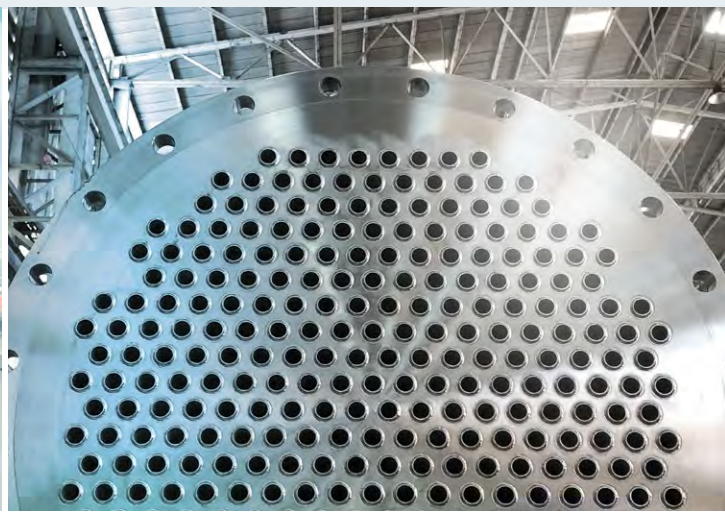


Industrial chemical cleaning

The comprehensive product range for alkaline, acidic, neutral, and solvent-based cleaning



With optimal solutions for clean workflows in your process

Increasing the efficiency and quality

As specialists for chemical cleaning, water treatment, and corrosion protection, we can always offer you optimum solutions:

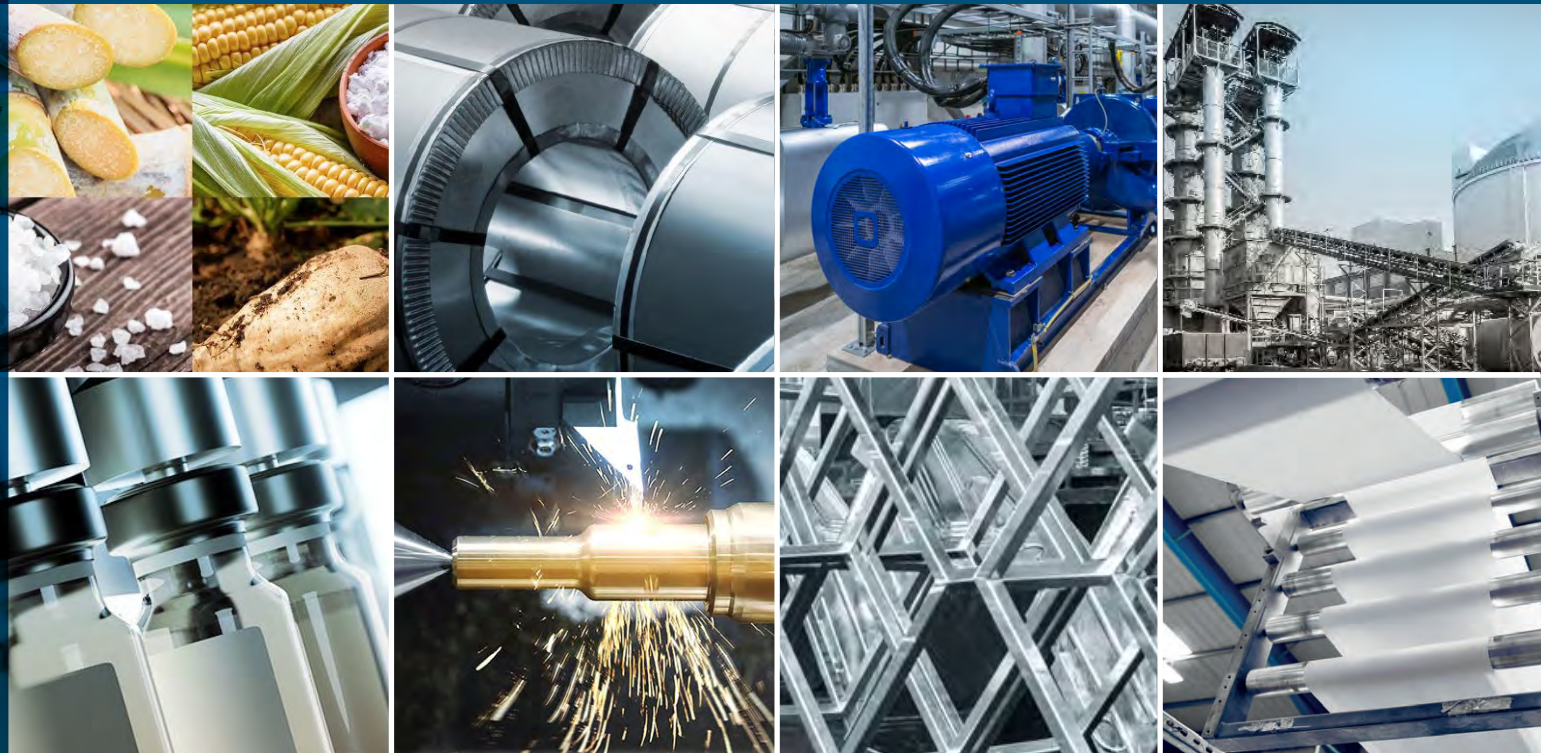
- ▶ Customized and individually tailored to your specific needs and challenges.
- ▶ With perfect customer service, a high level of commitment, and personalized advice.

We focus on your interests with the clear goal of extending the service life of your equipment, **while increasing quality and safety as well as reducing your maintenance costs.**

We make this possible with high-quality products and services that ensure clean processes in your production facilities.

We offer

1. High and economical cleaning performance, thereby reducing your production costs.
2. Increasing production safety.
3. Increasing occupational safety.
4. Ensuring the quality of your end product.
5. The reduction of your energy consumption (CO₂ reduction).



Mineral scale hinders heat transfer and impairs the efficiency of the plant

Modern thermal equipment has special requirements for cleaning. Mineral scale and organic deposits form particularly on heat exchanger surfaces in water-carrying systems over the course of time, **which may severely impair the efficiency of the installation.** The heat transfer is reduced by the incrustation, and the heating or cooling process is affected. 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.

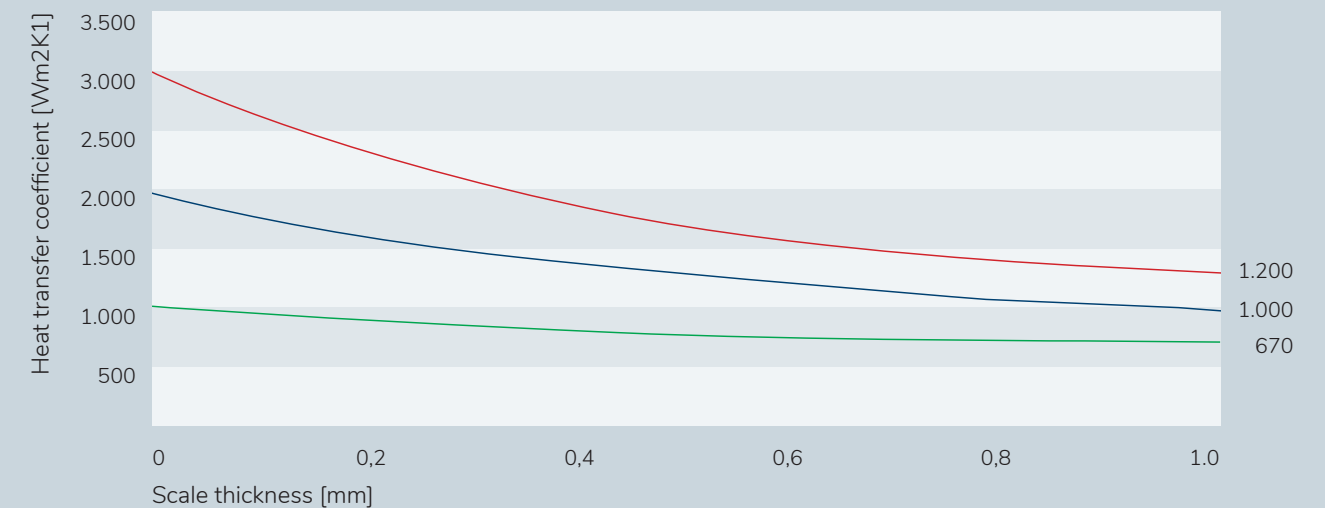
In the case of thicker encrustation, such as scale, thermal stresses also occur because the coefficient of thermal expansion of the encrustation is much lower than that of the metallic material beneath the scale. Cracks may occur as a result, thereby translating into expensive repairs. **To this day, mineral scale and corrosion are among the most common causes of operational failures.**

Encrustation leads to increased energy consumption and CO₂ emissions

A successful cleaning process is crucial **because just 1 mm of scale is enough to increase fuel consumption by about 10 percent.**

This is where our KEBO cleaners and inhibitors make a decisive contribution to avoiding cost-intensive operational downtimes and protecting the equipment. Regular, professional cleaning increases the efficiency of the plant, reduces maintenance costs, extends its life cycle and ensures greater operational reliability.

Effect of the scale thickness on heat transfer



Chemical analysis is our element

Chemistry is our passion

For roughly 100 years, we have been analyzing the composition of substances and substance mixtures using state-of-the-art methods and procedures, identifying and quantifying all components down to the smallest detail.

A distinction is made here between scale such as lime, rust, and other organic deposits that occur **where oxygen and water lead to oxidation or build-ups**. Foreign deposits include, for example, welding release agents and cooling lubricants.

Oils and greases are also included. They are the classic in soiling. When oil, gas, or even solid fuels such as wood are burned in a boiler, scale such as ash, soot, sludge, etc. are produced. **All of these residues can be removed chemically.**

Not all deposits are the same

By applying suitable analytical methods, fundamental questions can be answered, which are the prerequisite for developing the optimal cleaning solution:

- ➔ What is the deposits' composition?
- ➔ How thick is it?
- ➔ What's the material?

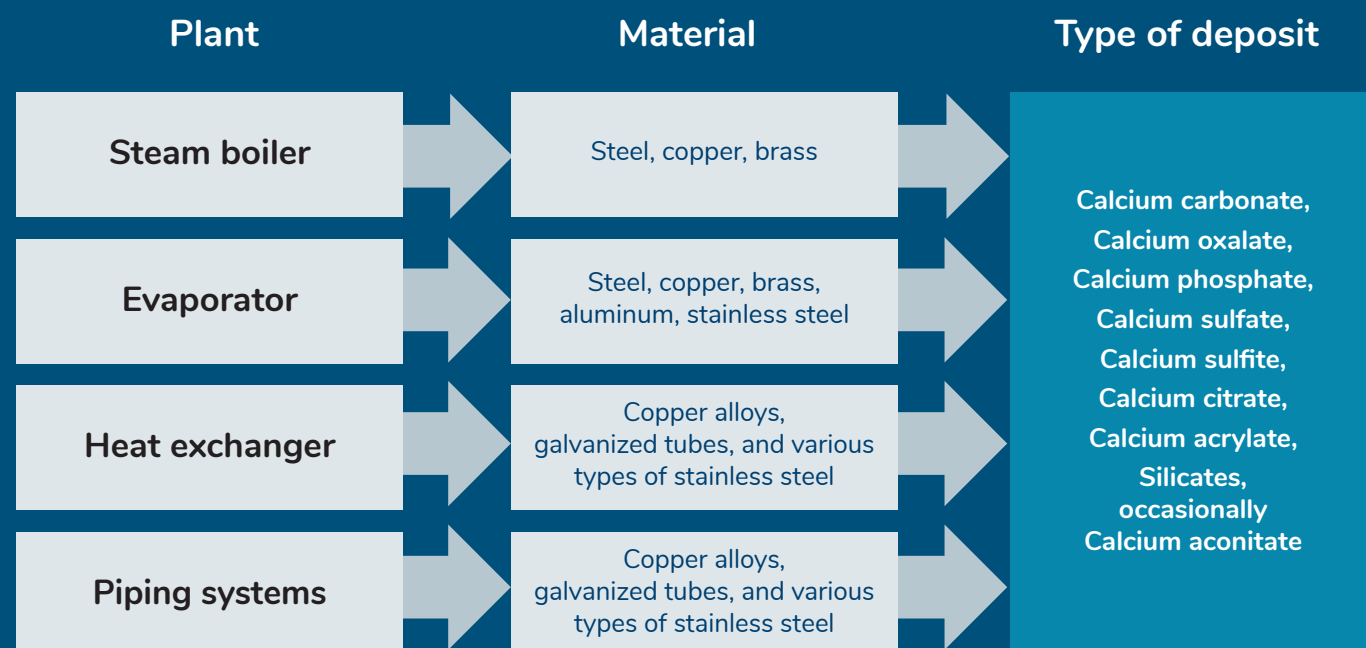


We advise you on all questions regarding acidic and alkaline cleaning

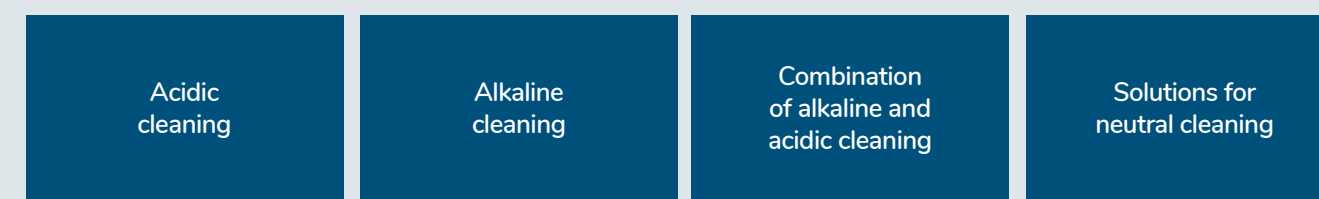
There is no universal agent for the rapid removal of scale; **they usually have different compositions**. Some can be removed well with alkaline agents, others better with an acidic cleaner. Therefore, **the precise analysis of the deposits**, taking into account the nature of your plant, is the prerequisite for a successful cleaning process.

We offer the right solution for all chemical cleaning processes

Principally: While acidic cleaners are mainly used to combat mineral soiling such as lime or rust, alkaline cleaners have a dissolving effect on most organic residues and greasy soiling such as oil, grease, soot, or wax.



Types of cleaning



We recommend a comprehensive cleaning concept that is optimally tailored to your needs.

Deposits analysis is the first factor to consider, followed by an in-depth evaluation of the plant material.

The quality of the tested deposit sample significantly determines the meaningfulness of the analysis. Our experts are, therefore, happy to receive fresh, dry deposits without chemical pretreatment in a quantity of at least 40 g.

Alkaline cleaners



Alkaline cleaners remove greasy soiling

Alkaline cleaners are good for removing organic deposits such as oil, grease, soot, and wax. They dissolve the organic residues and greasy dirt. Principally: The more stubborn the contamination from these substances is, the higher the concentration of the alkaline product should be; otherwise, the cleaning time must be extended. Caution, on the other hand, must be exercised 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, the more corrosive the lye.**

Alkaline cleaners

- Removal of inorganic soiling such as metal abrasion, pigments, and dust.
- Removal of organic deposits, such as fats, oils, soot, and sugar carbon.

Our experts for aqueous alkaline cleaning

Our alkaline cleaners are specifically designed for use in demanding environments and are ready-formulated cleaners **to provide thorough cleaning while maintaining material integrity and surface finish.**

They are versatile, can be used on a variety of surfaces, and provide outstanding cleaning performance for degreasing metal surfaces in aqueous solutions.

With our **KEBOCLEAN products**, we offer ready-formulated cleaning agents for degreasing metal surfaces in aqueous solutions primarily containing surfactants with alkalis.

KEBOCLEAN VT

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

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

KEBOCLEAN ALU

An aqueous industrial cleaner

- Universally applicable for the removal of dirt and grease. Especially aluminum and its alloys are not attacked.



Additives for alkaline cleaning

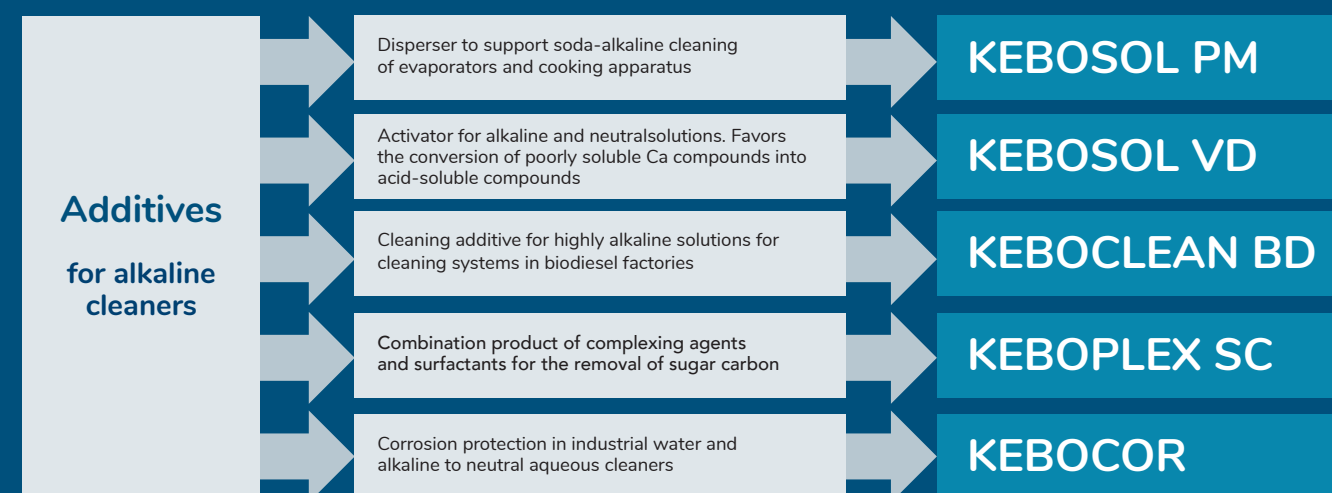
Optimal cleaning down to the smallest detail

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

Our **KEBOSOL and KEBOPLEX products** contain activators and dispersants for dry cleaning. These products are thus surface-active cleaning aids that are added to alkaline cleaning liquids. They reduce the surface tension and facilitate the penetration of cleaning solutions into pores and crevices of the deposit to be removed.

For the follow-up treatment of dry cleaning, **we recommend our KEBOPLEX program:** The complexing agents serve as a hardness stabilizer, dispersing agent, wetting agent, emulsifier, and corrosive 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. The use of our products for watertreatment **prevent the formation of deposits throughout the system.**



Neutral and solvent based cleaners

Neutral cleaners

KEBO LT 711 MOD

A mixture of surfactants resistant to acids and alkalis that is particularly applied in the cleaning and degreasing of hard material surfaces

Our specialist for neutral cleaning is our **KEBO LT 711 MOD**. It shows excellent wetting and dispersing properties and at the same time has a low tendency to foam.

- It is readily biodegradable and complies with the conditions as fixed in the EC Directive No. 648/2004/EG for detergents.
- As non-ionic product it is compatible not only with anionic and cationic surfactants but also with the scale forming agents in the water.

Solvent based cleaners

KEBOCLEAN KB

A metal cleaner that is especially developed for cleaning tanks and pipelines

This outstanding additive and highly effective cleaner provides the **effective removal of oil residues and scale** to ensure the optimum performance and efficiency of your equipment.

- Even dissolves viscous crude oil residues.
- Makes them pumpable so that such substances can be reused in the refinery.
- Expensive actions of disposal are not necessary anymore.
- Reuse of 90% of the oil residues.
- Reduction of the amount of waste deposits up to 90%.
- Reduction of cleaning times by more than 50% compared to mechanical cleaning.

Inhibited acid cleaners – highly concentrated and economical

LITHSOLVENT Cleaners: our acidic cleaning professionals

Our inhibited (acid) cleaners provide an **efficient and time-saving solution for chemical cleaning of various systems**. These combination products consist of a balanced mixture of acid and corrosion inhibitor, which 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.

We offer a variety of inhibited cleaners. Depending on the material to be protected, the acid used and the respective application, different inhibitors have to be applied.

The advantages of LITHSOLVENT cleaning concentrates

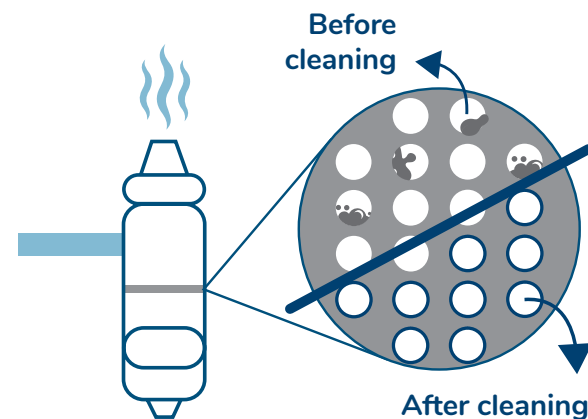
Our customers only need to dilute the concentrated cleaner according to the instructions. This ease of use allows users to save time and resources by eliminating the need for the costly and time-consuming adjustment of the cleaner mixture.

**You don't have the opportunity to prepare your own cleaning solutions?
Our experts will be happy to advise you!**

Versatile use in various applications

The LITHSOLVENT Cleaners can be used for the removal of scale in industrial equipment, piping, heat exchangers, and other systems. **They help improve the life and efficiency of treated equipment** and reduce the need for costly repairs and component replacement.

Our high effective LITHSOLVENT Cleaners are both effective and safe, **helping you keep your system in optimal condition.**

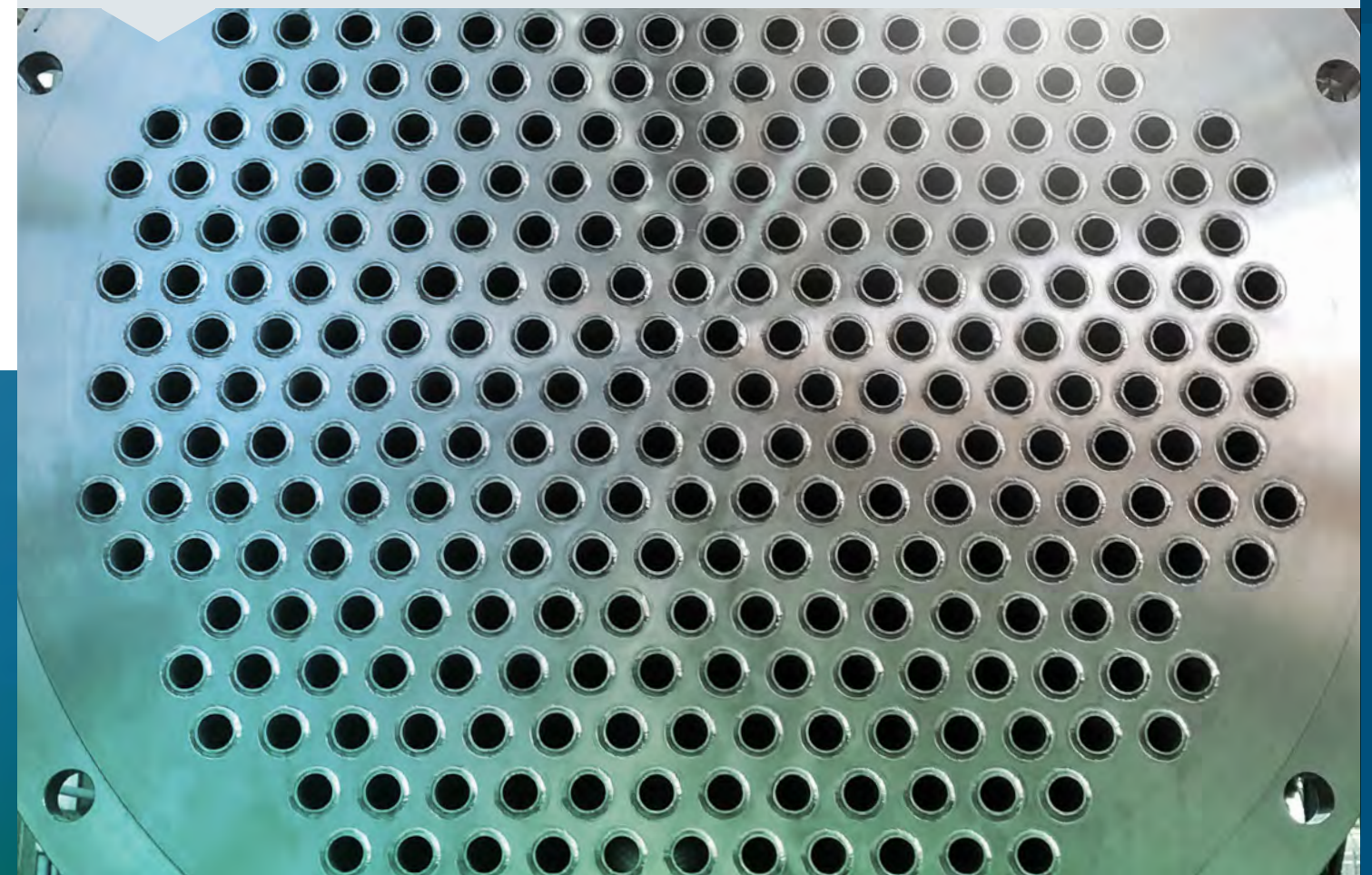
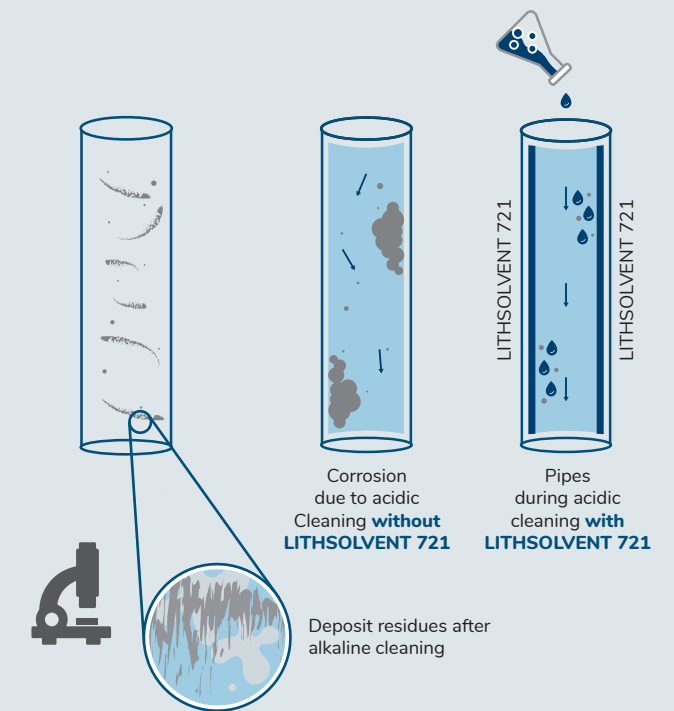


One of our product highlights is the highly concentrated **LITHSOLVENT Cleaner 721**. He is suitable as an acidic and ready-inhibited cleaning concentrate with its unique property profile for dissolving mineral scales and other deposits at temperatures up to max. 90°C.

LITHSOLVENT Cleaner 721

A biological cleaner based on methanesulfonic acid

- Strong organic acid = high cleaning performance
- Odorless
- Easily biodegradable
- No toxic vapors
- High thermal stability
- Colorless
- Free from nitrogen and halogen compounds
- Hydrolysis stable



LITHSOLVENT Cleaners – the optimum solution for every application

With our highly concentrated cleaners, **you will enjoy a highly productive and thereby economically attractive solution** with less production effort and **increased occupational safety for your employees.**

Weak acids

- ➔ Acetic acid (CH_3COOH)
- ➔ Oxalic acid ($\text{C}_2\text{H}_2\text{O}_4$)
- ➔ Carbonic acid (H_2CO_3)
- ➔ Citric acid ($\text{C}_6\text{H}_8\text{O}_7$)

Medium strength acids

- ➔ Hydrofluoric acid (HF)
- ➔ Formic acid (CH_2O_2)
- ➔ Phosphoric acid (H_3PO_4)

Strong acids

- ➔ Hydrochloric acid (HCl)
- ➔ Sulfuric acid (H_2SO_4)
- ➔ Nitric acid (HNO_3)
- ➔ Methanesulfonic acid ($\text{CH}_3\text{SO}_3\text{H}$)

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 Stainless 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	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	

¹Please refer to the respective product data sheet for the exact mixing ratio

For us, efficiency and sustainability go hand in hand

KEBO, your partner with 100% reliability

At KEBO, two things are essential: constant innovation and constructive cooperation. **That is why trust, responsibility, reliability, and respect have been our top priorities for 100 years.**

We are proud to have been certified as an “Ecoprofit 2023” company

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 environmental, 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.

And that is ensured worldwide.



As specialists for chemical cleaning, water treatment, and corrosion protection, we can always offer you optimum solutions:

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

KEBO product groups at a glance

Inhibited cleaners

Alkaline cleaners
Neutral cleaners
Acid cleaners
Solvent based cleaners

Corrosion inhibitors

Inhibitors
Standstill preservation
Water treatment (Cooling water)
Water treatment (Boiling water)
Water treatment (Rinsing after pickling)
Pickling inhibitors

Additives

Alkaline cleaning
Acid cleaning

Scale preventers

Food industry
Steam boilers
Cooling water
Industrial water

Defoamers

Sugar production for beet washing
Sugar production for juice extraction
Starch processing
Yeast processing
Fermentation
Technical applications

Biocide

Industrial water treatment

Crystallization

Decolorizers
Viscosity reducers
Crystallization agents



Contact us, we will provide you with 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 almost 100 years of tradition, we stand for quality, service orientation, 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, and 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 our guiding principles in dealing with colleagues, customers, and nature.

Our services for you:

- Advice from our chemists & engineers in application technology and, of course, also in 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.

Visit our website



and find out more



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