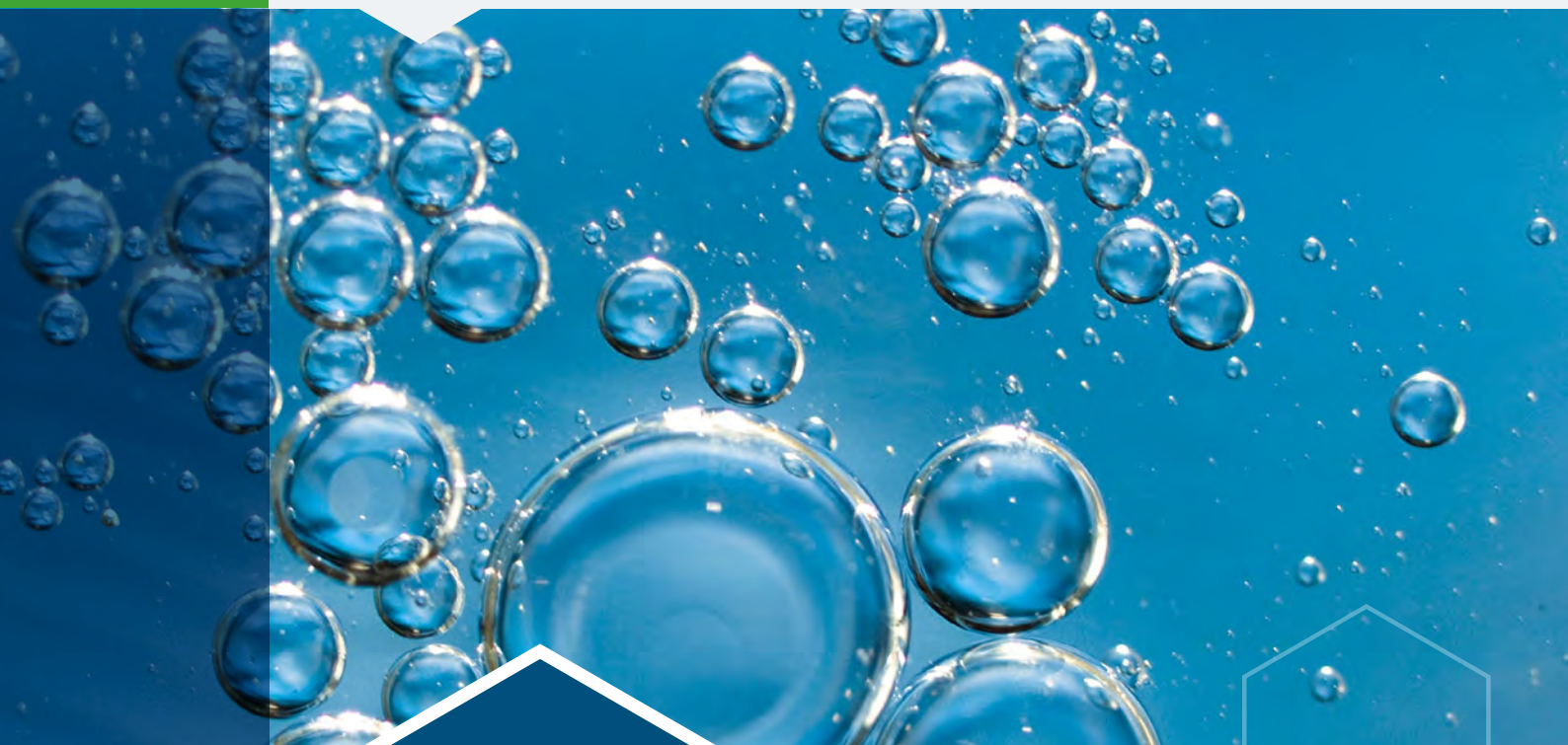




Specialty Chemicals

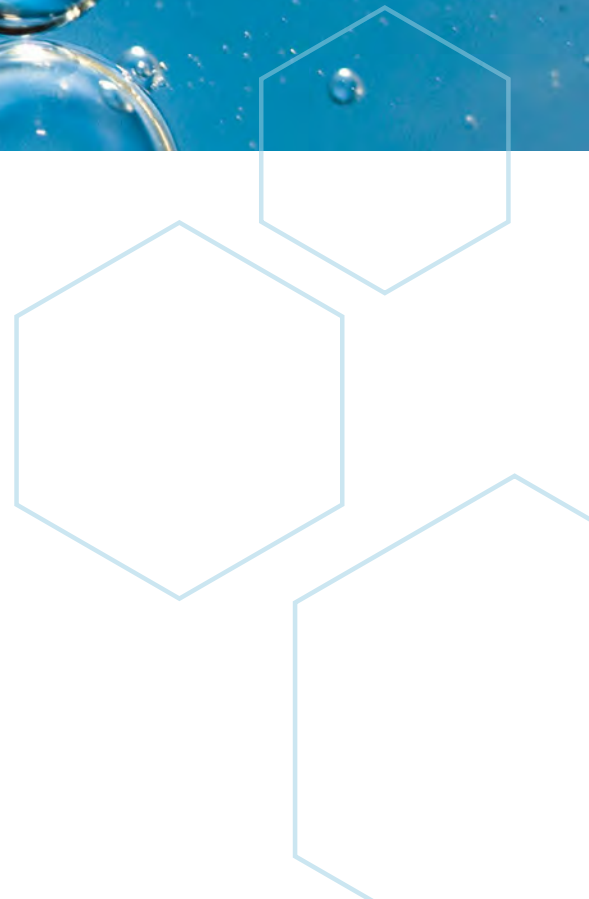
Conditioning of industrial, cooling, and boiler water

Scale preventers, corrosion inhibitors, defoamers and biocide



NEW

Scale prevention
products



Effective water treatment

Water treatment generally aims to improve or maintain water quality by removing impurities, adjusting the pH value as well as disinfecting and controlling deposits. KEBO's expertise is primarily in the conditioning of industrial, cooling, and boiler water using high-quality specialty chemicals. Through the use of **scale preventers**, **corrosion inhibitors**, **defoamers**, and **biocides** from our product portfolio, water systems can be optimized to minimize or prevent problems resulting from deposits, corrosion, foaming, and biological growth.



Our water-soluble polymers, in their function as **scale preventers**, complex and disperse ionic components that would otherwise form as deposits and crystals on surfaces.



Our **corrosion inhibitors** protect metallic surfaces from corrosion, especially in cooling water systems as well as boiler and feed water systems where metallic components are exposed to prolonged high chemical and thermal loads.



Our **defoamers** control and reduce foam formation and remove foam that has already formed by reducing the surface tension of the water.



Our **biocide** is used to kill or inhibit the growth of microorganisms such as bacteria, algae, and fungi, controls biological growth, and prevents the formation of biofilms.

In short: All of our products optimize the performance of your water systems to ensure efficient and reliable operation.

Chemical analysis is our element

Our team will be happy to advise you on all matters relating to chemical cleaning, corrosion protection, viscosity reducers, scale preventers, water treatment and conditioning, and much more. Analysis is the starting point of any collaboration with our customers.

We use state-of-the-art chemical analysis methods to identify and quantify the composition of substances and substance mixtures down to the smallest detail. We continuously invest in the latest technologies to offer our customers innovative and efficient solutions.

Thanks to our expertise and many years of experience, we are able to act as a trustworthy partner for companies from a wide range of industries.

For example, we specialize in the development and manufacture of high-quality products used in various areas of the food industry, including sugar production, potato processing, starch production, yeast production, and fermentation. In addition, our customers include companies that use water treatment.

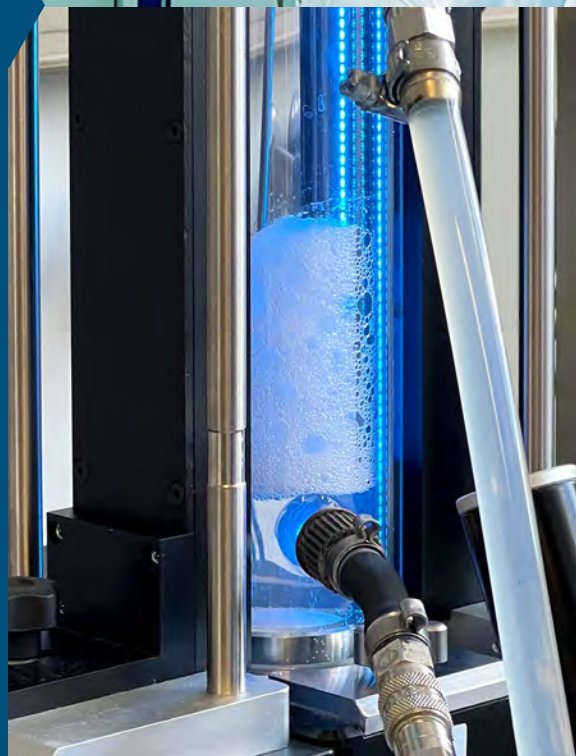
Our analyses provide the necessary answers to questions that are crucial to success, such as the composition and porosity of scaling in order to develop customized cleaning solutions, reduce foam development in the various process stages, or offer you the right protection against corrosion. Our goal is always to improve our customers' production processes and increase their efficiency.

We know from our many years of experience that every industry, process, and system has its own specific requirements. Thanks to our expertise and experience, we can always offer you one of our customized solutions. Regardless of the segment that you operate in, for example, whether specific application temperatures need to be taken into account or whether a silicone-free or silicone-containing solution is required for your process – the result must be right. We will help you get there.

Remember!

As the operator, you are obliged to check the cooling water regularly at the prescribed intervals (Section 7 of the 42nd Federal Immission Control Ordinance (BImSchV)).

This also applies to the boiler water area, which the operator must check and document the process.





Scale preventers

Polymers for scale prevention in cooling and boiler water as well as food processes

In many branches of the industry, cooling circuits are used to dissipate heat by means of circulating water systems. Impurities can accumulate in these circuits, leading to the precipitation of salts. The deposition of salts and other particles on the surfaces can reduce the efficiency of heat transfer and lead to increased operating and maintenance costs.

The **water-soluble KEBO polymers** help to prevent the formation of scale in cooling circuits, boilers, and evaporators. They keep salts dispersed to prevent deposits and can change the structure so that deposits are less stubborn and permanent. Depending on the product, KEBO polymers are effective against calcium carbonate, calcium sulfate, calcium phosphate, silicon dioxide, and silicate. The applications of polymers to prevent scale formation and reduce deposits in cooling circuits, boilers, and evaporators are diverse and cover a wide range of areas:

Industrial boiler and cooling water treatment

Polymers are common components of treatment systems for boiler and cooling water in industrial plants. They are added to the water to prevent the formation of deposits such as scale and limescale by inhibiting crystal formation and agglomeration.

Cooling water circuits

In power plants, refineries, chemical plants, and other industrial facilities, polymers are used in cooling water circuits to prevent deposits on the surfaces of heat exchangers, pipes, and other components. This helps to maintain the efficiency of the heat exchange and reduce energy consumption.

Evaporators and distillation units

Polymers are used in evaporators and distillation systems, particularly in the food and beverage industry as well as in the chemical and pharmaceutical industries, to prevent deposits on the surfaces of the evaporators. This maintains process efficiency and product quality.

Food and beverage industry

In the food and beverage industry, polymers are used to reduce deposits in steam boilers, cooking equipment, steam ovens, and other equipment used in food processing. This is particularly important to ensure compliance with the hygiene and food safety standards.

Heating systems

In hot water and steam heating systems, especially in heating systems, polymers can be used to reduce deposits on the heating surfaces and improve heat transfer efficiency.

	Advantages	Application	MW	pH	Solids content [%]	Characterization
KEBO WCA	Multifunctional additive with excellent calcium carbonate, calcium phosphate, and iron oxide dispersing properties	Cooling and boiler water	3,500	8	43	Acrylic acid homopolymer
KEBO WDA	Scale preventer and excellent dispersant for all types of sludge	Cooling and boiler water	4,500	3.5	48	Acrylic acid homopolymer
KEBO WDS	Scale preventer and dispersant; stabilization of phosphonates	Cooling and boiler water	4,500	4	44	Sulfonated copolymer
KEBO WIS	High sulfonate content; prevention of calcium carbonate scales and silicates; excellent dispersion of sludge, phosphonate stabilizer; complies with FDA 173.310	Boiler water, food processes	10,000	4.8	37	Sulfonated copolymer

	Description	Advantages
KEBO DS RO	Scale preventer for reverse osmosis systems; specially developed to prevent mineral deposits in reverse osmosis systems.	Prevents the formation of highly structured crystals and is characterized by its good dispersing properties.





Corrosion protection

Cooling water

Closed systems

Our corrosion inhibitors, such as **KEBOCOR 206 Cu**, offer optimum protection for steel and copper in aqueous solutions, especially against stagnation corrosion. **KEBOCOR 213**, consisting of a synergistic mix of organic and inorganic inhibitors, offers the best corrosion protection in closed and semi-open water systems.

Open, water-carrying systems

Our **KEBOCOR 224 L** is used as a corrosion inhibitor for iron and copper alloys in hard cooling and process water. It is a combination product of corrosion inhibitors, hardness stabilizers and dispersants for open, water-carrying systems and prevents the precipitation of alkaline earth carbonates and the deposit of suspended solids on metal surfaces. It is also hydrolysis and temperature stable and compatible with free chlorine (Cl_2). The specially formulated organic corrosion inhibitors containing nitrogen and phosphorus produce thin, firmly adhering top coats on steel and non-ferrous metal surfaces.

For open cooling systems with high calcium and bicarbonate concentrations for scale prevention and corrosion protection of steel, we recommend our hardness stabilizer and corrosion inhibitor **KEBOCOR 226**. It contains low molecular weight anionic polyelectrolytes and organophosphates as hardness stabilizers. In sub-stoichiometric amounts, they are able to hold alkaline earth ions in solution in the presence of high carbonate hardnesses (threshold effect). The product is hydrolytically stable and resistant to wall temperatures up to 200°C. It is also compatible with free chlorine (Cl_2).

The corrosion protection is produced by a special organophosphorus component. It forms thin but dense top coats of calcium and iron compounds on the metal surface.

In open cooling systems with low acid capacity (low m-value) and/or low calcium content (make-up water softening), our **KEBOCOR 241** is used as a corrosion inhibitor, hardness stabilizer, and dispersant. It is a corrosion inhibitor for steel and copper alloys in open cooling systems. Thanks to the dispersing properties of the high molecular weight polymers it contains, it prevents particles from agglomerating and settling on the walls of the system, prevents hardness precipitation, and disperses dirt particles. The polyelectrolytes contained in the sub-stoichiometric dosage also prevent precipitation from supersaturated solutions.

Closed and semi-open water systems	
KEBOCOR 206 Cu	<p>An effective corrosion inhibitor for steel and copper in aqueous solutions. Particularly effective against stagnation corrosion due to synergistic carboxylic acid derivatives and copper inhibitors.</p> <ul style="list-style-type: none"> • Largely insensitive to the hardness constituents of the water.
KEBOCOR 213	<p>Ensures optimum corrosion protection in closed and semi-open water systems through a synergistic mixture of organic and inorganic inhibitors. Iron, copper, and aluminum materials are protected.</p> <ul style="list-style-type: none"> • Heat transfer surfaces are kept clean. • Even at high temperatures, limescale deposits are prevented and suspended particles are dispersed.
Open, water-carrying systems	
KEBOCOR 224 L	<p>Developed for use in demanding cooling and process water as, corrosion protection agent for iron and copper alloys. The water quality should have an acid capacity of at least 3 mmol/l (8.4°dH) up to a pH value of 4.3 and a calcium concentration of at least 0.5 mmol/l (2.8°dH).</p> <ul style="list-style-type: none"> • Prevents the precipitation of alkaline earth carbonates and suspended solids on metal surfaces. Minimizes malfunctions due to corrosion and deposit formation. Special organic corrosion protection agents create thin, adhesive top coats on steel and non-ferrous metals. • Organophosphonates and anionic polyelectrolytes stabilize the water hardness and prevent calcium carbonate precipitation. • Hydrolysis and temperature stable and compatible with free chlorine (Cl₂).
KEBOCOR 226	<p>For open cooling systems with high calcium and bicarbonate concentrations, it prevents deposits and protects steel against corrosion. A pH value control of the circulation water is not necessary.</p> <ul style="list-style-type: none"> • The contained hardness stabilizers keep alkaline earth ions in solution, even at high carbonate hardness (threshold effect). • Polyacrylates of medium molecular weight produce good dispersing effects for organic and inorganic suspended solids. Corrosion protection is provided by a special organophosphorus component that forms thin but dense top coats of calcium and iron compounds on metal surfaces. • Stable to hydrolysis, heat-resistant up to 200°C on the walls and compatible with free chlorine (Cl₂).
KEBOCOR 241	<p>To be used in open cooling systems with low acid capacities or low calcium contents as a corrosion inhibitor, hardness stabilizer, and dispersant. A mixture of organic and inorganic compounds that protect steel and copper alloys against corrosion, prevent hardness precipitation, and disperse dirt particles.</p> <ul style="list-style-type: none"> • Prevents precipitation from supersaturated solutions by blocking crystal nucleation. • Reduces the agglomeration and settling of particles on the system walls due to the dispersing properties of higher molecular weight polymers. • Compatible with free chlorine (Cl₂) and non-ionic biocides.



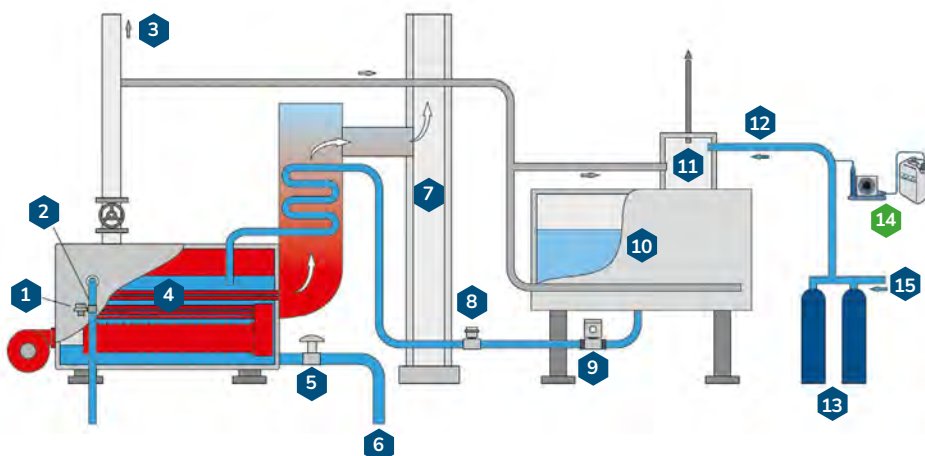
Corrosion protection

Boiler and feed water

Effective chemical pre-treatment of boiler and feed water is crucial to prevent corrosion of the boiler system and to avoid deposits such as boiler scale. Our boiler water conditioning program enables individual adaptation to the specific requirements of your system.

Application example: Steam and hot water boiler systems

Products used: **KEBO X**, **KEBOCOR SL**, **KEBOMIN S**



- 1 Valve
- 2 Desalination
- 3 Steam to the consumer
- 4 Steam generator with firing system
- 5 Desludging valve
- 6 Desludging
- 7 Chimney
- 8 Feed water control valve
- 9 Boiler feed water pump
- 10 Feed water tank
- 11 Degasser dome
- 12 Make-up water (condensate or water from the treatment process)
- 13 Water treatment
- 14 Dosing device
- 15 Raw water

	Our measures include alkalization according to the requirements of DIN EN 12953-10:2003, residual hardness binding to prevent scale formation , oxygen binding to prevent oxygen corrosion, and protection of the condensate system to prevent corrosion in steam generators.	Alkalinization according to EN 12953-10:2003	Residual hardness binding	Oxygen binding	Protection of the condensate system	Corrosion protection	Suitable for food plants
KEBO X	<p>The effect extends to warm and hot water heating systems as well as the entire water-side operation of a steam boiler system, including feed water tanks, feed water pumps, and pre-heaters. The application requires sufficient desludging equipment in the boiler.</p> <p>In addition to inorganic alkalis, the product also contains polymeric active ingredients and protective colloids whose interaction and effect are not subject to stoichiometric laws.</p> <ul style="list-style-type: none"> • Approved up to 68 bar. • It solves boiler water problems safely and without side effects, removes old deposits during operation, and improves steam quality. • As it is non-vapor volatile, it is suitable for various applications, including food and feed operations, bakeries, dairies, and the beverage industry. 	●	●			●	●
KEBO ULTRA	<p>Boiler water conditioning agent which, in combination with alkalinizing substances, optimizes the operating conditions in steam generation systems.</p> <ul style="list-style-type: none"> • Effective against precipitation in the event of a drop in hardness and prevents the formation of solid deposits. It contains stable anti-foaming agents to prevent desalination and reduce steam cleanliness problems. Existing deposits are safely removed by converting them into loose sludge during operation. • Non-water vapor volatile and, therefore, it is suitable for food and feed processing industries. Compatible with commercially available boiler water treatment agents. 		●			●	●
KEBO VP 1009	<p>A boiler water conditioning agent in combination with sodium sulfite.</p> <ul style="list-style-type: none"> • The precipitates from hardness drops are effectively dispersed to prevent the formation of scaling. Sodium sulfite converts to sodium sulfate when oxygen is added, which prevents oxygen corrosion in the boiler and condensate network. • Non-volatile and, therefore, also suitable for use in the food and animal feed industries. 		●	●		●	●
KEBOCOR SL	<p>Oxygen binder to prevent oxygen corrosion in boiler and feed water, district heating or heating water and piping systems.</p> <ul style="list-style-type: none"> • The product is added in places with high turbulence, such as upstream of pumps, via a dosing system to ensure even distribution in the system. The use of plastic is recommended for containers, pipes, and pumps that are treated. 			●		●	●
KEBOMIN S	<p>Combination product of oxygen acceptors and vapor-volatile alkalinizing agents.</p> <ul style="list-style-type: none"> • Prevents corrosion damage in the feed water and boiler water area by chemically binding the oxygen. • The amines are ideal corrosion inhibitors in steam and condensate systems, as they are evenly distributed at different temperatures and protect the material. 	●		●	●	●	



Defoamers

Defoamers are used in various areas of the technical industry, including metal processing (e.g. galvanizing, electroplating, aluminum production), the oil and gas industry (e.g., in oil treatment and processing), the chemical industry (e.g., in the production of plastics and paints) and the paper and pulp industry (e.g., in pulp preparation and paper production).

Foam always occurs when air or gases are mixed with liquids, e.g., due to chemical reactions or changes in pressure caused by mechanical interaction, and it cannot escape due to the high surface tension of the liquid. Industrial processes can be exposed to high temperatures, pressures, and extreme pH values.

Therefore, defoamers must be stable and effective under these conditions to ensure reliable performance.

	Description	Advantages	Temperature range [°C]	pH range
KEBOSPUM LF	Universal foam control of aqueous systems	<ul style="list-style-type: none"> • Easily emulsifiable with water • Resistant to acids and weak alkalis 	5-80	1-11
KEBOSPUM VZ	Defoaming of used, acidic degreasing baths (especially for galvanizing plants)	<ul style="list-style-type: none"> • Can be used undiluted or diluted with water 	5-80	1-11
KEBOSPUM HTS PL	Acidic surfactant solutions	<ul style="list-style-type: none"> • Not water-vapor-volatile and water-miscible 	from 45	1-11



Biocide

KEBOCID 306 is used to prevent and remove organic growth. It kills existing organisms by repeated shock dosing and prevents new growth with regular low dosing.

Process water systems provide ideal growth conditions for microorganisms, such as bacteria, molds, and algae, and microorganisms, such as paramecia, water fleas, ameba, and rotifers. Algae need sunlight to reproduce, while molds and many strains of bacteria grow in oxygenated (aerobic) systems, such as open cooling water circuits and air scrubbers. Other bacteria multiply under oxygen-free conditions, such as in closed circuits, in the sump of open systems, and under layers of slime and coatings. The organic and inorganic substances dissolved in the water are metabolized.

Parts of the system, such as cellulose in wooden cooling towers, plastics, or iron ions as well as dosed water conditioning agents can also serve as nutrient and energy suppliers for microorganisms. One consequence of microbial growth is the formation of biofilms on the surface or in the sump of the system.

In addition to the deterioration of system parameters, such as heat transfer and clogging of pipes, biofilms also lead to the build-up of potential differences on metal surfaces, which accelerate the microbially induced corrosion process (biofouling).

It is also possible for pathogens to survive or multiply, for example in air scrubbers. In view of these negative effects of microbial growth in service water systems, it makes technological and economic sense to prevent the proliferation of microorganisms by means of targeted disinfectant dosing.

	Description	Advantages
KEBOCID 306	<p>KEBOCID 306 is suitable for the treatment of systems in which water is stored or used for industrial purposes (such as cooling and gas scrubbing systems, air conditioning systems, process, and washing water).</p> <p>KEBOCID 306 is based on isothiazoline derivatives.</p>	<ul style="list-style-type: none"> • Strong, fast-acting broad-spectrum biocide. • Effective against gram-positive and gram-negative bacteria (e.g., mucus formers), fungi and algae. • Effectiveness is maintained over a wide pH range. • Does not foam.

Chemistry is our passion



An effective response for every requirement: not only chemical but also very personal.

We are a globally active company in the specialty chemicals industry. With almost 100 years of tradition, we stand for quality, focus on service, reliability, and innovation. When it comes to operating your production plants, KEBO products and services ensure clean processes. We meet all of the challenges related to chemical cleaning processes, water treatment, and corrosion protection (whether for the sugar industry, the production of ethanol, starch, yeast, or for the steel industry). We see ourselves as a partner to our customers and provide our knowledge on an equal footing. Trust, responsibility, and respect are the guiding principles in our interactions with colleagues, customers, and nature.

Visit our
website and
find out more.



Our services for you:

- Consultation by our chemists and engineers in application technology as well as your planning of the necessary apparatus and operating equipment.
- A worldwide network of competent sales partners who are available to assist you directly on site in analysis, planning, and implementation.



Specialty Chemicals

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