the robust **sera** dosing pumps is the variable use with alternating chemicals. For example, the same pump can be used to meter defoaming agents, enzymes, additives, a variety of acids and lyes.

Optional manual stroke length and frequency adjustment allows for further adaptations to the respective application.

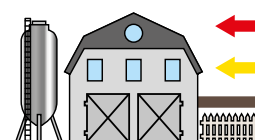
A drip pan, pressure-keeping valves and leakage sensors are always part of the standard system and ensure safe and optimal operation.



Residential building



Stables





# Customised dosing systems

## System solutions for the paper, printing and textile industry

### Circulating varnish unit for the feeding of the paint bucket by sera

The circulating varnish unit by **sera** feeds the paint bucket with varnish. There is a dosing pump of the type ZR 409.1-190e installed for the suction of the varnish. The varnish is continuously circulated in order to prevent drying in the paint bucket.

The parts that are in contact with the varnish have to be cleaned with fresh water or the corresponding cleaning agents after the ending of the dispensing process. Therefore, there are 3-way ball valves and solenoid valves installed that allow rinsing with water and emptying of the paint bucket through corresponding switching positions. The varnish-/rinsing solutions are provided into a rinsing tank.

The control of the circulating varnish unit takes place at the machine console of the printing press.

### KKV dosing systems for the textile industry

**sera** delivers KKV dosing systems as twin-head diaphragm pumps. The 4:1 ratio is adjusted by an electric actuator. The flow rates of both components are measured volumetrically.

A PLC continuously compares both measured values and immediately initiates in the event of the slightest deviation in correction by approaching the actuator. The period of the actuating pulse can be precisely calculated from the size of the deviation.

This technology guarantees a constant dye quality, regardless of disturbances like different suction heights, viscosities, temperatures, dosing sizes etc.







# Reference projects worldwide

## Cooling water treatment in Egypt

The plant-stimulating growth effect of nitrogen was discovered around 1840. Bound in nitrates, this is obtained from ammonia and nitric acid. Ammonium nitrate is produced, which quickly supplies plants with nitrogen, preventing its release into the atmosphere.

However, many farmed lands today are low in nitrogen. Therefore, fertilisers are important for agriculture and thus for the food supply across the entire world.

In 2013, the international plant constructor, Thyssen Krupp Uhde, built an ultra-modern and efficient plant in Egypt for the manufacture of 200,000 tons of ammonium nitrate per year. This complex specialises in producing LDAN (Low Density Ammonium Nitrate). The cooling water quality is of fundamental importance for trouble-free operation of the site.

Subsequently a **sera** dosing system was selected for the cooling water treatment. Design, engineering, manufacturing, documentation and delivery were included in the scope of supply. Many different water treatment chemicals such as oxygen-binding agents are dosed in the system, providing corrosion protection. Furthermore, trisodium phosphate for pH value adjustment and sodium hypochlorite for disinfection are also dosed.

As the systems are installed outdoors, the design had to be accordingly adapted to the climatic conditions of Egypt. This was not a problem for the **sera** application engineers.







# Reference projects worldwide

## Water treatment in the Hessian Ried

For more than 20 years, **sera** dosing pumps have been used in the treatment of drinking water by the Hessian Ried water board in Biebesheim. The water board was founded in 1979 and is responsible for an area of 1,200 km<sup>2</sup>. The main task of the water works in Biebesheim is to keep the ground water table at a normal level. Water is drawn in from the Rhine and treated in the extensive modern plant, resulting in a product of drinking water quality.

Thanks to good maintenance, the **sera** dosing pumps are even today in pristine condition and still have the original paintwork from when they were manufactured and delivered.

In addition to maintaining the ground water table, the water board also provides agricultural sprinkling irrigation water for the Ried area. The capacity of the Biebesheim water works is 5,400 cubic metres per hour, which is 43 million cubic metres a year.

As the average natural precipitation of 600 mm per year in the region is not sufficient to provide the water needs of the crops, up to 5 million cubic metres are made available for agricultural sprinkling. This means that vegetables can continually be irrigated in the fields of Hessian Ried even during long periods of drought, and the whole region supplied with fresh crisp lettuce and asparagus.

The water from the Rhine is processed in eight consecutive steps and then made available as optimum quality for drinking water, ground water or for sprinkler irrigation.

In the fourth part of the water treatment procedure, the primary flocculation process, the **sera** dosing pumps add iron (III) chloride as well as flocculation aids to the water. Step by step, bigger and bigger flocs are formed in the four attached flocculation basins, trapping the particles of dirt including heavy metals and microorganisms, and letting them sink to the bottom where they can be removed.

Iron (III) chloride is also used in the secondary flocculation to trap the last muddy materials as flocs. These are again isolated and removed in the subsequent multi-layered filter. **sera**'s pumps are optimally sized and rated to facilitate efficient and precise dosage of chemicals as well as safe and economical treatment.







# Reference projects worldwide

## Dosing of phosphoric acid in the UK

### From the saviour in time of need to a system partner

The English subsidiary of **sera**, **sera ProDos UK Ltd.**, was approached by Barhale & Trant Utilities (BTU) with somewhat of a logistical problem for 10 replacement Orthophosphoric dosing systems. The units were urgently required to replace old failing systems of the large regional water utility company, Southern Water. BTU had only recently signed an Alliance agreement with them and thus did not want to let their customer down.

BTU therefore decided to adopt a high-risk strategy and find a new supplier for the dosing systems in a minimum of time.

In their quest for a suitable partner, they found a link to **sera ProDos UK Ltd.** and approached them accordingly.

The initial contact was to gain more knowledge about **sera**. The fact that we had been in existence for decades, along with many testimonials reinforcing **sera's** reputation for long-lasting reliable products, helped convince BTU. **sera** were also able to show that they had worked with many blue-chip companies, particularly in brewing, food, pharmaceutical and power industries globally. This gave BTU the confidence to proceed with the real issue of getting their project back on line.

In order to be sure that **sera ProDos UK Ltd.** were able to handle the large scope of the project, the General Manager of **sera ProDos UK Ltd.** visited a couple of the sites to examine the works.

An additional advantage was, that the pricing offered by **sera** was very close to that of the original contractor and, therefore BTU, were not going to be penalised for switching supplier.

One thing that stands out with this project was that BTU and Southern Water were ideally looking for a standardised system that would be as identical as possible across all project sites. Unfortunately, it was soon discovered that the water flow and pressure demands on the various sites were different, as additional scoping confirmed.

However, because of **sera's** expertise in designing and developing standardised dosing systems, they were able to utilise the original design concept put forward with only minor changes between the sites.

**sera's** German manufacturing facility made the necessary design changes and production was promptly executed!









# Reference projects worldwide

## Boiler demineralisation in South Africa

### De-mineralisation boiler feed-water supply upgrade

**sera ProDos SA (PTY) Ltd.** was recently selected as the chemical dosing pump supplier for the Chevron Refinery in Cape Town's, demineralisation boiler feed-water plant upgrade.

The demineralisation process requires raw water to flow over resin in a cation and anion column. The minerals are attracted to the resin, stripping them out and insuring that the water entering the boiler tubes is mineral free.

This is important to prevent scaling and corrosion of the boiler tubes that can result in poor heat transfer and tube failure.

In the process, the demineralisation resin needs to be regenerated (the minerals need to be removed from the resin). This process is carried out by dosing 98% sulphuric acid [ $H_2SO_4$ ] into a water stream. The diluted acid is then pumped through the resin, stripping the minerals and cleaning the resin.

Once the resin is clean, caustic soda (Sodium Hydroxide) NaOH is dosed into the water stream. The diluted caustic is then pumped through the resin to rinse and neutralise the acid water, before returning the demineralisation plant back into service.

The boiler feed water is critical to the refinery's production reliability. With reliability as the key focus, **sera** dosing pumps were chosen as the preferred dosing pump supplier. The R410.2-940 ML pumps were installed for both chemical applications, as the multilayer diaphragm design is perfect for the extremely corrosive sulphuric acid. With the multi-layer diaphragm, the pump gear box will be protected should the diaphragm fail.







### What are sera ProDos characteristics?

Our customers' and partners' individual needs are always the centre of our attention. Besides our product portfolio, we convince with our extensive services:

- Global assembly and commissioning
- Maintenance
- Spare-parts service
- 24-hour delivery service
- Repair service
- Advisory service and engineering
- Extensive technical support
- Customer qualifications
- Individual customer training

### Online Tools and Apps to support technical managers and planners

Extensive technical product descriptions and information can be requested on the [www.sera-web.com](http://www.sera-web.com) homepage and are thus at the planners' disposal at any time.

#### The sera app

Applying the **sera app**, you can quickly and reliably check at a glance the respective resistance of the materials used in the dosing and compressor technology against liquid and gaseous chemicals.

The choice of the media and materials specifically targets the needs of the machine and plant engineering with a focus on dosing, feeding and compressor technology.

The app is free of charge and available in German and English for IOS and Android, depending on the language configuration of the smartphone.

#### sera PLATO

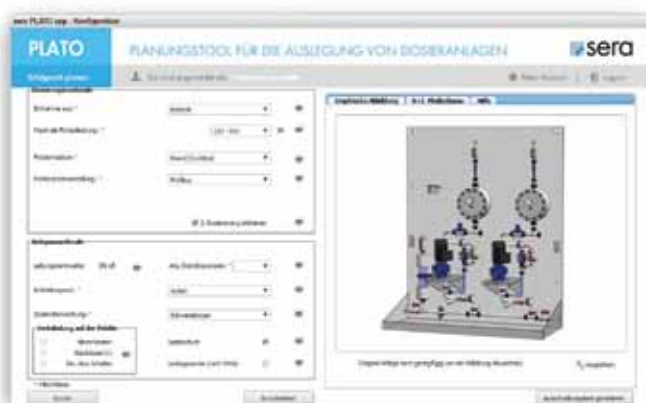
With the powerful and cost free "**sera PLATO app**", **sera** provides technical managers and planners of industrial and municipal sewage and wastewater plants with a simple and platform-independent tool for the configuration and technical specification of dosing systems for precipitants such as iron and aluminium salts.

#### Benefits overview:

- Completely free, platform-independent use
- Intuitive user interface with comprehensive support
- With a few mouse clicks, the perfect solution for the process can be planned
- Saving of created tender specifications in the own project directory
- Export of the tender specification text as TXT, PDF, Word and GAEB







# Locally present for our global customers



With headquarters in Germany and local offices in England, Spain and South Africa and a worldwide sales and service network with more than 30 foreign representatives in more than 80 countries across all continents, sera guarantees optimum support for customers locally.

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