

BREWING 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.

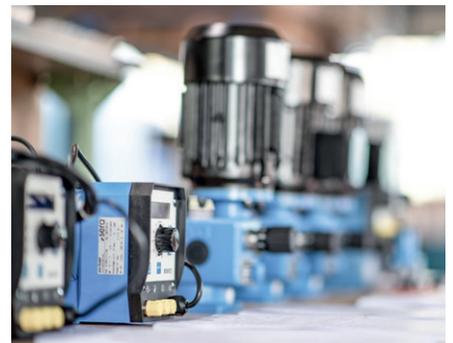
sera is an independent family-owned company headquartered in Immenhausen. In addition to subsidiaries in Great Britain, Austria, Switzerland, South Africa and Spain, **sera** also operates branches in Italy and the United Arab Emirates. More than 30 strong partners represent **sera** in over 80 countries,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



PRECISE DOSING IS HALF THE BREWING PROCESS

Our expertise for your success

Plants and systems for the production of food and beverages must be regularly cleaned and disinfected – this also applies to brewing beer. In order to produce high-quality beer, strict hygiene standards and efficient processes for cleaning and disinfecting the production plants, as well as the treatment of all water resources required for the brewing process, are required in addition to sophisticated brewing processes. Reliable cleanliness of all components is crucial to ensure the quality and safety of the final product.

For decades, sera pumps and dosing systems have been an important and reliable part of many breweries worldwide. They play a central role in the pro-

duction plants and support consistently high beer quality through their precise and reliable performance.

The comprehensive sera product range includes dosing and transfer pumps, standardised dosing systems and units, as well as customised system and unit solutions that have been specially developed for the following applications:

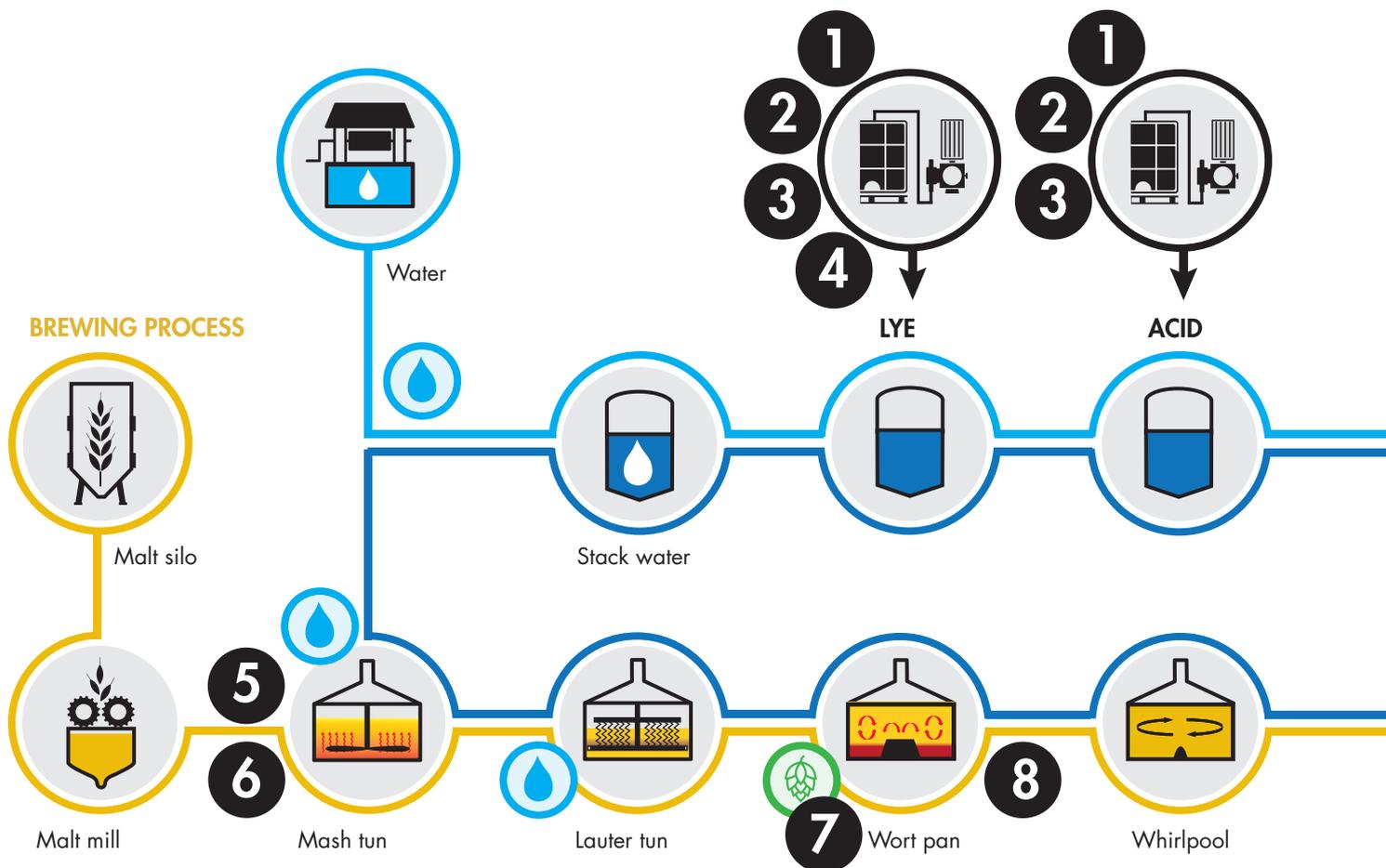
- Cleaning and disinfecting containers, pipes and systems (CIP)
- Brewing water treatment
- Beer filtration
- Waste water treatment



- Treatment of process water
- Dosing of enzymes, additives and auxiliary agents
- Yeast addition
- Dosing of conveyor belt lubricants
- Cooling water treatment
- Treatment of boiler feed water (steam generation)

With this wide range of products and solutions, sera offers breweries worldwide the opportunity to make their production processes efficient and sustainable.

APPLICATION IN THE BREWING PROCESS

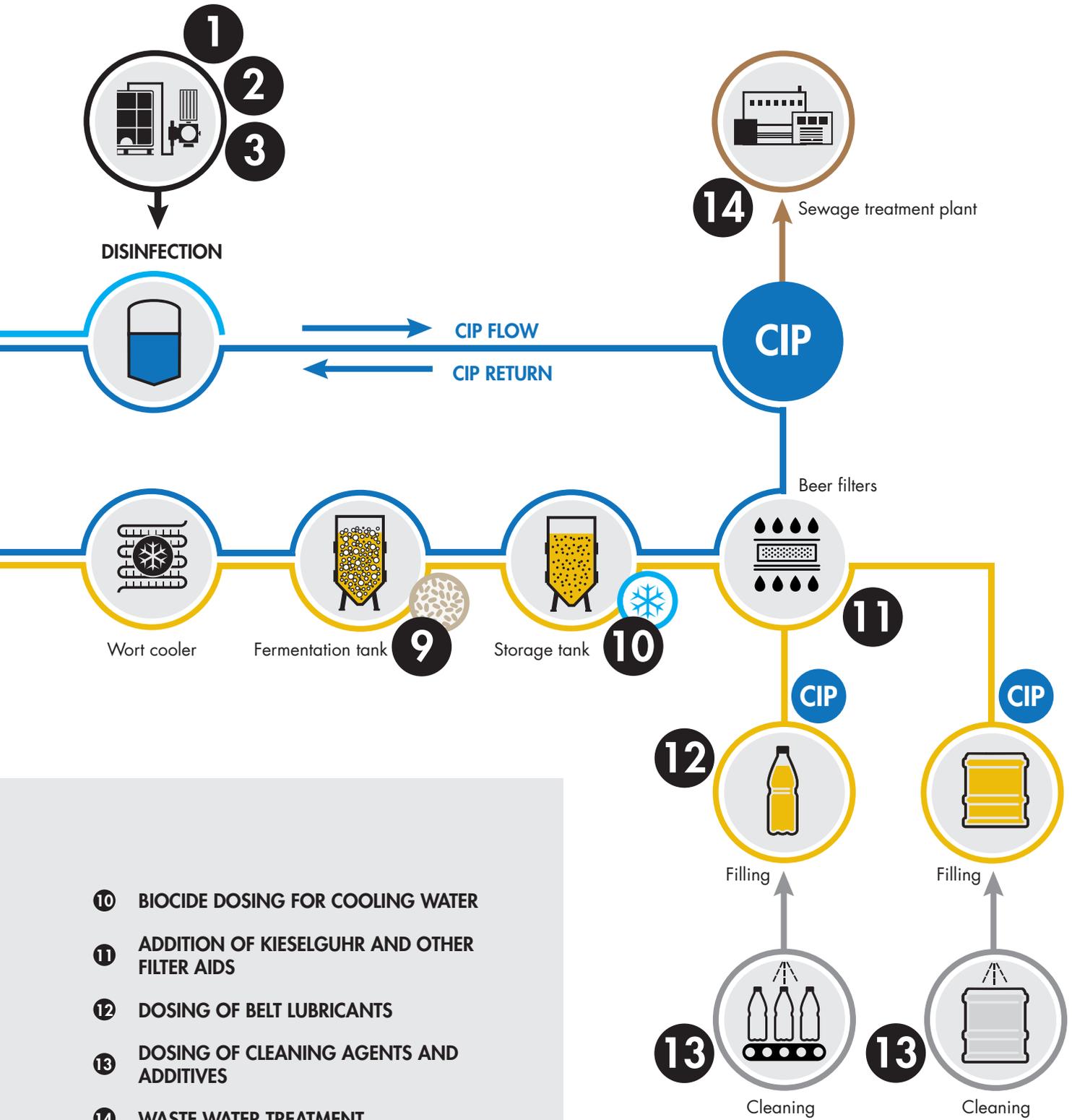


We offer a comprehensive range of products to ensure that the optimum solution is found for each step in the process. Based on a typical process in the brewing process, we present some examples of solutions from our comprehensive range:

- | | |
|--|--|
| 1 DOSING OF CHEMICALS AND ADDITIVES FOR CLEANING AND DISINFECTION | 6 PREPARATION AND DOSING OF CALCIUM CHLORIDE AND CALCIUM SULPHATE |
| 2 IBC EMPTYING | 7 ADDITION OF HOP EXTRACT AND HOP OILS * |
| 3 WITHDRAWAL OF CHEMICALS FROM STORAGE TANKS | 8 ADDITION OF ROASTED MALT BEER |
| 4 PREPARATION OF CAUSTIC SODA FROM SOLIDS | 9 ADDITION OF YEAST |
| 5 DOSING OF ENZYMES */LACTIC ACID | |

* only permissible outside of the Purity Law

THE RIGHT SOLUTION FOR EVERY PROCESS STEP



- 10 BIOCIDES DOSING FOR COOLING WATER
- 11 ADDITION OF KIESELGUHR AND OTHER FILTER AIDS
- 12 DOSING OF BELT LUBRICANTS
- 13 DOSING OF CLEANING AGENTS AND ADDITIVES
- 14 WASTE WATER TREATMENT

1

The precise and reliable dosing of lyes, acids and disinfectants is essential for the ancillary processes of the actual brewing. The standardised CVD dosing systems impress with their versatility, short delivery times and unrivalled price/performance ratio. CVD (Compact Vertical Dosing) is a large modular system for dosing applications. sera is the only manufacturer to offer the appropriate drive technology in a configurable system for every application.

13



DOSING OF CHEMICALS AND ADDITIVES



AREAS OF APPLICATION

- Dosing of cleaning agents and disinfectants in the CIP process
- Dosing of chemicals for cleaning bottles and barrels



PUMP FEATURES

- Modular design allows for a wide range of variants
- Controllable pumps on request with Profibus / Profinet
- Stepper motor pumps for precise and low-pulsation dosing



SETUP

The fully modular design makes it possible to adapt the system's functions to individual dosing requirements using standardised components, as if from a construction kit. The CVDs are suitable for use with IBCs, drums, small containers and storage tanks. Matching suction lances and connections complete the portfolio:

- Compact design, modular system
- Space-saving wall mounting
- High operational and process reliability
- Options with one pump (CVD1), two pumps (CVD2) or as a compact solution CVD1s
- Suction and pressure-side connection available



2

In the brewery, continuous removal of chemicals is very important – as is the efficiency of the process. **sera**'s IBC emptying station fulfils both requirements.

IBC EMPTYING



AREAS OF APPLICATION

Precise dispensing of chemicals such as caustic soda or disinfectants from IBCs.



FEATURES

- Simple structure consisting of a storage area and a storage tank
- Inclined storage area ensures complete emptying of the IBC
- When the IBC is completely empty, a defined residual volume remains in the storage tank
- IBCs can be replaced without interrupting the process
- Monitoring with level indicator and two float switches
- Improvement in occupational safety



SETUP

The IBC emptying station enables a continuous supply of chemicals in production processes. It consists of an inclined storage area for the IBC container, a receiving vessel and a collection tray. The liquid flows by gravity from the IBC into the receiving vessel, leaving a defined residual volume – this means that the IBC can be replaced without interrupting the process. The dosing station is placed directly on the collection tray. An additional drip tray is therefore not necessary.

3

In large breweries, the chemicals are usually stored in storage tanks, centrally in concentrate rooms. The **sera** dosing systems not only ensure that the chemicals are removed safely and easily, but also that they are precisely dosed over long pipe routes.



REMOVAL OF CHEMICALS FROM STORAGE TANKS



AREAS OF APPLICATION

Extraction of acids, lyes and disinfectants in large-scale food and beverage production plants.



FEATURES

- Siphon on the tank
- Suction aid
- Pulsation damper
- Flow meter



SETUP

Due to the design of the containers in the collecting tray, the product is only removed from the storage tanks, which are up to five metres high, from above. Therefore, a lifting device is always installed on the tanks at the highest point. In addition, the **sera** dosing systems are equipped with a suction aid. These devices enable trouble-free operation. **sera** offers the option of manufacturing storage tanks with a volume of up to 10 m³ in-house. This means that individual requirements can be flexibly implemented and high quality standards guaranteed.



4

When caustic soda is prepared from solids, an exothermic reaction occurs with temperatures of up to 95°C. The **sera** caustic soda preparation station is designed so that the user can easily add the caustic soda flakes to the process from a safe distance.

PREPARATION OF CAUSTIC SODA FROM SOLIDS



AREAS OF APPLICATION

Preparation of caustic soda from pellets and flakes.

Caustic soda is essential for thorough cleaning in the beverage industry and thus a prerequisite for safe, high-quality products.



FEATURES

- Media-contacting parts made of stainless steel
- Bag emptying with screw conveyor approx. 1,000 kg/h
- Filling level display with shut-off
- Electric agitator
- Temperature display
- Overflow with siphon
- Manual water addition
- Contact protection (all-round pipes)

- Bag emptying separate from hot area
- Version available for Big Bag feeding
- Improvement in occupational safety
- NaOH solutions from 20 to 50% possible



SETUP

The stainless steel container is filled with solids by a screw conveyor. The solids are fed into a conveyor hopper by the operator. The distance to the hot container ensures the operator's safety.

ACCESSORIES

- Suction device
- Transfer station
- Storage tank

6

The **sera** preparation stations are designed to meet the special requirements of preparing CaCl_2 and CaSO_4 . The containers are fitted with a conical bottom that allows complete emptying and rinsing after preparation. The materials are of high quality, so that even heat development during preparation with anhydrous CaCl_2 is not a problem. In order to ensure continuous availability of the additives, sera offers suitable storage containers.



PREPARATION AND DOSING CaCl_2 AND CaSO_4



AREAS OF APPLICATION

Addition and dosage of calcium chloride (CaCl_2) and calcium sulphate (CaSO_4) for brewing water treatment. Calcium chloride and calcium sulphate can be added to the brewing water to obtain a soft and rounded aroma later on.



FEATURES CaCl_2

- Very aggressive towards stainless steel
- When water-free CaCl_2 enormous heat development



FEATURES CaSO_4

- CaSO_4 is a suspension and has an abrasive effect
- Product must be kept in a suspended state by an agitator



SETUP

- Manual batching from bagged material
- Manual addition of water for rinsing
- PP container with conical bottom for complete discharge of residue
- Bag dump station
- Electric agitator
- Capacitive level indicator, adjustable
- All components are suitable for suspensions and heat-resistant



5

A hygienic dosing pump ensures precise and safe dosing of liquid additives such as enzymes or flavours in the brewery. It is made of food-safe materials, is easy to clean and prevents contamination. The pump meets strict hygiene standards and contributes to the quality and safety of the end product.

7

8

DOSING OF FOOD ADDITIVES



AREAS OF APPLICATION

- Dosing of lactic acid and enzymes (permissible outside of the Purity Law)
- Addition of hop extract, hop oils or roasted malt beer



FEATURES

- CIP-cleanable pump body
- Food compliant according to EC 1935/2004 and FDA
- SIP capability
- Dead space optimised design of pump body and valves



SETUP

- All parts that come into contact with the media are made of stainless steel or other food-grade materials.
- Smooth, electropolished surfaces and a special design allow for thorough cleaning and prevent contamination.

7 DOSING OF LIQUID HOP PRODUCTS

A hygienic dosing solution ensures precise and reproducible addition of liquid hop products in the brewery. Hop extracts and oils are dosed accurately so that bitterness and aroma remain consistent. All components that come into contact with the media are food-grade, easy to clean and meet the highest hygiene standards. This keeps beer quality stable and the production process safe.



DOSING OF LIQUID HOP PRODUCTS



AREAS OF APPLICATION

- Dosage of hop extracts to adjust bitterness
- Addition of hop oils for flavouring
- Recipe-dependent dosage of liquid hop products in the brewing or cold area

MEDIA

- Viscous hop extracts
- Hop oils
- Liquid hop products



FEATURES

- Precise and reproducible dosing for consistent beer quality
- Large adjustment ranges for different recipes
Hygienic design with dead space-optimised construction
- Electropolished stainless steel surfaces to prevent adhesion
- Food-grade materials in accordance with Regulation (EC) 1935/2004, Regulation (EC) 10/2011 and FDA
- Resistant to cleaning and disinfection processes
- Hygienic process connections (Tri-Clamp or milk pipe)
- Suitable for higher viscosities



ADDITION OF YEAST

Reliable yeast dosing is necessary for optimal fermentation. The minimal mechanical stress caused by the use of a peristaltic pump helps to avoid yeast stress. The design of the pump also allows for optimal cleaning, which minimises the risk of yeast contamination.



ADDITION OF KIESELGUHR

During filtration, yeast and other particles that cause cloudiness are removed from the beer. This results in a fine, shiny, clear beer. Diatomaceous earth and other filter aids are usually used in this process. The peristaltic pump is ideal for dosing these abrasive suspensions.

ADDITION OF YEAST AND KIESELGUHR



AREAS OF APPLICATION

Addition of yeast, kieselguhr and other filter aids

MEDIA

- Abrasive media
- Corrosive media
- Viscous media
- Shear-sensitive media



FEATURES

- Maximum resistance to abrasion
- Unparalleled suction ability
- Unlimited dry running
- No valves or mechanical seals
- Gentle pumping
- Dosing possible in both directions
- Full dosing control
- Industrial, chemical-resistant and food-grade versions
- Dosing accuracy of $\pm 1\%$

10 BIOCIDES DOSING

In breweries, evaporative cooling systems provide cooling, but their environment can favour the growth of legionella, which can enter the environment via aerosols and cause health problems. Since 2017, operators have been obliged to monitor them in accordance with the 42nd BImSchV. Intermittently dosed biocides prevent the growth of legionella, for which our simple dosing system offers an efficient solution – without any connection to the process control system.

12 CONVEYOR BELT LUBRICATION

In breweries, precise dosing of conveyor lubricants ensures smooth operation and reduces wear and downtime. Exact dosing is particularly crucial in the food industry, where hygiene and operational safety are top priorities..



BIOCIDES DOSING AND BELT LUBRICATION



AREAS OF APPLICATION

- Dosing of biocides
- Dosing of lubricants for conveyor belts.



SETUP

- High-quality dosing pumps
- Suction lances for various container sizes
- Control units for quantity-proportional dosing
- Collecting tray if required
- Choice of materials according to the media used



ADVANTAGES BELT LUBRICATION

- Efficient lubrication: precise quantities reduce lubricant costs.
- Hygiene requirements: metering reduces residues and germ formation.

- Extended service life: gentle metering minimises material wear and maintenance costs.
- Environmentally friendly: less lubricant means lower water consumption and less environmental pollution.



ADVANTAGES BIOCIDES DOSING

- Effective germ control: precise dosing fights germs with minimal use of biocides.
- Product safety: controlled dosing prevents contamination and protects quality.
- Material protection: exact dosing reduces wear on seals and lines.
- Cost optimisation: precise dosing reduces costs and minimises chemical consumption.



14

Wastewater treatment is a key component of legally compliant and responsible operations in the food industry. Organic contaminants such as fruit residues, sugar, acids, and cleaning agents must be reliably removed before discharge in order to protect the environment and resources. Efficient treatment ensures compliance with legal limits and at the same time enables cost advantages through water reuse. Professional wastewater management thus not only strengthens operational safety, but also the sustainable image of the company.

WASTEWATER TREATMENT



CLASSIC APPLICATIONS

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



DELIVERY RANGE

- Complete dosing plants and systems
- Preparation and dosing plants for polymer solutions
- Plant accessories
- Dosing pumps



ERDINGER PRIVATE BREWERY

Precise dosing for belt lubrication, CIP and water treatment

CHALLENGES

As the world's largest wheat beer brewery, Erdinger produces exclusively at its Erding site for over 100 countries. High output volumes, traditional bottle fermentation and the demand for consistent beer quality place the highest demands on process stability and hygiene. Critical areas include smooth transport during filling and packaging, precise control of belt lubrication, and safe and economical CIP cleaning. Even slight deviations in the dosing of lubricants or cleaning chemicals could directly affect quality, plant availability and resource efficiency. At the same time, the demands on sustainability and water management are increasing: process and waste water must be treated in a controlled manner, pH values must be kept stable and resources must be used efficiently. The company was therefore looking for a consistently reliable dosing technology that meets the highest hygiene standards, avoids dead spaces and ensures precise, reproducible chemical addition in all relevant production areas – with maximum operational safety and economical use of water and additives.

SOLUTION FROM sera

For almost 30 years, the private brewery in Erding has relied on dosing technology from sera to control central production and cleaning processes in a stable, hygienic and economical manner. Around 150 dosing pumps and systems are in use at the Erding site, ensuring precise, reproducible chemical addition in various process steps. In belt lubrication, the exact dosing of lubricating chemicals in the water circuit ensures smooth transport in filling and packaging with reduced consumption. For CIP cleaning, compact CVD dosing systems precisely mix lye, acid and disinfectant in the required concentration and feed them into the cleaning process in a controlled manner. This ensures hygienic safety and optimised use of water and cleaning chemicals. In process and wastewater treatment, too, targeted dosing stabilises pH values and enables sustainable water treatment. Dead space-free, hygienic designs prevent deposits and meet the high requirements of the food industry.



CAMBODIA BREWERY LTD. (HEINEKEN ASIA PACIFIC) Safe caustic soda preparation for hygienic CIP cleaning processes

CHALLENGES

As part of the modernisation of Cambodia Brewery Ltd. in Phnom Penh, Heineken was faced with the task of making cleaning processes more efficient, safer and more economical. The use of caustic soda in the CIP process is essential for consistently high beer quality. At the same time, handling solid sodium hydroxide places high demands on occupational safety, dosing accuracy and process control. The exothermic reaction during preparation poses risks for operating personnel, and the demand for cleaning chemicals fluctuates depending on production capacity utilisation. The company was therefore looking for a solution that would enable a flexible, demand-oriented approach on site, reduce transport and storage costs and at the same time meet the highest safety standards. In addition to product safety and plant availability, the focus was particularly on employee protection, concentration stability and the economical use of resources. Small deviations in concentration or unsafe handling would have a direct impact on hygiene, process stability and operating costs.

SOLUTION FROM **sera**

As part of the modernisation of its brewery, Heineken opted for a caustic soda preparation station from **sera**. The system enables the safe and efficient preparation of sodium hydroxide in solid form and its controlled supply for the cleaning process. A stainless steel preparation tank with agitator ensures a homogeneous solution, while a separate conveyor system with feed hopper and screw conveyor feeds the solids in a controlled manner. The physical separation of the preparation and feeding areas reliably shields the operating personnel from the reaction area. Temperature and level monitoring as well as a safety tube cage further increase operational safety. After preparation, the finished lye is transferred to a storage tank and fed precisely into the CIP process via a modular **sera** CVD dosing system. Concentration and availability can be flexibly adjusted so that cleaning processes can be controlled safely, economically and according to requirements.



SERVICE FROM THE MANUFACTURER – FOR PERMANENTLY AVAILABLE SYSTEMS

Maintenance, testing and further development for safe, predictable operation

The **sera** service ensures that your systems are operated reliably, safely, and economically in the long term. Structured maintenance, standard-compliant tests, and targeted analyses help to avoid unplanned downtime, make costs predictable, and prevent efficiency losses at an early stage.

Maintenance and testing – compliant with standards, plannable, manufacturer-approved

Our maintenance and testing services include:

- Maintenance of sera systems, pumps, and valves
- Maintenance of third-party units and fittings
- One-time maintenance or structured maintenance contracts including price advantages on replacement and wear parts

- Option for extended warranty upon commissioning by **sera**
- Inspection of tanks and piping systems for wear and static service life
- Annual, legally required inspections in accordance with WHG and AwSV by a specialist company
- System check in accordance with DGUV V3
- Risk assessment
- Inspections for early detection of wear
- Free on-site appointment for technical inventory
- Free quotation based on this

Technical development for changed processes

When processes change or systems need to be modernized, **sera** provides support with technically flawless,



reliable adjustments tailored to existing systems and future requirements:

- Conversion and expansion of existing dosing systems
- Adjustment of pipelines, e.g., after pump replacement
- Elimination of leaks in pipelines
- Retrofitting of valves and flush connections (clean & safety)
- Modernization of older systems to increase operational safety

Repairs with analysis of causes

- In-house repair of pumps and valves
- On-site repairs by experienced service technicians
- Fault and process analyses in the event of malfunctions
- Use of original parts for long-term operational reliability

Support and training – so that expertise remains within the company

- Competent analysis of your plant technology
- Spare parts service with fast response times
- Technical telephone support
- User training for safe and efficient plant operation
- Customer training for the safe selection of the right technical solution for each process step

The result: reliable technology, predictable costs, and a partner who looks after your plants at every stage – so that your operations run safely, efficiently, and without disruption.



SETUP AND COMMISSIONING – COMPLETELY FROM A SINGLE SOURCE

From installation to safe operation

Technical systems can only deliver long-term performance if installation, piping, and commissioning are precisely coordinated. The **sera** service team takes care of every step—clearly coordinated, professionally executed, and consistently tailored to your processes.

Installation and tank integration designed as a complete system

- Installation of plants and systems
- Positioning of storage tanks
- Professional connection of the tanks to the plant technology
- Ensuring that the entire structure is ready for operation

Commissioning that anchors knowledge in the company

- Functional testing of all components
- Parameterization and fine-tuning of the plant
- Practical training of operating personnel
- Imparting knowledge for safe operation and fault detection

The goal is not only to start up the plant, but also to permanently anchor the necessary process understanding in the company.



Pipe installation as an integral part of the system

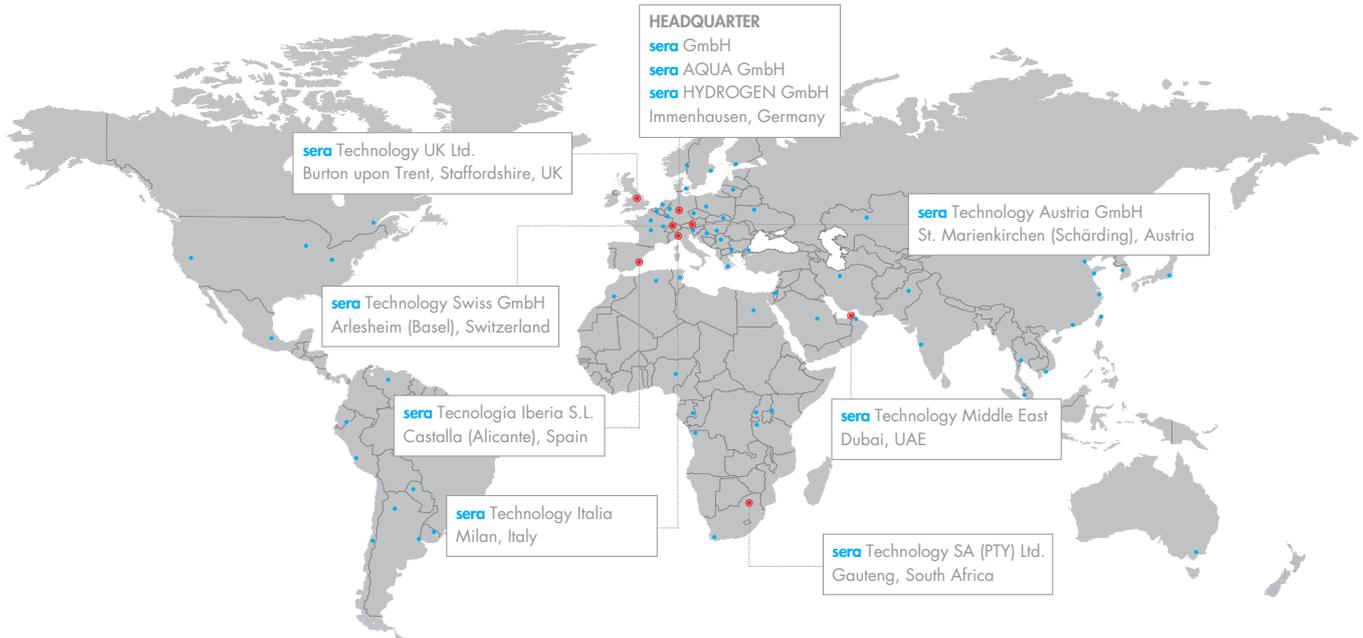
sera implements all piping variants:

- Plastic pipes: single-walled, double-walled, or with inliner
- Piping with trace heating
- Stainless steel pipes with clamp ring fittings
- Media-compatible design from the plant to the dosing point
- Hosing for flexible requirements

In doing so, **sera** not only takes current operating conditions into account, but also maintenance accessibility, expandability, and long-term operational safety. Each piping system is planned and implemented as an integral part of the overall system.

The result: stable, safe, and efficient dosing processes – from day one.

FOLLOW US



WORKING FOR YOU ALL OVER THE WORLD

sera GmbH
sera-Straße 1
34376 Immenhausen
Germany
Tel.: +49 5673 999-00
info@sera-web.com

sera AQUA GmbH
sera-Straße 1
34376 Immenhausen
Germany
Tel.: +49 5673 999-02
sales.aqua@sera-web.com

sera HYDROGEN GmbH
sera-Straße 1
34376 Immenhausen
Germany
Tel.: +49 5673 999-04
sales.hydrogen@sera-web.com

sera Technology Austria GmbH
Gewerbestraße 5
4774 St. Marienkirchen bei Schärding
Austria
Tel.: +43 771 131 7770
sales.at@sera-web.com

sera Technology Swiss GmbH
Altenmatteweg 5
4144 Arlesheim
Switzerland
Tel.: +41 615 114 260
sales.ch@sera-web.com

sera Tecnología Iberia S.L.
Calle Cocentaina n°8,
03420 Castalla (Alicante)
Spain
Tel.: +34 666 024 388
sales.es@sera-web.com

sera Technology UK Ltd.
Unit 5, Granary Wharf Business Park
Wetmore Road, Burton upon Trent
Staffordshire DE14 1DU
United Kingdom
Tel.: +44 1283 753 400
sales.uk@sera-web.com

sera Technology SA (PTY) Ltd.
Unit 3-4, Airborne Park
Cnr Empire & Taljaard Str Bartletts
Boksburg, 1459 Gauteng
South Africa
Tel.: +27 113 975 120
sales.za@sera-web.com

sera Tecnología Italia
Milan
Italy
Tel.: +39 340 81 92 744
sales.it@sera-web.com

sera Technology Middle East
Dubai
UAE
Tel.: +971 589 287 559
sales.mena@sera-web.com

www.sera-web.com

