

Specialty chemicals for efficient industrial processes

Overview of the KEBO product groups





KEBO product groups at a glance

Your partner with 100% reliability

Product development at KEBO is always a team effort.

That's why we bring together in-house experts from a wide range of disciplines who know exactly which parameters are important for your individual processes and systems in order to take them into account during development, including in the chemical analysis procedures and the test series. Ultimately, this results in customized, tailor-made solutions that are precisely geared to you and your problems. Just as we see ourselves as team players and partners at eye level in close cooperation with you as our customer.

After all, at the end of the day, it's all about you and your personal business. That's why listening to you always comes first for us. We accompany you throughout the entire development process from start to finish and we support you with our expertise at all times.

We know from our many years of experience that every industry, process, and system has its own specific requirements. You never get an "off-the-shelf" product from us. You will always get the exact one you need. Regardless of the segment you operate in, 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.

The products we offer are

- Customized and individually tailored to your specific needs and challenges
- With perfect customer service, a high level of commitment, and personalized advice

Your interests are the focus of our actions. **With the clear goal of extending the service life of your equipment, increasing quality and safety, and reducing maintenance costs.**

We achieve this by providing high-quality products and services that ensure clean processes in your production facilities.

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Industrial chemical cleaners

The comprehensive product program for alkaline, acid, neutral, and solvent-based cleaning



Alkaline cleaning



Acid cleaning

Deposits hinder heat transfer and impair the efficiency of the plant

Modern thermal equipment has special requirements for cleaning. In particular, scale forms on heat exchanger surfaces in water-carrying systems **over the course of time, which may severely impair the efficiency of the plant.** The heat transfer is reduced by the deposits, thereby affecting the heating or cooling process. The consequence: Performance drops and energy consumption rises. There is a risk of overheating, long-term material fatigue and, in the worst case, operational failure.

In the case of thicker deposits, such as scale, thermal stresses also occur because the coefficient of thermal expansion of the deposit is much lower than that of the metallic material under the deposit. Cracks may develop as a result and lead to expensive repairs.

To date, scale and corrosion are among the most common causes of operational failures.



Neutral cleaning

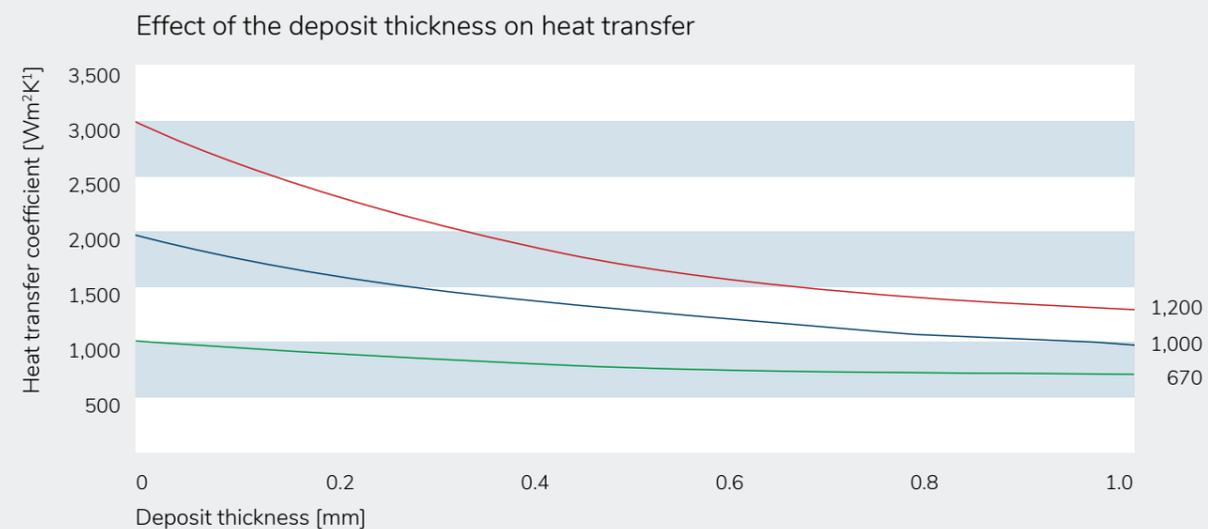


Solvent based cleaning

Boiler scale causes increased energy consumption and CO₂ emission

A successful cleaning process is critical **because only 1 mm of scale, for example, is enough to increase fuel consumption by around 10 percent.**

This is where our KEBO cleaners make a decisive contribution to avoid costly downtime and protect the equipment. Regular, professional cleaning increases the efficiency of the plant, reduces maintenance costs, extends its life cycle, and ensures greater operational reliability.



We advise you on all questions regarding industrial chemical cleaning

There is no universal agent for the rapid removal of deposits; **they usually have different compositions.** Some can be removed well with alkaline agents, while others do better with an acid cleaner. This is why an **exact analysis of the deposits**, taking into account the nature of your system, is a prerequisite for a successful cleaning process.

We offer solutions for all chemical cleaning processes

Principally: While acid cleaners are mainly used against mineral soiling, such as lime or rust, alkaline cleaners act as solvents for most organic residues and greasy soiling, such as oil, grease, soot, or wax.

We will be glad to recommend a comprehensive cleaning concept that optimally matches your requirements. The first factor to be considered is the analysis of the deposits, followed by an in-depth evaluation of the substrate.





Alkaline cleaning

Alkaline cleaners remove greasy soiling

Alkaline cleaners are good for removing organic deposits such as oil, grease, soot, and wax. They dissolve organic residues and greasy dirt. Principally: The more stubborn the soiling is from these substances, the higher the concentration of the alkaline product should be or the cleaning time must be extended. On the other hand, you must exercise caution with surfaces whose composition contains organic substances.

The mode of action of alkalis

Alkalis are substances that form lyes together with water. That is why alkaline cleaners are also called lyes. As with acids, lyes also vary in strength. Lyes have a pH value greater than 7. **The higher the value is, the more corrosive the lye will be.**

Alkaline cleaners

- ▶ Detachment of inorganic soiling such as metal abrasion, pigments, and dust
- ▶ Removal of organic deposits such as greases, oils, soot, and sugar charcoal

With our **KEBOCLEAN products**, we offer ready-formulated cleaning agents for degreasing metal surfaces in aqueous solutions. They mainly contain surfactants supported by alkalis.

KEBOCLEAN VT

An alkaline cleaner with specific acting complexing agents, surfactants, and dispersants in an optimal mixture

- ▶ Especially developed for the cleaning of inserts from thick juice or clarifying filters. Universally applicable for the removal of calcium oxalate, silicates, and organic sugar decomposition substances.

KEBOCLEAN ALU

An aqueous industrial cleaner

- ▶ Universally applicable for removing dirt and grease. Especially aluminum and its alloys are not attacked.

Neutral and solvent-based cleaning

Neutral cleaning:

KEBO LT 711 MOD

An acid and alkali-resistant surfactant mixture used in particular for cleaning and degreasing hard material surfaces.

Our specialist for neutral cleaning **KEBO LT 711 MOD** possesses pronounced wetting and dispersing properties combined with a low foaming tendency.

- ▶ Readily biodegradable and meets the requirements of detergents regulation no.: 648/2004/EC.
- ▶ As a non-ionic product, it is compatible with both anionic and cationic surfactants as well as with water hardness constituents.

Solvent based cleaning:

KEBOCLEAN KB

A metal cleaner especially for cleaning tanks and pipelines

This outstanding additive and highly effective cleaning agent facilitates the **effective removal of oil residues and deposits** to ensure the optimum performance and efficiency of your systems.

- ▶ Dissolves even tough crude oil residues and makes them pumpable so that the cleaning fluid can be returned to the refinery for processing.
- ▶ Costly disposal can thereby be avoided.
- ▶ Utilization of 90% of the oil layers as raw material
- ▶ Reduction of waste quantities by approx. 90%
- ▶ Cleaning times reduced by over 50% compared to mechanical cleaning

Acid cleaning

LITHSOLVENT cleaners: our acid cleaning professionals

Our inhibited (acid) cleaners offer an **efficient and time-saving solution for the chemical cleaning of various systems**. These combination products consist of a balanced mixture of acid and corrosion inhibitor that are already optimally matched to each other. This setting ensures that the cleaners are fully effective while protecting the materials of the systems being cleaned from corrosion and damage.

The advantages of LITHSOLVENT cleaning concentrates

All you need to do is dilute the concentrated cleaner according to the instructions. This ease of use allows users to save time and resources, as no complex and time-consuming adjustment of the cleaning mixture is required.

Don't have the means to prepare your own cleaning solutions? Our experts will be happy to advise you!

We offer a wide range of highly concentrated inhibited acid cleaners.

Depending on the material to be protected, the acid used, and the respective application, different inhibitors are required to ensure safe and efficient cleaning.

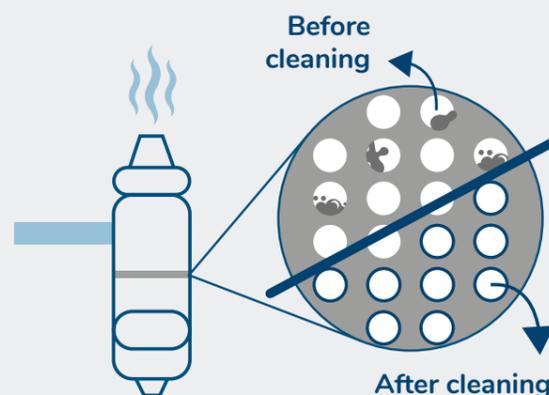
Take a look at our product highlights below.

Versatile use in various applications

The LITHSOLVENT cleaners ensure, among others, the removal of scale in industrial equipment, piping, heat exchangers, and other systems.

They contribute to improving the service life and efficiency of the treated systems and reducing the need for expensive repairs and the replacement of components.

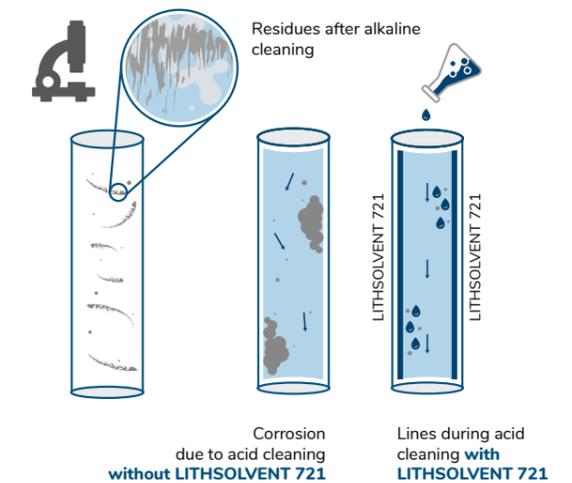
Our highly effective LITHSOLVENT cleaners are efficient and safe; **they also help you keep your systems in top condition.**



LITHSOLVENT Cleaner 721

A highly concentrated acid and ready inhibited cleaning concentrate that is based on MSA

- Cleaning concentrate with a unique property profile for dissolving boiler scale and other scales
- Can be used up to a temperature of 90°C
- Dissolves silicate-containing scales
- High cleaning performance through strong organic acid
- Odorless, easily biodegradable, and colorless
- No toxic vapors and it is resistant to hydrolysis
- Free from nitrogen and halogen compounds
- With high thermal stability



LITHSOLVENT Cleaner 701

An inhibited cleaning concentrate based on formic acid

- For the removal of boiler scale, incrustation, and other scales up to 90°C
- The following metals are protected: iron, steels, chromium, and chromium-nickel steels as well as copper-based alloys.
- **For zinc**, when used with formic acid, we recommend **LITHSOLVENT Cleaner 702**.

LITHSOLVENT Cleaner 707

Inhibited cleaner based on phosphoric acid

- To remove deposits at temperatures up to 40°C.
- The following metals are protected: steels, chromium, and chromium-nickel steels as well as cast iron, zinc, and copper-based alloys (also when in contact with iron).

LITHSOLVENT Cleaners

With our **highly concentrated, inhibited, and acid cleaners**, you will enjoy a **high yield and thereby economically attractive solution** with less production effort and increased occupational safety for the user.

Cleaner	Inhibited acid	Material	Temperature	Mixing ratio ¹ of the highly concentrated cleaner to be used	Deposits
LITHSOLVENT Cleaner 721	Methanesulfonic acid	Steel Stainless steel Copper alloy	up to max. 90°C	1:13	Inorganic scale, such as calcium carbonate, calcium oxalate, silicates, occasionally phosphates, aconates, citrates and, depending on water use, also sulfates or organic deposits
LITHSOLVENT Cleaner 701	Formic acid	Steel Stainless steel Copper alloy	up to max. 90°C	1:10 to 1:20	
LITHSOLVENT Cleaner 702	Formic acid	Zinc	up to max. 40°C	1:10 to 1:20	
LITHSOLVENT Cleaner 703	Hydrochloric acid	Steel Copper alloy	up to max. 80°C	1:3 to 1:10 depending on the amount of scale to be removed	
LITHSOLVENT Cleaner 706	Amidosulfonic acid	Steel Stainless steel Copper alloy Aluminum	up to max. 60°C	Whitish powder (approx. 210 g dissolve in 1 liter of water) Depending on the amount of scale to be removed, work with a 5-10% aqueous solution of the cleaner	
LITHSOLVENT Cleaner 707	Phosphoric acid	Zinc	up to max. 40°C	Depending on the amount of scale to be removed, work in a dilution ratio of 1:5 to 1:10	
LITHSOLVENT Cleaner 748	Citric acid	Steel Stainless steel Copper alloy Aluminum Zinc	up to max. 40°C	Recommended concentration for use in water is 25%. The consumption of the cleaner depends on the quantity of the scale and its composition.	

Additives for alkaline cleaning

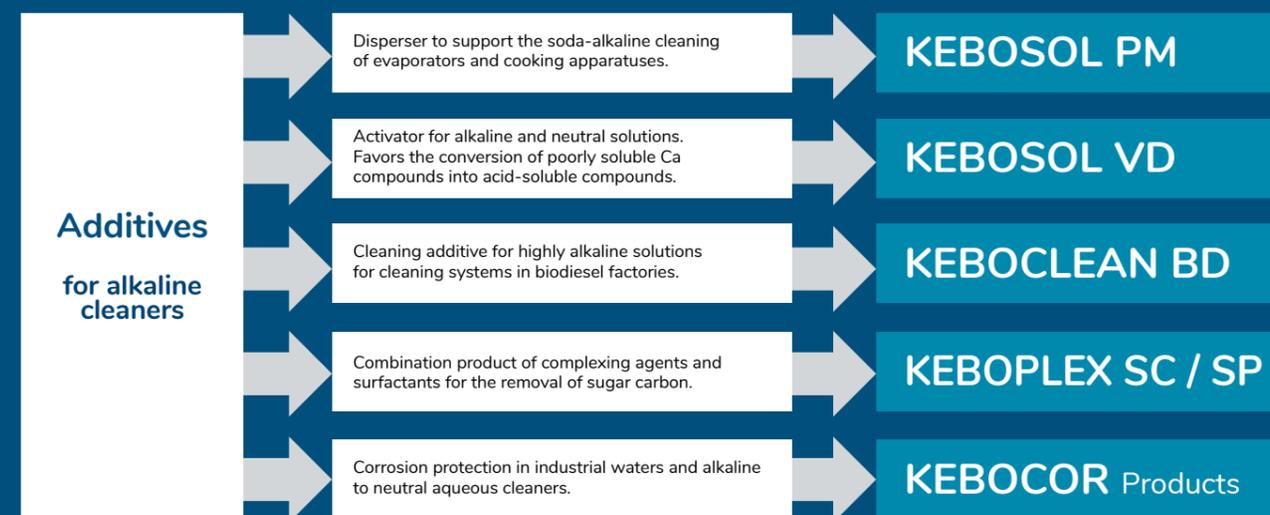
Optimal cleaning down to the smallest detail

Additives are substances that are added to process media **in order to specifically influence their properties. This is for the optimal protection of your plant!**

Our **KEBOSOL and KEBOPLEX products** contain activators and dispersants for chemical cleaning. These products are additives that are admixed with alkaline cleaning liquids to reduce the surface tension and thereby facilitate the penetration of cleaning solutions into the pores and crevices of the deposits to be removed.

For the follow-up treatment of chemical cleaning, **we recommend our KEBOPLEX program:** The complexing agents serve as a hardness stabilizer, dispersing agent, wetting agent, emulsifier, and corrosion protection additive.

Surface and well water are generally not suitable for direct feed into cooling systems because they contain dissolved salts and undissolved solid particles that, when heated, can impair the functioning of the equipment by fouling the surfaces. Using our products for water treatment **prevents the formation of deposits in the entire system.**



Additives in a neutral medium

KEBOSOL AN

For better cleaning results in neutral and alkaline media

- Accelerates the conversion of poorly soluble calcium compounds such as calcium sulfate (gypsum), calcium oxalate, and calcium silicate into acid-soluble forms, which significantly shortens the treatment time.
- During follow-up treatment, **KEBOSOL AN** promotes the neutralization of acid residues even in the smallest pores and hairline cracks, reducing the potential corrosion risks.
- Thanks to its excellent wetting and dispersing properties, it also improves the removal of sludge residues.
- It enables the effective removal of sugar charcoal in alkaline cleaning processes.
- It also ensures the improved removal of stubborn dirt particles from the pores of filter fabrics in neutral or slightly alkaline solutions by reducing the adhesive forces.

KEBOSOL EN

Powerful degreaser for industrial applications

KEBOSOL EN is a specially developed product for the efficient degreasing of industrial systems and boilers. It is based on a formulation of non-ionic surfactants that only exhibit low foaming at operating temperatures above 70°C.

- Great spontaneous emulsification facilitates the fast and effective dispersion of oils and greases.
- Superb cleaning power reliably removes greasy, oily, and resinous soiling.
- Improved wetting: Reduction of surface tension, which means that even surfaces that are difficult to wet quickly come into contact with the degreasing solution.
- Temperature resistant: Maintains its effectiveness even at high temperatures and has little tendency to foam.

Additives for acid cleaning

KEBOSOL 2000

Highly effective degreaser with a simultaneous inhibiting effect to protect metallic materials in hydrochloric acid up to 35°C

Preparatory degreasing is one of the most important operations in the surface treatment of metals. With the large number of drilling and grinding emulsions, drawing greases, corrosion protection, cooling lubricants, etc. that are used, pickling degreasers must cover as broad a spectrum of action as possible. KEBOSOL 2000 has been specially developed for this application.

The grease and oil layer adhering to the metal surface is liquefied, which significantly reduces the viscosity of this layer. This adsorptively bound molecular layer of oil and grease is displaced by the surfactants contained in the product. The degreasing effect and duration depends on the acid and iron concentration.

An optimum degreasing effect is achieved at an acid concentration of 5–8% HCl. In practice, the amount of oil and grease that accumulates or separates in a degreasing bath depends very much on the greasing condition of the supplied parts, i.e., the amount of grease and oil per m² surface area.

- ➔ The highly concentrated, liquid wetting agent-inhibitor combination disperses quickly and evenly in diluted acids.
- ➔ The liquid form allows for easy dosage.
- ➔ The acidic degreasing bath can be reduced to 1–2% free hydrochloric acid.

KEBOSOL EL

This is especially used for degreasing industrial plants and boilers, and it is a formulation of low-foaming, non-ionic surfactants above an operating temperature of 70°C.

- ➔ Exhibits great spontaneous emulsification.
- ➔ High dirt removal capacity for oily, greasy, and resinous soiling.
- ➔ Reduction of surface tension, which means that even surfaces that are difficult to wet quickly come into contact with the degreasing solution.
- ➔ Stable even at high temperatures with little tendency to foam.

KEBOSOL S

Surfactant pickling activator with a simultaneous inhibiting effect in hydrochloric acid and other pickling acids, such as sulfuric and phosphoric acid

Can be used in cold and hot pickling baths, and it largely prevents acids from attacking the steel. Avoids overpickling and reduces acid consumption, resulting in quality improvements and cost savings.

- ➔ Distributes quickly and evenly in the pickling solutions.
- ➔ The liquid form allows for easy and precise dosage.
- ➔ Reduces the surface tension, thereby shortening the incubation time until the start of the pickling process.
- ➔ At the same time, the diffusion process between the acid and the scale or metal surface is promoted, which accelerates the pickling process and shortens the pickling time overall.
- ➔ Oil and grease films that occasionally appear on the pickling material are spontaneously wetted and removed from the surface.
- ➔ Produces bright and clean surfaces and, after good rinsing, does not impair subsequent treatments (e.g., hot metallization and phosphating).
- ➔ Develops a light foam blanket on the bath surface, which prevents acid vapors from escaping. This improves the pickling atmosphere.
- ➔ In heated baths, the thin foam blanket acts as thermal insulation, resulting in low steam consumption.

KEBOSOL ZN

A highly concentrated, liquid wetting agent-inhibitor combination that disperses quickly and evenly in diluted acids.

A highly effective degreaser for hydrochloric acid and generally used at ambient temperature. The baths can be used at 20–25°C up to Fe contents of 100–120 g/l. In this Fe range, they must be disposed of, as the surfactant substances become insoluble with high electrolyte contents. An optimum degreasing effect is achieved at hydrochloric acid concentrations of 5% to 8%.

- ➔ The liquid form allows for easy dosage.
- ➔ Has a short-term emulsification for greases, mineral oils, and kerosenes, which enables rapid oil and grease separation.
- ➔ Should only be used in conjunction with an oil separator (oil separator, skimming) for optimum effectiveness.
- ➔ Produces bright and clean surfaces and, after good rinsing, does not impair subsequent treatments (e.g., hot dipping or phosphating).

Corrosion inhibitors

Inhibitors – the optimum protection against aggressive media



Corrosion inhibitors

Acids play an important role in many industries. Hydrochloric acid is one of the most important inorganic acids in the chemical industry. It is used in the processing of ores or for pickling and etching in metal processing. Another important basic chemical in industry is sulfuric acid. It is used to manufacture products such as fertilizers, dyes, and detergents. The food industry also uses various acids, such as malic acid and citric acid, to preserve products.

Acids are also used for cleaning – to remove mineral scale such as lime or rust. The challenge is, on the one hand, to remove the deposits completely and, on the other hand, to protect the metal surfaces adequately at the same time. Therefore, special inhibitors are added to the acids for material protection.

KEBO LITHSOLVENT inhibitors for use with existing acids

KEBO LITHSOLVENT types help the acid to infiltrate the deposits due to the surfactants they contain. The reaction of the acid with the metals produces hydrogen gas, which blasts the deposits from the substrate. Once the metal surface is exposed, the inhibitor will protect it from further attack by the acid. At the same time, detached dirt particles are dispersed.

KEBO LITHSOLVENT inhibitors for optimum material protection

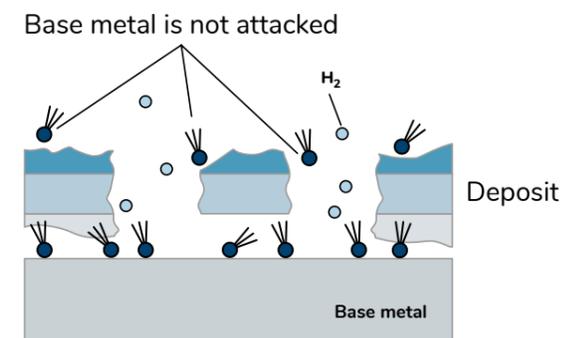
Corrosion inhibitors have a special chemical effect that influences a chemical reaction in such a way that it is slowed down, inhibited, or prevented completely. In the case of acid cleaners, this prevents the acid from attacking the material that is to be cleaned.

Number of acid cleaning actions	After 5 cleaning actions	After 20 cleaning actions	After 27 cleaning actions	After 28 cleaning actions
Protected by KEBO inhibitors				
Without Protection				

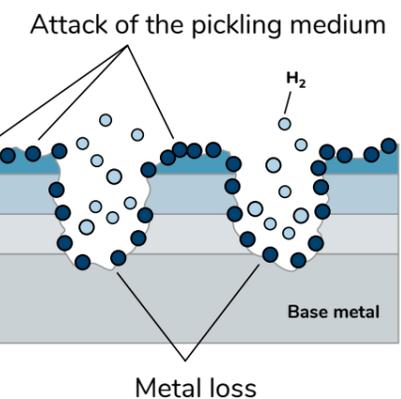
The most important acids at a glance:

Weak acids	Medium strength acids	Strong acids
<ul style="list-style-type: none"> → Acetic acid (CH_3COOH) → Oxalic acid ($\text{C}_2\text{H}_2\text{O}_4$) → Carbonic acid (H_2CO_3) → Citric acid ($\text{C}_6\text{H}_8\text{O}_7$) 	<ul style="list-style-type: none"> → Hydrofluoric acid (HF) → Formic acid (CH_2O_2) → Phosphoric acid (H_3PO_4) 	<ul style="list-style-type: none"> → Hydrochloric acid (HCl) → Sulfuric acid (H_2SO_4) → Nitric acid (HNO_3) → Methanesulfonic acid ($\text{CH}_4\text{O}_3\text{S}$)

Protected by KEBO inhibitors



Without protection



Good corrosion inhibitors should have the following properties:

- high stability against aging, oxidation, and reduction
- temperature resistance
- immediate effectiveness on addition
- no prolongation of the reaction time on addition
- high protection value at a low inhibitor concentration
- no interfering influences on the acid mixture or further processing of the treated metal

(From M. H. Akstinat, Waverley-Johannesburg)

LITHSOLVENT Inhibitors for admixture in acids

Use our **highly concentrated LITHSOLVENT inhibitors for more efficiency and the optimum long-term protection of your equipment.** They are characterized by their extreme yield. On request, we will determine the mass removal values with and without an inhibitor for you in the laboratory in order to numerically record the subsequent protective effect in your plant.

Deposits

Inorganic scale such as calcium carbonate, calcium oxalate, silicates, occasionally phosphates, aconates, citrates and, depending on water use, also sulfates or organic coatings

Acid								Material				
Hydrochloric acid	Hydrochloric and hydrofluoric acid	Phosphoric acid	Formic acid	Citric acid	Amidosulfonic acid (max. 60°C)	Sulfuric acid	Methanesulfonic acid	Steel	Stainless steel	Copper alloy	Aluminum	Zinc
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Inhibitor	Temperature in °C	Dosage in 5% acid solution ¹ in %	Consistency	Foaming behavior in 5% aqueous solution	VOC in %	Surfactants
LITHSOLVENT 620	up to max. 90	0.25	liquid	O	< 1	< 5% cationic and 5-10% non-ionic
LITHSOLVENT HC MOD	up to max. 100	0.20	powdery	-	none	none
LITHSOLVENT OT	up to max. 90	0.25	liquid	+	approx. 5	< 20% cationic
LITHSOLVENT 803	up to max. 80	0.20	liquid	O	approx. 70	< 20% non-ionic
LITHSOLVENT HZN	up to max. 40	0.5 - 0.7	liquid	O	none	non-ionic and cationic each 5%
LITHSOLVENT 1299	up to max. 80	0.20	liquid	O	approx. 80	< 20% non-ionic
LITHSOLVENT CS	up to max. 60 and 90 ¹	0.25	liquid	+	none	< 25% non-ionic < 10% cationic
LITHSOLVENT PZN	up to max. 50	0.7 - 0.8	liquid	O	approx. 7	2-5% cationic und 2-5% non-ionic
LITHSOLVENT AZN	up to max. 50	0.7 - 0.8	liquid	O	none	none
LITHSOLVENT EB Chloride-free	up to max. 100	0.25	powdery	-	none	0
LITHSOLVENT CL 4	up to max. 60 and 90 ²	0.20	liquid	+	< 1	< 1%
LITHSOLVENT PF	up to max. 90	0.25	liquid	+	< 1	< 1%
LITHSOLVENT AL	up to max. 40	0.25	liquid	+	< 1	< 1%

¹For formic acid and citric acid up to 90°C, with amidosulfonic acid up to 60°C
²For hydrofluoric acid/phosphoric acid up to 90°C and acid conc. 1-2%, with amidosulfonic acid/organic acid up to 60°C and acid conc. 3-10%

+ (strong)
 O (weak)
 - (no)



Corrosion protection

For idle time preservation

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 primarily involves 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.

Shutdown preservation of steam generators and water-bearing systems in industrial and combined heat and power plants is of great importance **to extend the service life of the equipment, reduce maintenance efforts, and enable rapid recommissioning.**

Careful shutdown preservation reliably protects the plant components from idle corrosion and **enables operation to continue smoothly and efficiently.** For the optimum protection of your plant, we offer various idle time preservation solutions for steam generators and boiler plants, depending on the duration of the idle time and adapted to the specific plant requirements.

KEBOCOR GFD

A corrosion inhibitor with antifreeze protection for open and closed apparatuses in the food processing industry

It combines corrosion-preventing, water, and moisture-removing as well as frost-protecting properties and, for example, is used:

- For the idle time preservation of heating, juice, and steam rooms, water ring pumps, and all pipelines and piping systems, including heating and cooling systems
- As a permanent corrosion-preventing and frost-protecting heat transfer medium in cooling and heating systems (e.g., in stationary mash)



Corrosion protection

For cooling water

Closed systems

Our corrosion inhibitors, such as **KEBOCOR 206 Cu**, offer optimum protection for steel and copper in aqueous solutions, especially against idle time 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 hydrolysis and temperature stable as well as compatible with free chlorine (Cl₂). 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 (Cl₂).

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 (makeup 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 a 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 as well as 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

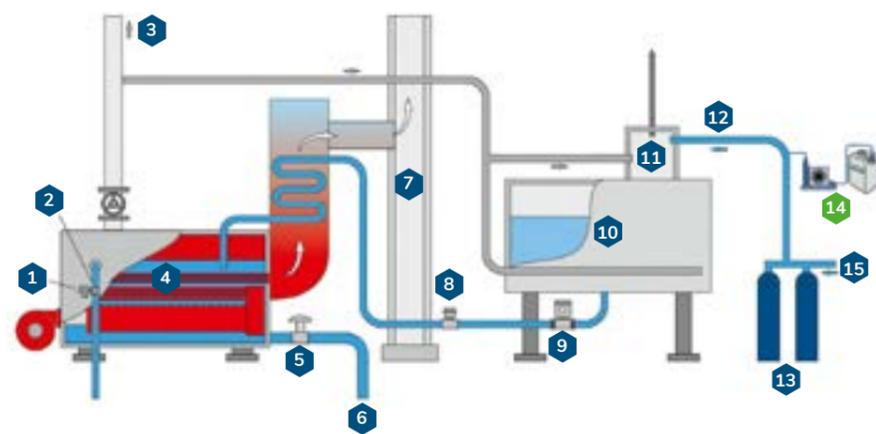
For Boiler and feed water

Effective chemical pre-treatment of boiler and feed water is crucial to prevent the 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 Makeup water (condensate or water from the treatment process)
- 13 Water treatment
- 14 Dosing device
- 15 Raw water

		Alkalization according to EN 12953-10:2003	Residual hardness binding	Oxygen binding	Protection of the condensate system	Corrosion protection	Suitable for food plants
	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.						
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. 	•		•	•	•	

Pickling inhibitors

Corrosion protection in the pickling process

To protect the material, reduce acid consumption, increase the effectiveness of the pickling process, and thereby reduce costs

ADACID – pickling inhibitors

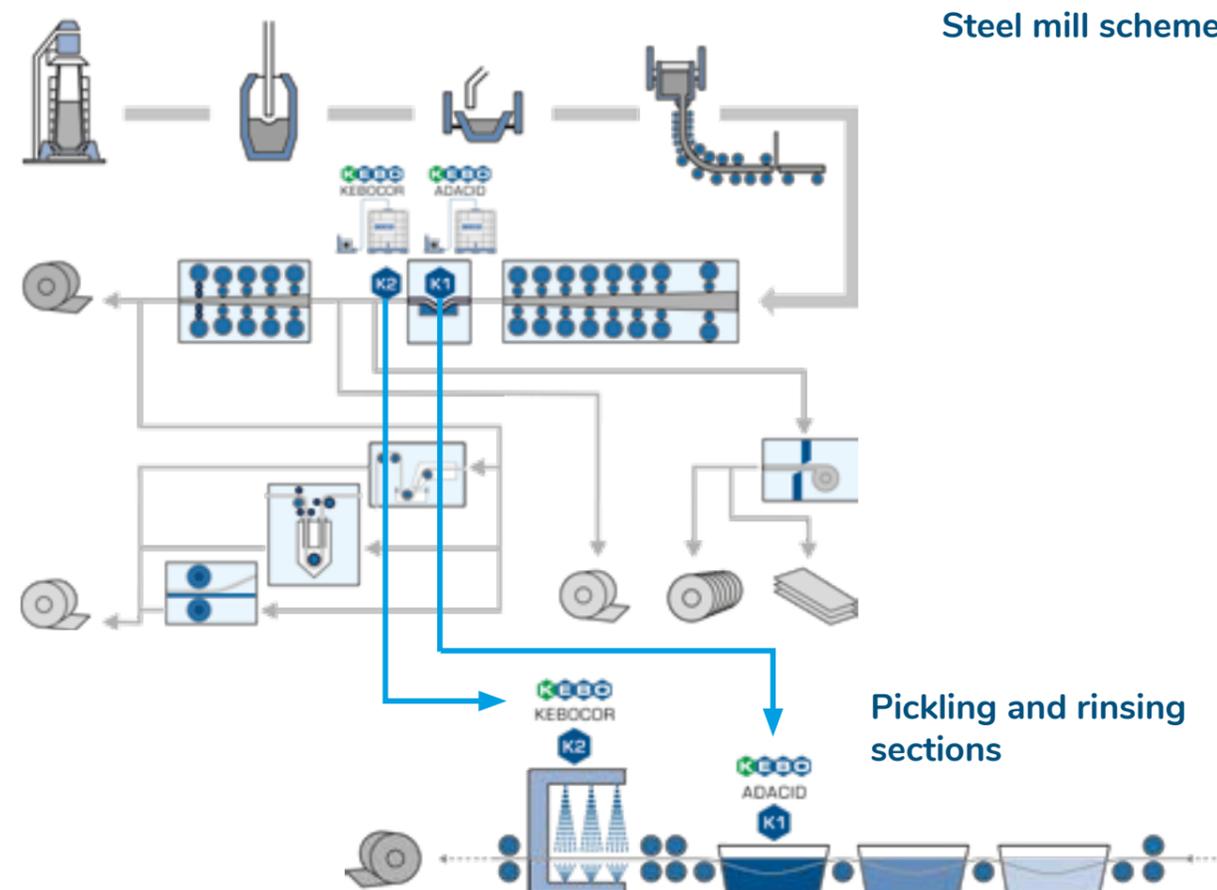
To keep the acid attack on the base material low, corrosion inhibitors (ADACID) are added to the pickling solutions. Different types of ADACID are used depending on the acid used and on the application temperatures.

KEBOCOR – for treatment after pickling!

The steel strips must be rinsed after pickling to remove residual acid and ferric chlorides from the strip surface and to prevent repeat corrosion and staining (iron hydroxide brown stains) due to entrained salts and acid.



Photos: © thyssenkrupp Steel Europe



Steel mill scheme

Pickling and rinsing sections

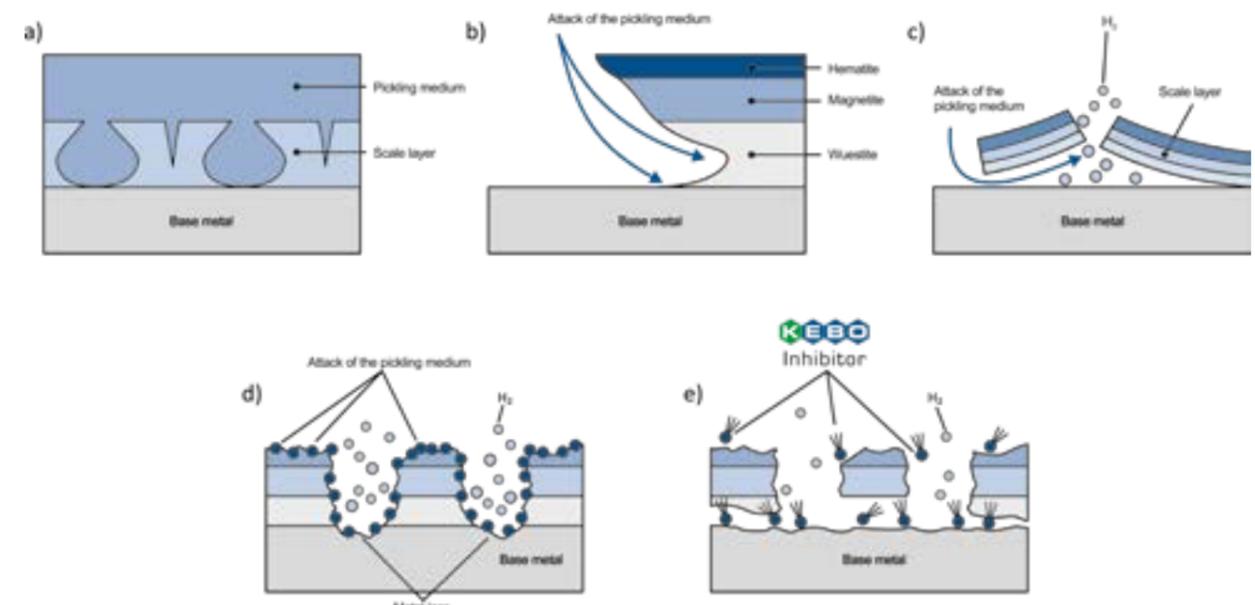
Acids are used during the pickling process to remove the oxide or scale layer and other corrosion products from the metal surface.

An oxide layer (scale) is formed on the surface of metal during production and thermal treatment (due to the reaction with atmospheric oxygen). This layer interferes with the further processing of the material. In the process, the base material is also undesirably attacked. Material losses, unnecessary acid consumption, and pickling damage, i.e., pore formation, overheating, hydrogen embrittlement, poor pickling atmosphere, etc., are the often costly consequences.

Therefore, ADACID inhibitors have become indispensable in many applications.

We develop pickling processes whose principles are determined by examining the surface states of metal samples.

Pickling model – acid attack and mode of action of the inhibitor:



ADACID – highly effective pickling inhibitors

You can only profit from this: Our inhibitors for the protection of metal surfaces during pickling can be used in all pickling lines – with and without a regeneration system.

Other pluses: They avoid overpickling and reduce acid consumption. The positive consequences: Quality improvements and cost savings. Subsequent surface finishes are also not affected.

Here is a sampling from our program:

ADACID 328

For pickling in brine baths up to 90°C

- Soluble without residue in water and in the pickling bath
- The liquid form allows for easy dosage
- Foam-free, so that disturbances in the regeneration systems are avoided
- In addition to inhibitors, it contains special dispersing agents that provide bright and clean metal surfaces

ADACID 337

For pickling in brine baths up to 50°C

- The liquid form allows for easy dosage
- Features excellent inhibition values even at high Fe contents, while not affecting scale dissolution
- Contains no hexamethylenetetramine and does not attack rubber or plastics
- Bright and clean metal surfaces are achieved

ADACID SUL

For pickling in sulfuric baths up to 100°C

- Soluble without residue in sulfuric acid solutions
- The liquid form allows for easy dosage
- Chloride and foam-free so that disturbances in the regeneration systems are avoided
- In addition to inhibitors, it contains dispersing agents and surfactants that provide bright and clean surfaces

KEBOCOR – Rinsing baths after pickling

Reliable against tarnishing and rusting of steel surfaces during the rinsing process after acid pickling.

In many cases, some of the rinse water is fed to the pickling baths. For this reason, KEBOCOR products have been designed to avoid interference with our pickling inhibitors (the ADACID products). KEBOCOR products contain a formulation of several alkanolamine derivatives of different molecular weights and, therefore, they possess buffering, complexing, and film-forming properties. In addition, they do not contain diethanolamine.

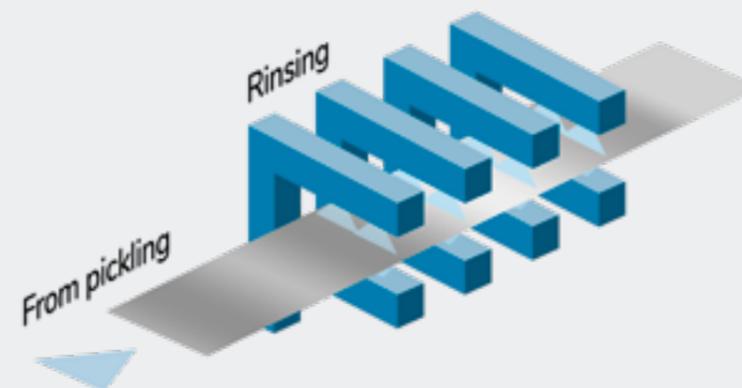
One of our KEBOCOR product highlights:

KEBOCOR 328 A

Can be used at any temperature

- Highly concentrated – for longer interim storage
- Almost residue-free evaporation at higher temperatures
- The liquid form allows for easy dosage
- The cathodic partial reaction of the corrosion process is predominantly prevented by an adsorptively bound thin layer

Rinsing section

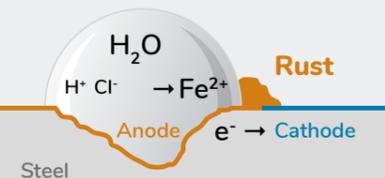


The advantages of passivators added to the rinse water:

- Prevent corrosion phenomena
- Form a protective layer
- Prevent predominantly cathodic partial reaction

Without KEBOCOR

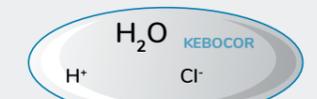
Oxygen



Steel

With KEBOCOR

Oxygen



Steel

KEBOCOR

Scale preventers – antiscalants

For maximum plant performance and energy efficiency

Antiscalants increase cleaning efficiency, extend the service life of the cleaning system, and prevent potential damage to surfaces or equipment.

Other pluses: They avoid overpickling and reduce acid consumption. **The positive consequences: Quality improvements and cost savings.** Subsequent surface finishes are also not affected.

Not all scaling is alike: They differ depending on the nature of the plant and the production process. **Scaling occurs in various areas and significantly reduces heat transfer in evaporators, for example.** Scaling is caused, for instance, by changes in the makeup from city water to well water, as city water has higher salt loads. Defective dosing equipment, a break in a heat exchanger, due to a mixture of media or process-related contamination, e.g., from the products being processed.

To prevent this from happening or to ensure that the existing scaling is removed smoothly, **we offer various scaling inhibitors**, such as hardness stabilizers as well as dispersion and wetting agents for different applications.

For the food industry

KEBO DS

A polyelectrolyte of low molecular weight that is nitrogen-free, and phosphate-free

- Ensures continuous and energy-efficient production.
- Scale-forming calcium salts are stabilized in solution and separated from the sugar crystals during centrifugation.
- Foam-free, so that disturbances in the regeneration systems are avoided.
- Final cleaning after the campaign is facilitated by the antiscalant.

KEBO DSP II

Developed specifically for scale prevention in evaporation plants in saline operations

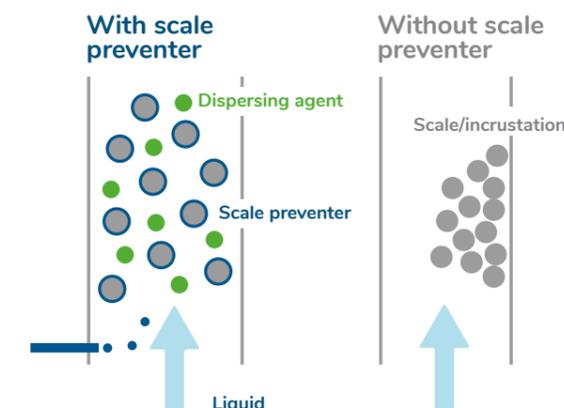
- A synergistically acting blend of anionic, low-molecular polymers and organophosphate – with complexing and dispersing properties.
- It is able to keep especially alkaline earth ions in strong salty solutions in dissolution at a substoichiometric dosage, i.e., under conditions which normally cause a precipitation of the scale forming agent.

For service water plants and open recooling systems

KEBOPLEX 138

With a special blend of modified polyacrylic and phosphonic acids

- Stabilizes and disperses.
- Effectively prevents calcium deposits, even at low doses, and specifically binds to seed crystals to prevent the growth of deposit-forming crystals.
- Foam-free, so that disturbances in the regeneration systems are avoided.



For cooling water systems

KEBOCOR 224L

For use in hard cooling and industrial waters

- As a corrosion inhibitor for iron and copper alloys.
- A combination product of corrosion inhibitors, hardness stabilizers, and dispersants for open, water-bearing systems.

For steam boiler systems

KEBO X

Combines inorganic alkalis with polymeric natural products and protective colloids that act synergistically and are not subject to stoichiometric laws.

- Tested by TÜV and certified for operation up to 68 bar according to Section 27 of the steam boiler regulation of the German Boiler Inspection Board.
- Physical mode of action: Prevents deposits and removes scales from boilers and heating systems during operation.
- Safely dissolves old deposits and gradually converts them into sludge.
- Reduces foaming and promotes the production of neutral, pure steam.



Polymers for scale prevention

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, including the following:

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.



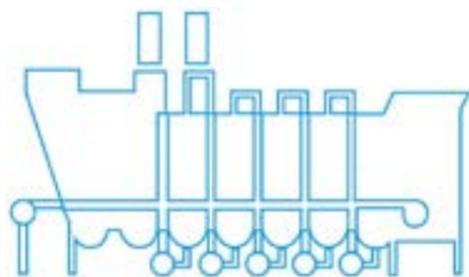


Biocides

Biocides against the unwanted growth of microorganisms

Biocides are chemical or biological substances used to control, inhibit, or kill harmful or undesirable microorganisms, such as bacteria, fungi, algae, or viruses. They are used in various industries to control the growth of microorganisms and to ensure the health, safety, and quality of products and processes.

The application areas of biocides are manifold, e.g., water treatment, agriculture, foodstuff industry, or in health management. KEBO specializes in water treatment. Our biocides are used in water treatment plants to control the growth of algae and microorganisms, for example in cooling towers and heating systems.



Our specialists: **KEBOCID products** prevent microbial growth or algae formation in open and closed circuits.

KEBOCID products are used to prevent and remove organic growth. If contamination is already present, the organisms are killed with repeated shock dosing and then renewed growth is prevented with low regular dosing.

KEBOCID 306

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 as well as process and washing water.

- 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

KEBOCID 310

A broad-spectrum biocide based on dithiocarbamates that is used in the area of extraction in sugar production to prevent microbially induced sucrose losses.

- Due to its broad spectrum of activity, KEBOCID 310 is suitable for the inactivation of bacteria, yeasts, and fungi.
- When used as intended, KEBOCID 310 meets the requirements of the German Food, Commodities, and Feed Code (LFGB, revised version, published on 15-SEP-2021).
- The ingredients are listed in the FDA Regulations 21 CFR 173.320.
- Halal certification no.: C-790-60-16-316 / PID: 0013
- Kosher certification no.: KLBD894880



Defoamer

For maximum effective foam control with innovative defoamers for your industry



Targeted foam control – with KEBOSPUM

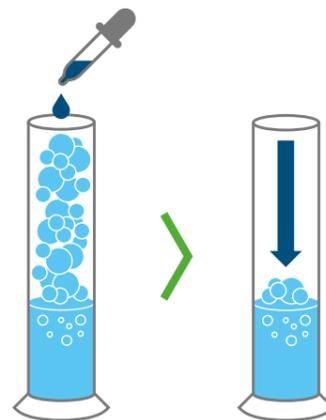
Foam formation in industrial transport and production processes is caused by air entrainment, gas release, and surface-active process components such as proteins, surfactants, or organic substances. Uncontrolled foam negatively affects key process parameters such as efficiency, maintenance costs, hygiene, occupational safety, and product quality.

KEBO defoamers are designed to either eliminate foam immediately (**defoamer with a knock-down effect**) or to prevent foam formation in advance (**antifoam with a hold-down effect**). In both cases, the focus is on the long-term suppression of foam formation. They are used across a wide range of industrial applications, including food processing (such as sugar, starch, yeast, potato processing, and fermentation), industrial cleaning, the paper and pulp industry, and as technical process systems.

All KEBOSPUM defoamers are Halal and Kosher certified.



- ➔ **Effective foam control, reduction, or elimination** for the sustainable optimization of your production processes
- ➔ **Good process compatibility** without compromising product quality or equipment
- ➔ **High stability** to ensure consistent foam control
- ➔ **Impressive dosing efficiency** and low dosing rates for being highly economical



KEBOSPUM KIS - A practical example

We always find the perfect defoamer for your specific production requirements.

This was also the case in this specific practical case with the task of finding a suitable defoamer for the interior of a sugar factory. The focus here was on the process steps of extraction, carbonation, and evaporation. The requirement was that the defoamer should not only work effectively at high process temperatures of up to 75°C, but also have a high chemical stability in order to have a long-lasting effect.

Our evaluation included a comparison with our KEBOSPUM KIS and the competitor products, which were in use at the time, in the form of laboratory measurements and an operational test directly on site.

The result: Top performance with high cost savings:

Temperature: 70°C				
	Dosage [ppm]	Time to max. foam height after 20 s [s]	Foam volume after 20 s [ml]	Time for foam decomposition up to 50% of the max. foam height [s]
Without defoamer	0	20.6	140.2	> 120
KEBOSPUM KIS	10 ppm	3.0	19.8	2.6
Competitor 1	35 ppm	6.6	39.1	3.6
Competitor 2	50 ppm	13.7	43.6	10.5

High-performance process defoamers can achieve **high overall cost savings** as the required dosage is much lower!

A simple sample calculation:

	KEBOSPUM KIS	Competitor 1	Competitor 2
Start of the campaign	10 ppm	35 ppm	50 ppm
End of the campaign	Up to 20 ppm	Up to 80 ppm	Up to 100 ppm
Total consumption	4,000 kg	15,000 kg	20,000 kg

✓ = very well suited ○ = suitable/depending on the boundary conditions

KEBOSPUM:

Application	Process	Temp.	KIS	KTX	KWX	HTS PL	LBF	AS	BWS	BWO	PP	VPL	VPF	VPN	HES	FES	FEZ	LF	VZ-Series*	
 Beet sugar	Diffusion, extraction, evaporation, crystallization	≥ 40°C	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Flume water, beet washing	5-40°C	-	-	-	-	✓	✓	✓	○	-	○	-	-	-	-	-	-	-	○
 Potato processing		10-40°C	-	-	-	-	-	-	✓	○	✓	✓	-	-	-	-	-	-	-	✓
 Vegetables & fruit	Transport, washing, processing	10-40°C	-	-	-	-	-	-	✓	○	✓	✓	✓	-	-	-	-	-	-	✓
 Starch production		10-40°C	-	-	-	-	-	-	-	-	✓	✓	○	○	✓	✓	✓	-	-	✓
 Fermentation	Aerobic (yeast, amino acids, carboxylic acids, vitamins, antibiotics)	20-40°C	-	-	-	-	-	-	○	-	○	✓	✓	✓	✓	○	✓	-	-	○
	Anaerobic	20-40°C	-	-	-	-	-	-	○	-	○	✓	✓	✓	○	✓	✓	-	-	○
	Bioethanol fermentation	30-40°C	-	-	-	-	-	-	○	-	○	○	○	○	○	✓	✓	-	-	✓
 Biogas		20-40°C	-	-	-	-	○	○	○	✓	-	-	-	-	-	-	○	-	-	-
 Water & wastewater treatment		variable	-	-	-	-	✓	✓	✓	✓	-	-	-	-	-	-	-	✓	✓	✓

Crystallization



Crystallization is of crucial importance in the efficient production of high-grade sugar of the desired quality. An optimal crystallization process leads to efficient production processes, improved yield, and competitiveness in the sugar industry.

KEBO SLURRY

Optimum control over crystallization

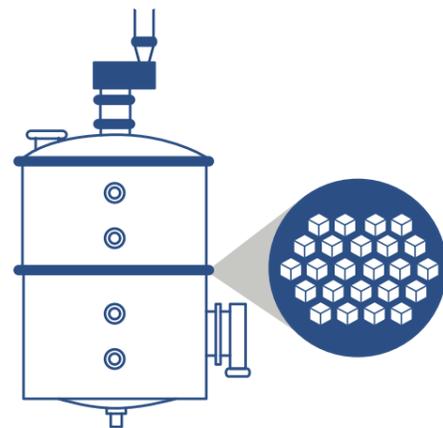
Defined sizes: With KEBO SLURRY for a desired, stable MA value, a low CV value, and more sugar in the desired quality grade.

KEBO SLURRY is a ready-to-use mixture of the finest, uniformly ground sucrose particles suspended in a highly viscous liquid. Using it guarantees a particularly homogeneous crystal growth, which in turn leads to defined sizes and low distributions in the sugar crystals.

The use has been tested in the sugar factory and sugar refinery.

The clear advantages of KEBO SLURRY

- ➔ **High efficiency** or reduction of molasses loss, resulting in a high yield of additional sugar.
- ➔ **Excellent MA control:** Coca-Cola standard 0.7 mm.
- ➔ **Lower and, therefore, better CV value:** The coefficient of variation improves by approx. 3% compared to conventional suspensions.
- ➔ **Whiter texture of the sugar crystal:** The low CV value in sugar crystallization results in a whiter color and more uniform sugar texture.
- ➔ **Kosher and Halal certified: Kosher-KLBD: 339647 and Halal-PID: 0405** Sugar crystals suspension takes place in crystal seed suspension, not in isopropanol alcohol.
- ➔ **High stability:** The particle size distribution is very narrow. When freshly stirred, **KEBO Slurry** is stable much longer than isopropanol suspensions.
- ➔ **Ready to use:** Ready-to-use solution with a fixed sugar content.



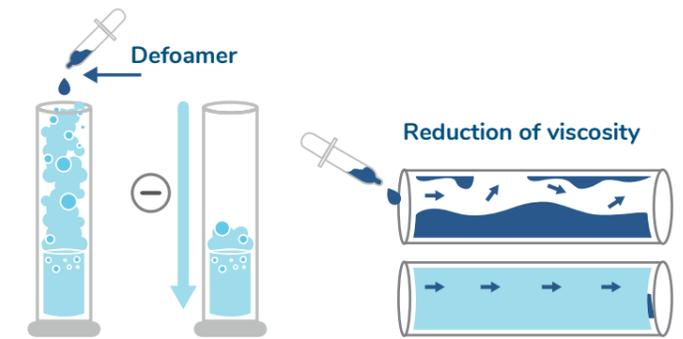
KEBOSOL CA

Viscosity reducers and defoamers – crucial for the control and optimization of crystallization processes

Reducing the viscosity of the sugar solution has a direct, positive influence on foam formation, flowability, and crystal formation.

KEBOSOL CA reduces the viscosity allowing for better mixing of the solution and thereby better crystal formation.

The use of KEBOSOL CA leads to energy savings, allows the process to run at a higher density, and generally stabilizes the process of crystallization.



KEBOSOL CA at a glance

- ➔ **Viscosity reducing and defoaming:** The surface tension of intermediate liquids is reduced.
- ➔ **Faster crystal growth** due to noticeably improved filler circulation as well as an immediate and lasting defoaming effect (boiling)
- ➔ **Optimum use with:**
 - Vacuum pans** – resulting in better circulation of the Masecuite white sugar filling masses and thereby homogeneous and uniform crystal growth. Due to its anti-foaming properties, contamination of the condensate by excessive foaming can be prevented.
 - Centrifugation** – resulting in the rapid and complete separation of sugar crystals and molasses.
- ➔ **Higher desugaring in the post-product mashes** as well as better flow characteristics in the mash batteries.
- ➔ **Faster “strike-through” of molasses** in the discontinuous centrifuge, and a striking improvement of the centrifuging and covering process in the continuous centrifuge as well as faster and complete deaeration of molasses (centrifugability)
- ➔ **Ready to use** – Ready dosed, non-ionic surfactant that is ready to use at 20°C room temperature.
- ➔ **Easy and fast application** – Due to its properties, it can be added directly to the intermediate liquids.
- ➔ **Low dosage** – Just 10-15 ppm KEBOSOL CA is sufficient to achieve optimum viscosity or foam reduction.





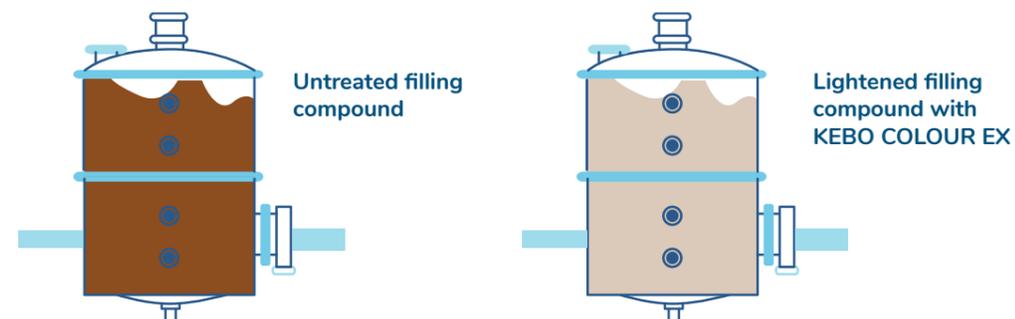
KEBO COLOUR EX

Sugar quality based on various criteria such as color, purity, moisture, granulation, and filterability

Color is one of the most important characteristics for the sugar quality, as it is directly related to its purity. Colorants from molasses and other impurities can also remain in the sugar crystal after crystallization. KEBO COLOUR EX destroys color molecules and is able to lighten the product when used during crystallization.

Color reducer to lighten the filling compounds as well as to bind and remove impurities

During the crystallization process, various organic compounds and impurities may be present in the sugar suspension. These impurities can lead to an undesirable dark colored sugar.



KEBO COLOUR EX at a glance

- ➔ **Strongly acting reducing agent** – based on a selected sulfur-containing compound. The lightening of the filling compounds is based on the reduction of the chromophoric groups of sugar compounds.
- ➔ **KEBO COLOUR EX decomposes without residues** when exposed to moisture and heat when drying the sugar crystals.
- ➔ **Fast processes** – KEBO COLOUR EX is drawn into the cooking apparatus through vacuum in a dry, powdery state (without pre-dissolving in water) immediately after sugar crystallization is complete.
- ➔ **Proper storage:** This ensures the dry and powdery state of KEBO COLOUR EX.
- ➔ **Kosher and Halal Certified:** Kosher-KLBD: 339647 and Halal-PID: 0405

Your partner with 100% reliability

At KEBO, efficiency and sustainability go hand in hand

At KEBO, two things are essential: constant innovation and constructive cooperation. **That's why trust, responsibility, reliability, and respect are our top priorities** – and not just since yesterday but rather for a proud 100 years.

We are proud of our certification as an “Ecoprofit operation”

As part of the chemical industry, we are aware that we have a special obligation. **That is why we are wholeheartedly committed to sustainability.**

We treat our resources with care. We are continually aware of the interplay between the environment, social, and economic goals in our day-to-day work.

For us, this is not just a principle for us. It is a practiced conviction that drives us all.

Worldwide, to be sure.



Contact us and we will give you the name of your local contact partner.

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 100 years of tradition, we stand for quality, service, reliability, and innovation.

When it comes to operating your production facilities, KEBO products and services ensure clean processes. Whether for the sugar industry, the production of ethanol, starch, and yeast, or the steel industry, we meet all of the challenges of chemical cleaning processes, water treatment, and corrosion protection. We see ourselves as a partner to our customers, and we share our knowledge on an equal footing. Our guiding principles in dealing with colleagues, customers, and nature are trust, responsibility, and respect.

Our services:

- Consultation by our chemists and engineers in application technology and, of course, also in your planning of the necessary apparatuses and operating equipment
- A worldwide network of expert sales partners who can provide on-site analysis, planning, and implementation support

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The KEBO Anniversary

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