



Specialty Chemicals

# CLEANERS AND INHIBITORS

Scale removal and optimum surface protection  
for more efficiency





Specialty Chemicals

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KEBO Cleaners and Inhibitors – Made in Germany

# SOLUTIONS THAT CLEAN YOUR PLANT OF INTERFERING INFLUENCES

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

When it comes to operating your plant, our products and services ensure clean processes. Not only with customized applications for perfect cleaning and effective protection against corrosion and scale, but above all with a great deal of commitment and personal advice in solving very individual challenges.

Whether in the steel or food processing industry, in power plants, refineries or the chemical industry – our personal service is just as responsive as our individual products. 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 offer:

1. high and economical cleaning performance, thus saving process costs
2. increase of production safety
3. increase in occupational safety
4. ensuring the quality of your final product
5. reduced energy consumption (CO<sub>2</sub> reduction)

KEBO specialty chemicals for dry cleaning include additives, dispersants, activators, defoamers and corrosion inhibitors for a wide range of applications and industries.

## At KEBO, efficiency and sustainability go hand in hand

Climate change, energy transition and sustainability are the biggest challenges that many industries have to face now and in the future. Our specialty chemicals help to increase the efficiency of your processes, reduce the energy consumption of your plants and thus create a lower CO<sub>2</sub> footprint.

Reduced  
**CO<sub>2</sub>**  
footprint

More efficiency in operation

# CONSISTENTLY GETTING TO THE BOTTOM OF DEPOSITIS



## Cleaning and maintenance of modern thermal equipment requires special know-how

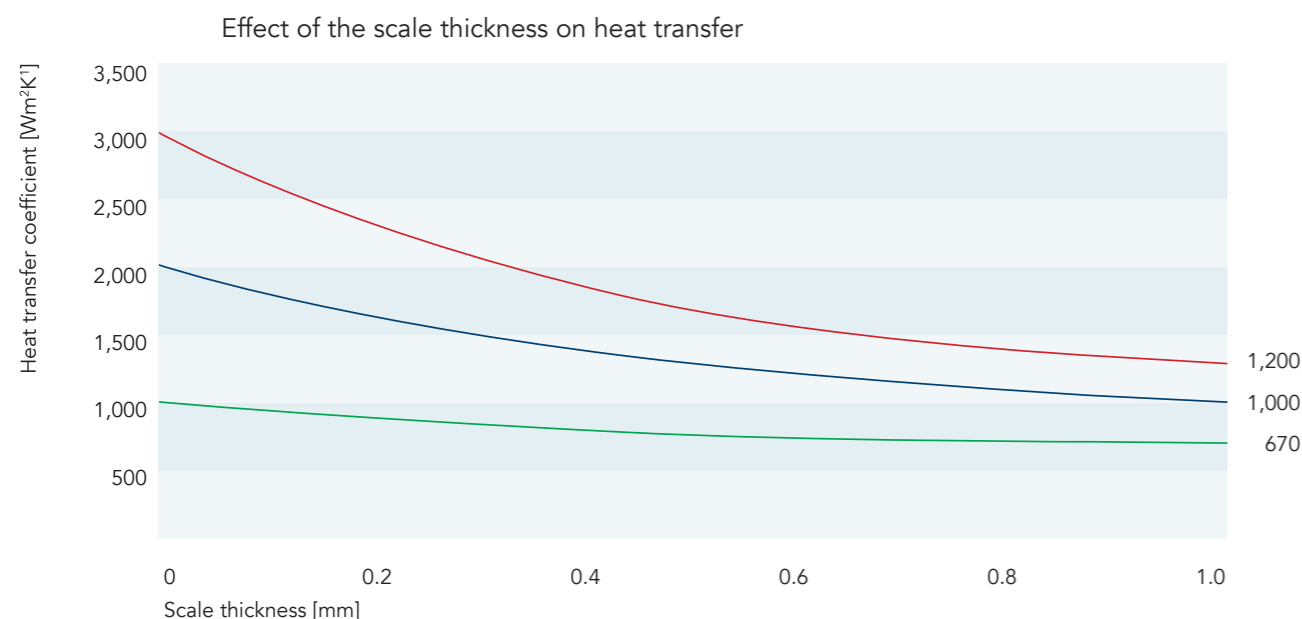
Modern thermal equipment has special requirements for cleaning. Mineral Scale and organic deposits form particularly on heat exchanger surfaces in water-carrying systems over the course of time, which may severely impair the efficiency of the installation. The heat transfer is reduced by the incrustation and the heating or cooling process is affected. The consequence: Performance drops, 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 translating into expensive repairs. To this day, mineral scale and corrosion are among the most common causes of operational failures.

### mineral scale hinder heat transfer and impair the efficiency of the plant

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.

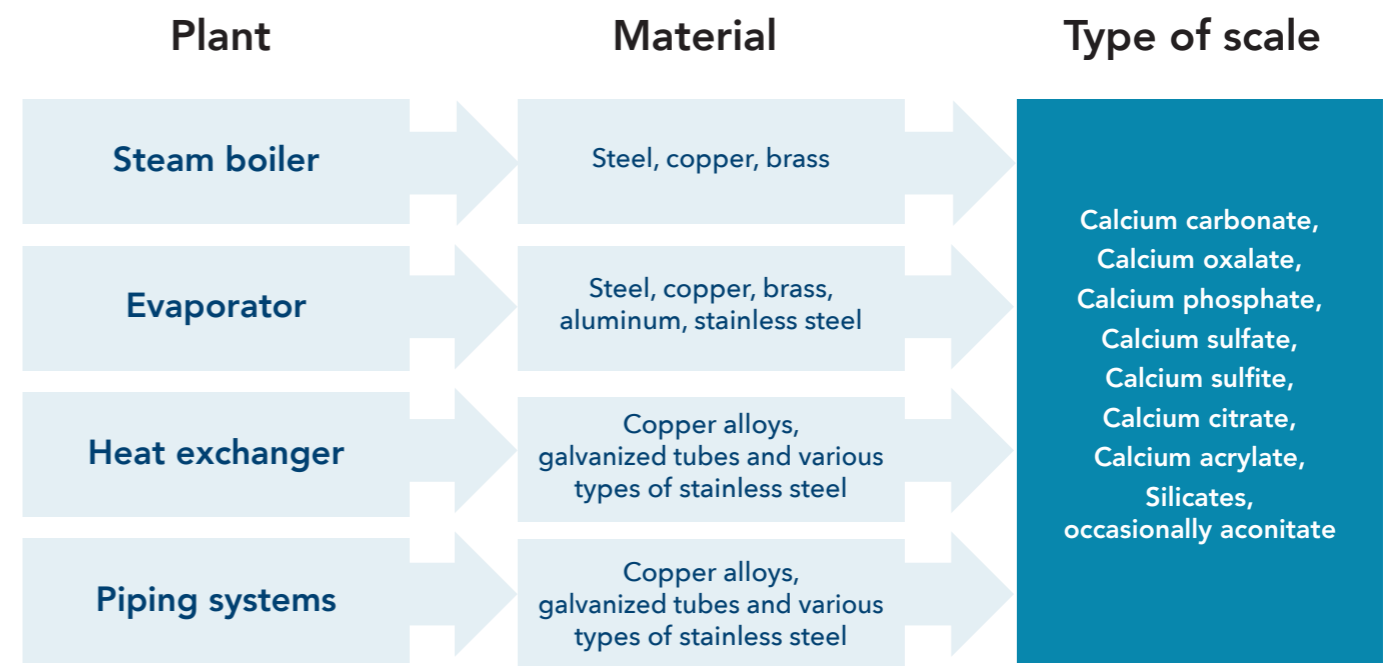
### Encrustation significantly reduces heat transfer in evaporators and leads to increased energy consumption and CO<sub>2</sub> emissions



## Not all deposits are the same: They differ depending on the nature of the plant and the production process

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 these residues can be removed chemically.



Just 1 mm of scale is enough to increase fuel consumption by about 10 percent.



# CHEMICAL ANALYSIS IS EXACTLY 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.

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

1. What is the deposits' composition?
2. How thick is it?
3. What's the material?

## Dimensional analysis by means of automatic titration

With the "Potentiometric Titration Principle", a known substance whose concentration is unknown is reacted in a specific chemical reaction with a measured solution whose concentration is precisely known. The volume of the consumed measuring solution is measured and the unknown concentration of the sample solution is calculated.



## Analysis of trace elements by ICP OES

In ICP-OES analysis, the sample solution is introduced into an inductively coupled argon plasma via a pneumatic atomizer system, and the elements are atomized and emit a specific light. The method allows the simultaneous determination of all metals and some nonmetals.

## Determination of dissolved anions with the ion chromatograph

In ion chromatography, a solution is passed over a column of charged resin and the ionic compounds are "held" to it for a specific time. Due to the preceding calibration, the anions can be determined so precisely.



## 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.

Acidic cleaning

Alkaline cleaning

Combination of alkaline and acidic cleaning

Solutions for neutral cleaning

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.

**Deposits analysis is the first factor to consider, followed by in-depth evaluation of the plant material. On this basis, we recommend a comprehensive cleaning concept that is optimally tailored to your needs.**



# THE PUREST PROTECTION AGAINST AGGRESSIVE MEDIA

## Acidic cleaning

### 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. Sulfuric acid is also an important basic chemical in the industry. 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: On the one hand to remove the Encrustation completely and on the other hand to protect the metal surfaces adequately at the same time. Therefore, special inhibitors are added to the acids to protect the material.

### The most important acids at a glance:

Weak acids	Medium strength acids	Strong acids
<ul style="list-style-type: none"> <li>Acetic acid ( <math>\text{CH}_3\text{COOH}</math> )</li> <li>Oxalic acid ( <math>\text{C}_2\text{H}_2\text{O}_4</math> )</li> <li>Carbonic acid ( <math>\text{H}_2\text{CO}_3</math> )</li> <li>Citric acid ( <math>\text{C}_6\text{H}_8\text{O}_7</math> )</li> </ul>	<ul style="list-style-type: none"> <li>Hydrofluoric acid ( <math>\text{HF}</math> )</li> <li>Formic acid ( <math>\text{CH}_2\text{O}_2</math> )</li> <li>Phosphoric acid ( <math>\text{H}_3\text{PO}_4</math> )</li> </ul>	<ul style="list-style-type: none"> <li>Hydrochloric acid ( <math>\text{HCl}</math> )</li> <li>Sulfuric acid ( <math>\text{H}_2\text{SO}_4</math> )</li> <li>Nitric acid ( <math>\text{HNO}_3</math> )</li> <li>Methanesulfonic acid ( <math>\text{CH}_4\text{O}_3\text{S}</math> )</li> </ul>

The inhibitor depends on the acid used. The choice of acid, in turn, depends on the material of the plant and the scale formed by the processed raw material.



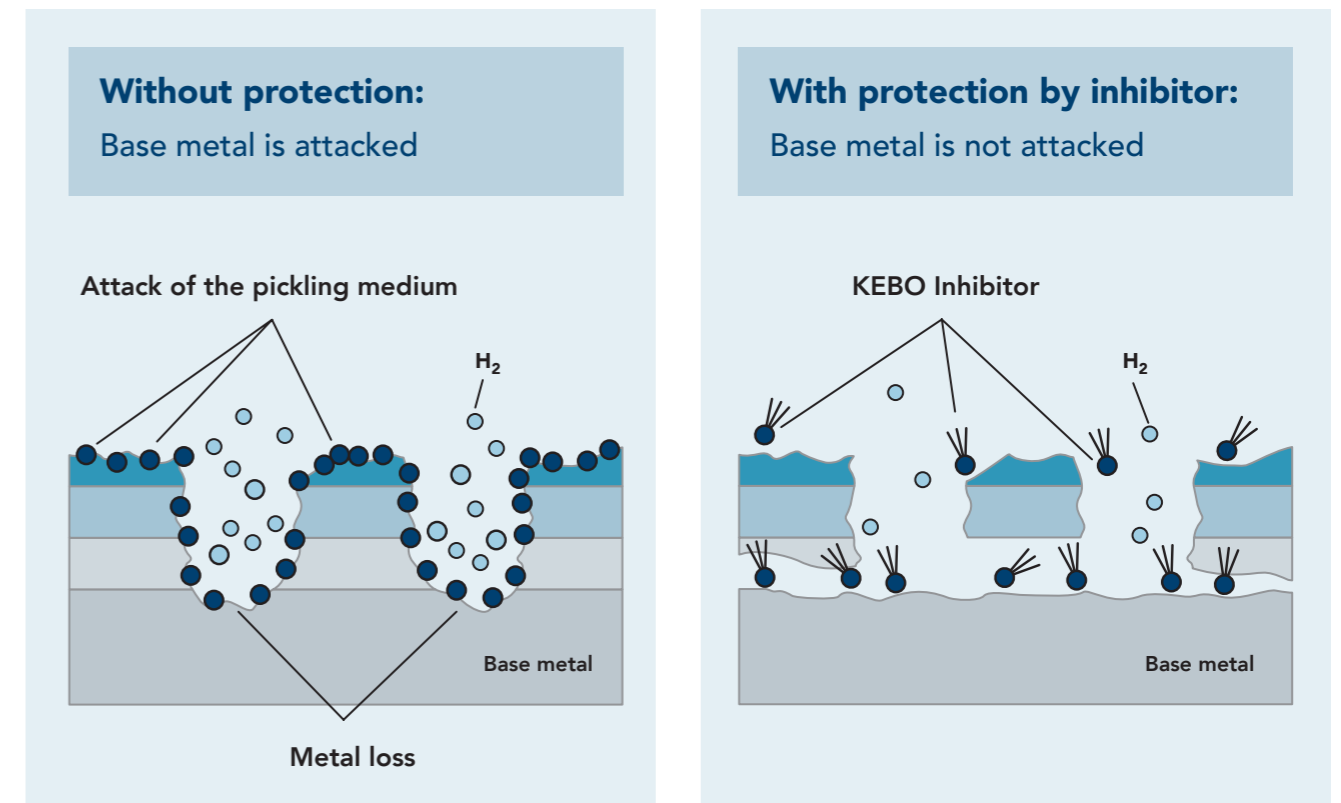
### Inhibitors as material protection when using acids

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 acidic cleaners, this prevents the acid from attacking the material to be cleaned.

Number of acid cleaning actions	After 5 cleaning actions	After 20 cleaning actions	After 27 cleaning actions	After 28 cleaning actions
<b>With inhibitors</b>				
<b>Without protection by inhibitors</b>				

### Inhibitors and their function

The inhibitors form a monomolecular protective film on the metal surface without hindering the dissolution of the scale by the acids. The result: optimum cleaning performance with simultaneous protection of the substrate.



# CLEARING UP PROBLEMS BY DEGREASING

## Alkaline cleaning

### 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, the higher the concentration of the alkaline product should be or 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



Fig: Sugar coal from a plate evaporator

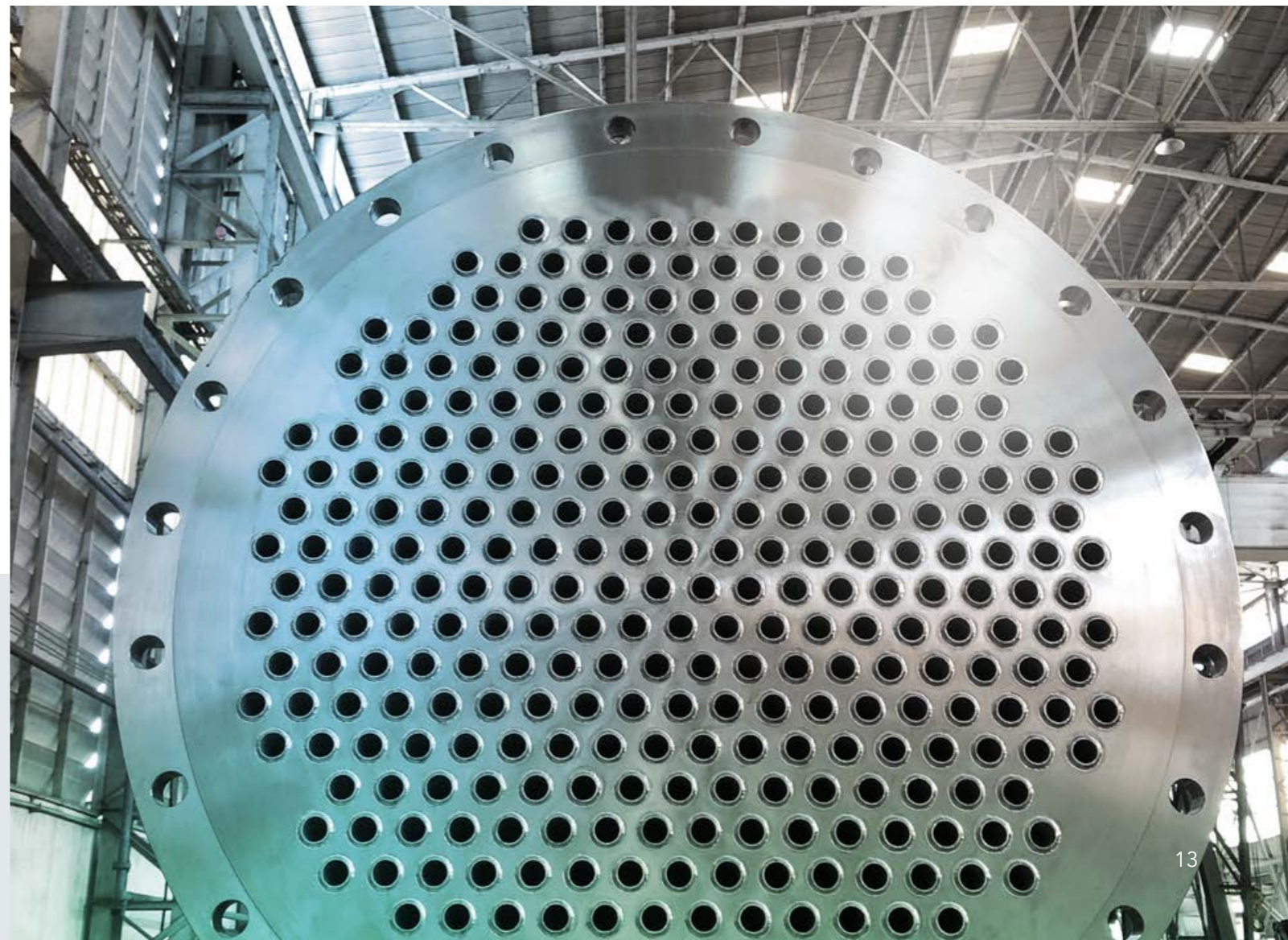
In addition to the type of deposits and the nature of the plant material, the temperature and duration of exposure also play a role in cleaning.



### Degreasing by means of alkaline cleaning

Further increasing demands on the quality of components and equipment require ever more complex solutions for the cleaning of metals. For example, metal workpieces are often contaminated with coolant residues or grease during mechanical processing. Depending on the manufacturing process, other contaminants such as dust are also form deposits on the inner surface of the equipment.

Degreasing is an essential operation in the pretreatment of metal surfaces, as it is necessary before the surfaces can be further finished by galvanizing, painting or powder coating. Residual grease prevents the uniform scale of metallic coatings on the base material, with the appearance and function of the coating being impaired.



The KEBO product range for deposit removal  
with acidic or alkaline media

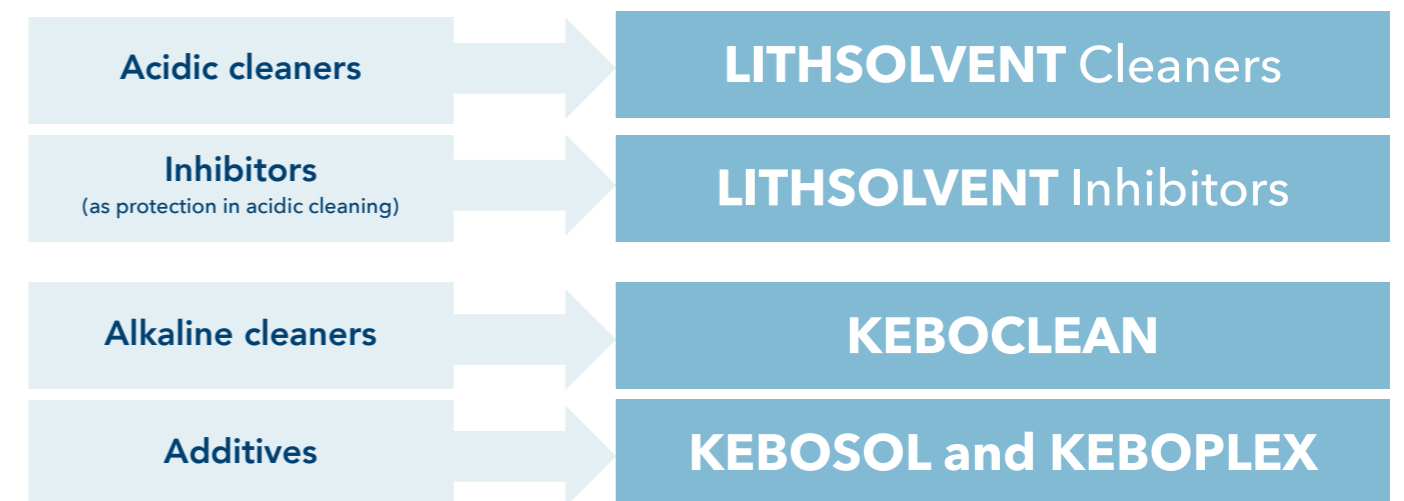
# FUNCTIONAL CLEANLINESS BY ALL MEANS



## We meet cleaning problems with a comprehensive product range for all challenges

Our product diversity enables optimum cleaning performance for all conceivable cleaning requirements. The decisive success factor is always the in-depth consultation before cleaning begins.

When choosing, we distinguish between four product groups:



## The result: efficient cleaning performance and maximum protection

Whether oil- or grease-containing residues, whether lime or rust – all KEBO cleaning chemicals have a high material compatibility and have been specially developed, adjusted and tested in practice for their intended use.



# WITH CONCENTRATION TO THE OPTIMAL SOLUTION

"A good corrosion inhibitor should have the following properties:

1. High stability against aging, oxidation or reduction
2. Temperature resistance
3. Immediate effectiveness of additive
4. No prolonged reaction time for additive
5. High protective value at low inhibitor concentration
6. No interfering effects on acid mixture or further processing of treated metal."

By M. H. Akstinat, Waverley-Johannesburg

## LITHSOLVENT cleaners: our acid cleaning professionals

KEBO's experience over many decades with a wide variety of issues relating to the removal of troublesome scale has produced a very wide range of cleaners and inhibitors. LITHSOLVENT cleaners and inhibitors are our answer to all acidic cleaning challenges.



## Material protection in acidic cleaning with inhibitors from KEBO

As a rule, these are corrosion inhibitors that prevent acidic attacks on metal surfaces by forming a type of top layer that effectively protects the underlying material.

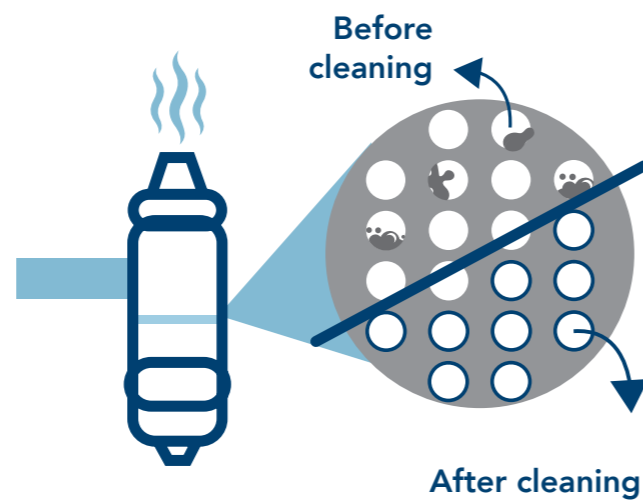


## The advantages of LITHSOLVENT cleaning concentrates

Our experts have developed LITHSOLVENT cleaners especially for acidic cleaning. These are ready-to-use mixtures of acid and inhibitor, ideally suited for a temperature range from room temperature to 80 °C.

LITHSOLVENT cleaners are intended for customers who do not have the option to prepare their own cleaning solutions. Generally, they are inhibited methanesulfonic, formic, hydrochloric, amidosulfonic, citric and phosphoric acids, formulated for different cleaning temperatures and materials.

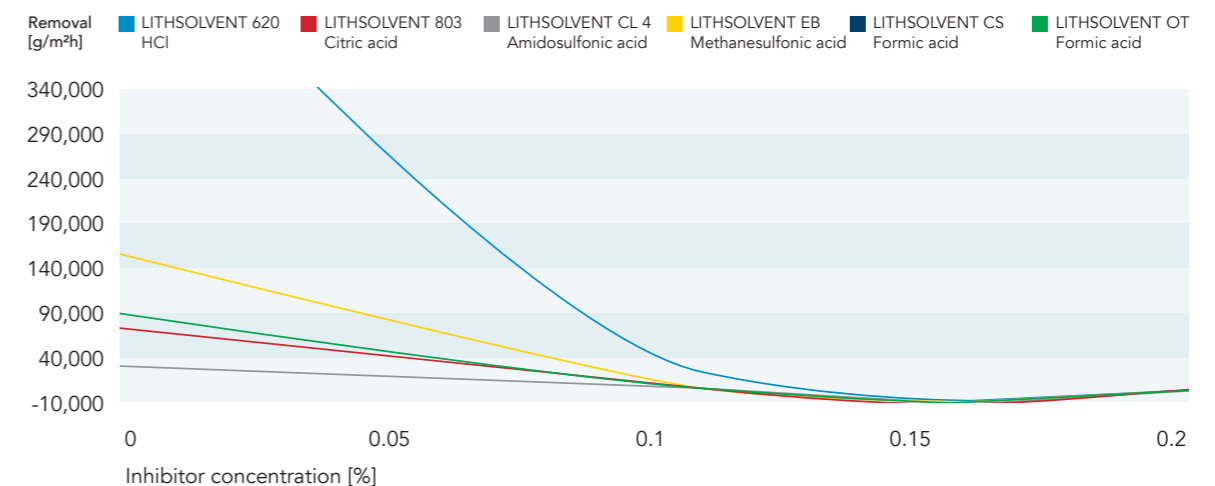
**Our experts will be happy to advise you!**



## LITHSOLVENT inhibitors when using existing acids

Surfactants contained in LITHSOLVENT types help the acid to infiltrate the scales. The reaction of the acid with the metals produces hydrogen gas, which blasts the scales 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.

## Protection >98% by LITHSOLVENT inhibitors from a concentration of 0.1% inhibitor



# EFFICIENT CLEANERS CLEANLY SORTED

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

For this purpose, we supply the already optimally adjusted combination products of acid and corrosion inhibitor, so that our customers can merely dilute the concentrated cleaner and then start the chemical remediation of their respective systems.

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

Coverings	Inhibited acid	Material	Cleaner to be used	Temperature	Mixing ratio <sup>1</sup> of the highly concentrated cleaner to be used	Maximum shelf life
	Methanesulfonic acid	Steel	LITHSOLVENT Cleaner 721	up to max. 90 °C	1:13	1 year Protect from frost and heat
		Stainless steel				
		Copper alloy				
	Formic acid	Steel	LITHSOLVENT Cleaner 701	up to max. 90 °C	1:10 to 1:20	2 years Protect from frost and heat
		Stainless steel				
		Copper alloy	LITHSOLVENT Cleaner 702	up to max. 40 °C	1:10 to 1:20	1 year / Protect from frost
		Zinc				
	Hydrochloric acid	Steel	LITHSOLVENT Cleaner 703	up to max. 80 °C	1:3 to 1:10 depending on the amount of scale to be removed	3 years Protect from frost
		Stainless steel				
		Copper alloy				
	Amidosulfonic acid	Steel	LITHSOLVENT Cleaner 706	up to max. 60 °C	Depending on the amount of scale to be removed, work with a 5–10% aqueous solution of the cleaner	Can be stored for at least 2 years at temperatures below 40 °C  Protect from moisture and heat
		Stainless steel				
		Copper alloy				
		Aluminum				
		Zinc				
	Phosphoric acid	Zinc	LITHSOLVENT Cleaner 707	up to max. 40 °C	Depending on the amount of coating to be removed, work in a dilution ratio of 1:5 to 1:10	6 months
	Citric acid	Steel	LITHSOLVENT Cleaner 748	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	1 year Protect from frost
		Stainless steel				
		Copper alloy				
		Aluminum				
		Zinc				

# SERIES PROTECTION AGAINST CORROSION

You already work with acids? Then use our highly concentrated inhibitors for more efficiency and optimum long-term protection of your equipment

The material is attacked when acids are used. Depending on the acid and material, we offer appropriate inhibitors – for effective protection of your plant. Our LITHSOLVENT inhibitors are characterized by their extreme yield.

On request, we will determine the mass removal values with and without inhibitor for you in the laboratory in order to numerically record the subsequent protective effect in your plant.

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

Coverings

Acid								Material				
Hydrochloric acid	Hydrochloric and hydrofluoric acid	Phosphoric acid	Formic acid	Citric acid	Amidosulfonic acid	Sulfuric acid	Methanesulfonic acid	Steel	Stainless steel	Copper alloy	Aluminum	Zinc
●	●							●		●		
●	●	●	●	●	●	●	●	●				
●	●	●	●	●	●	●	●	●	●			
●		●									●	
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		●	●	●	●			●	●	●		
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			●	●	●			●	●	●		
			●	●	●		●	●	●	●		
			●					●		●		
			●									●

Inhibitor	Temperature	Acid concentration in %	Dosage in g/ltr. Acid solution <sup>1</sup>	Consistency	Duration/Storage
LITHSOLVENT 620	up to max. 90 °C	3 - 10	2.5 - 5	liquid	In sealed original containers at least 2 years
LITHSOLVENT EB	up to max. 100 °C	3 - 10	2.5	fixed	In sealed original containers at least 2 years
LITHSOLVENT EB Chloride - free	up to max. 100 °C	3 - 10	2.5	fixed	In sealed original containers at least 2 years
LITHSOLVENT AL	up to max. 40 °C	< 5	2	liquid	In sealed original containers at least 2 years
LITHSOLVENT PAL	up to max. 50 °C	< 3 - 10	5	liquid	In sealed original containers at least 1 year
LITHSOLVENT CL 4	up to max. 60 and 90 °C <sup>2</sup>	1 - 2 and 3 - 10 <sup>2</sup>	2	liquid	In sealed original containers at least 2 years
LITHSOLVENT PF	up to max. 90 °C	3 - 10	2.5	liquid	In sealed original containers at least 2 years
LITHSOLVENT PZN	up to max. 50 °C	5	7 - 8	liquid	In sealed original containers at least 1 year
LITHSOLVENT 803	up to max. 80 °C	3 - 10	2	liquid	In sealed original containers above 5 °C at least 2 years
LITHSOLVENT CS	up to max. 60 and 90 °C <sup>3</sup>	2 - 10	2.5	liquid	In sealed original containers at least 2 years
LITHSOLVENT OT	up to max. 90 °C	2 - 10	2.5	liquid	In sealed original containers at least 2 years
LITHSOLVENT AZN	up to max. 50 °C	3 - 8	7 - 8	liquid	In sealed original containers at least 1 year

<sup>1</sup>Please refer to the respective product data sheet for the exact mixing ratio

<sup>2</sup>For 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%

<sup>3</sup>For formic acid and citric acid up to 90 °C, for amidosulfonic acid up to 60 °C

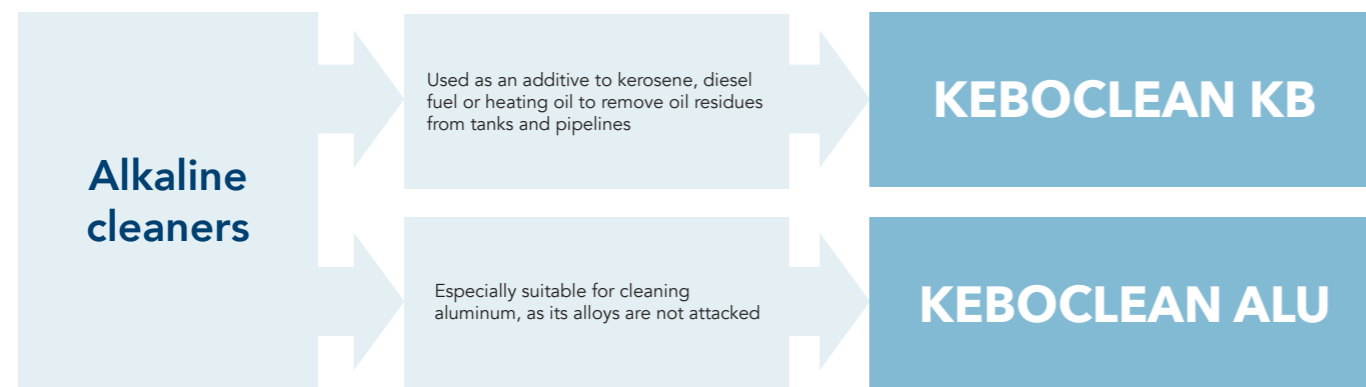
<sup>4</sup>For citric acid up to 100 °C, for amidosulfonic acid up to 60 °C

# REMOVING ORGANIC DEPOSITS ON THE WHOLE SURFACE



## Our experts for aqueous alkaline cleaning

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



## Optimal cleaning down to the smallest detail

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

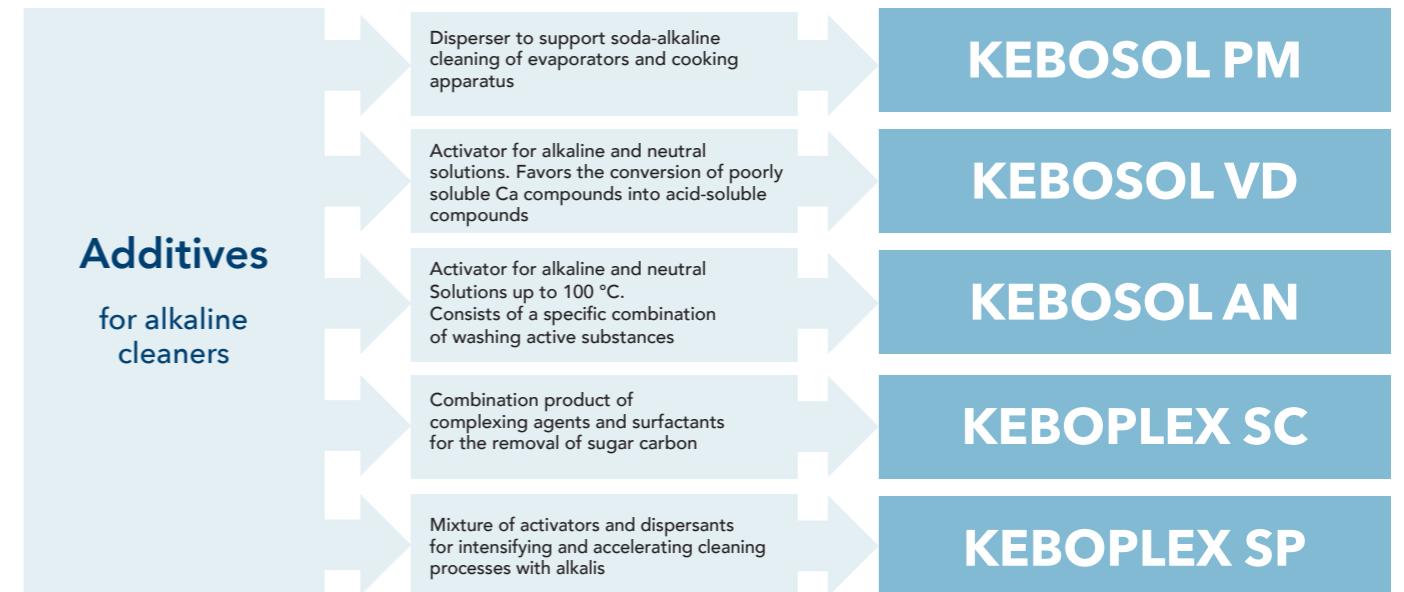


Image source: BMA Braunschweigische Maschinenbauanstalt AG



For follow-up treatment of dry cleaning we recommend our KEBOPLEX program: The complexing agents serve as hardness stabilizer, dispersing agent, wetting agent, emulsifier, 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 which, 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.

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



The KEBO product highlights

# OUR TOP PERFORMERS FOR THE REMOVAL OF SCALE



## KEBO – a combination of chemistry and service

A compound always consists of at least two components. At KEBO, for example, it is an effective product combined with personal consulting service. Because first-class solutions can only be created where both come together.

Regardless of whether acidic or alkaline cleaning is required, our range of products and consulting services stands for brilliantly calculated cleaning results: highly effective and economical.

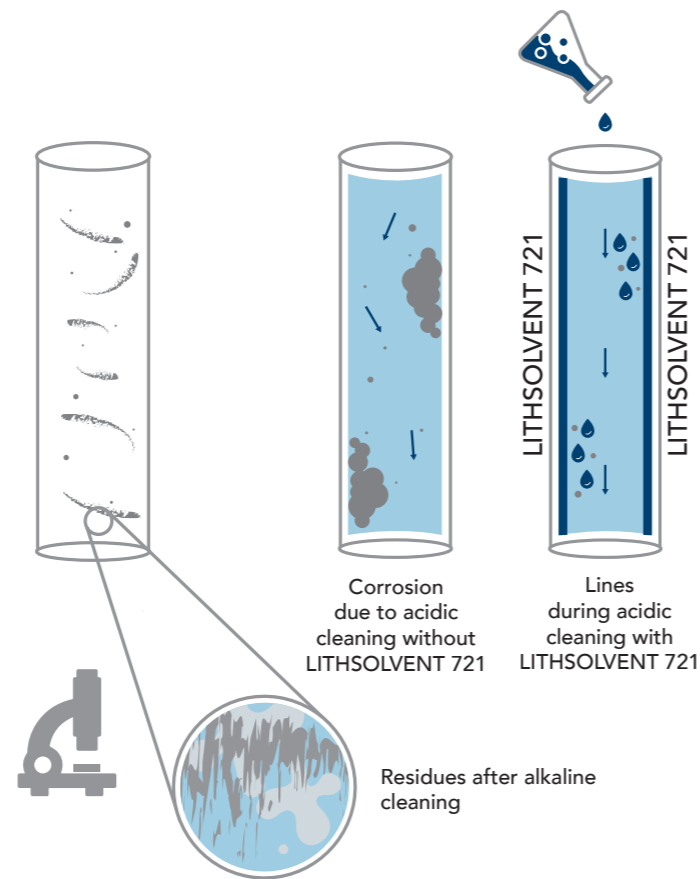
# LITHSOLVENT CLEANER 721

## Our biological cleaner based on methanesulfonic acid

LITHSOLVENT Cleaner 721 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. Even silicate containing scales are dissolved.

### LITHSOLVENT Cleaner 721 offers many advantages:

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



## Methanesulfonic acid: the sustainable alternative to conventional acids

Demand for methanesulfonic acid (MSA) has risen steadily in recent years. The reason for this is the increasing interest in particularly environmentally compatible products and formulations.

### Methanesulfonic acid offers multiple advantages:

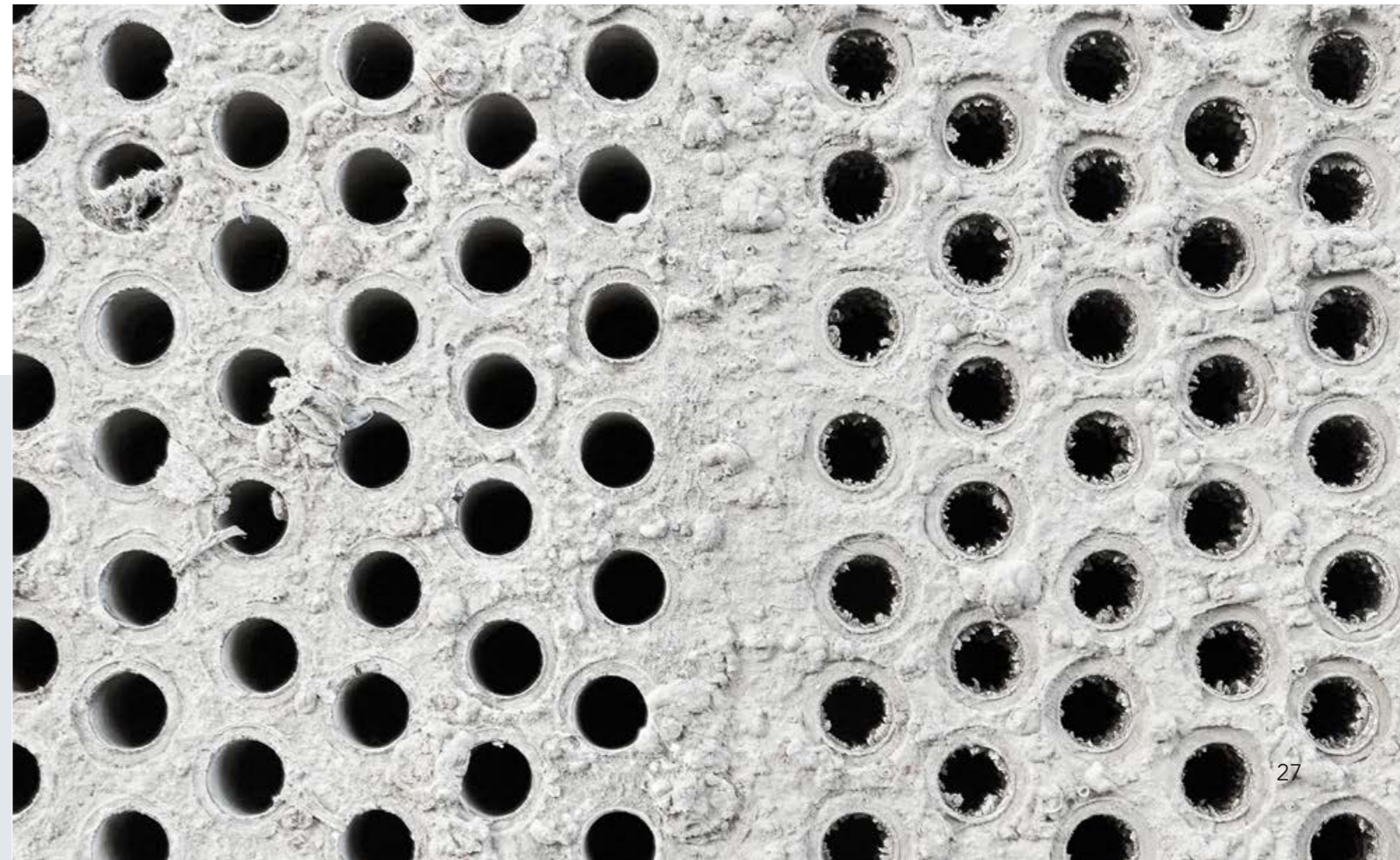
- MSA is a strong organic acid that has no oxidizing properties.
- The salts that MSA forms with metals are readily soluble.
- Further advantages from an ecological point of view are the easy degradability and the low carbon content (TOC).

MSA is increasingly used as an ingredient in acidic cleaners, as it is significantly less hazardous than conventional cleaner acids such as phosphoric or hydrochloric acid at high acid strength. According to OECD Guideline 301 A, MSA is readily biodegradable and is therefore also referred to as a "green" acid.



Due to its outstanding property profile, MSA is increasingly used in many industries – from the production of biofuels to metal surface treatment in the electronics industry and industrial cleaning.

Methanesulfonic acid is often referred to as the "green" acid because it is less dangerous than conventional acids and is also easily biodegradable.



# LITHSOLVENT 620

The highly effective inhibitor formulation is used to protect metallic materials during chemical cleaning or pickling with hydrochloric acid or hydrochloric acid and hydrofluoric acid mixtures.

**LITHSOLVENT 620** dissolves immediately when added to diluted or concentrated hydrochloric acid. It also remains stable in concentrated hydrochloric acid (25–33%). This property is of great importance for the production of inhibited acids, which may be stored for a long time before being used.

The table shows the removal values without and with inhibitor **LITHSOLVENT 620** at an exposure time of 3 hours and proves the excellent corrosion protection effect.

% HCl*	°C	Attack in g/m <sup>2</sup> h	
		without inhibitor	with 2.5 g/l LITHSOLVENT 620
5	60	75	0,9
5	75	550	1.5

\* Hydrochloric acid

### LITHSOLVENT 620 offers many advantages:

- works at **temperatures up to 90 °C**
- for cast iron the **maximum working temperature is 40 °C**
- is suitable for **hydrochloric acid and hydrofluoric acidic mixtures**
- dissolves immediately when added to diluted or concentrated hydrochloric
- contains a combination of specifically acting inhibitors and special surfactants with a high wetting effect – by reducing the interfacial tension, rapid wetting of the surfaces to be cleaned is ensured
- does not affect the dissolution of mineral scales as well as rolling and annealing encrustation
- is currently available in the container sizes 60 kg, 200 kg and 1.000 kg

### LITHSOLVENT 620 protects the following materials in the temperature range specified above:

- Standard steels
- Special steels (e.g. superheater and low-temperature steels)
- Copper based alloys
- Cast iron (only up to max. 40 °C)

# LITHSOLVENT CL 4

**LITHSOLVENT CL 4** is a highly effective inhibitor for the protection of all metallic materials in acidic solutions commonly used in boiler and plant construction.

### Areas of application for acidic solutions inhibited with LITHSOLVENT CL 4

Chemical cleaning with hydrofluoric acid solutions for the removal of rust, scale and magnetite (Fe<sub>3</sub>O<sub>4</sub>) from boilers, production plants, piping systems, etc., in recirculation and continuous processes

Chemical cleaning of boilers, pipelines, etc. with organic acids

The inhibitor does not reduce the efficient dissolution of the mineral scale by the acid.

### LITHSOLVENT CL 4 offers many advantages:

- works at **temperatures up to 90 °C**
- is suitable as inhibitor **for amidosulfonic, hydrofluoric, phosphoric and organic acids**
- does not interfere with the dissolution of mineral scale
- contains cationic inhibitors and non-ionic surfactants with surface-active character – this results in a reduction of surface tension, which leads to immediate wetting of the surfaces to be cleaned
- reduces the incubation time, the time until the start of the dissolution process of the scale to be removed
- is currently available in the container sizes 60 kg, 200 kg and 1.000 kg

### LITHSOLVENT CL 4 protects the following materials in the temperature range specified above:

- all types of steel and copper-based alloys

The highly effective inhibitor formulation is used to protect all common iron and copper based metallic materials during chemical cleaning with hydrofluoric acid and its mixtures with organic acids as well as acid salts of EDTA (ethylenediaminetetraacetic acid) at temperatures up to 80 °C.

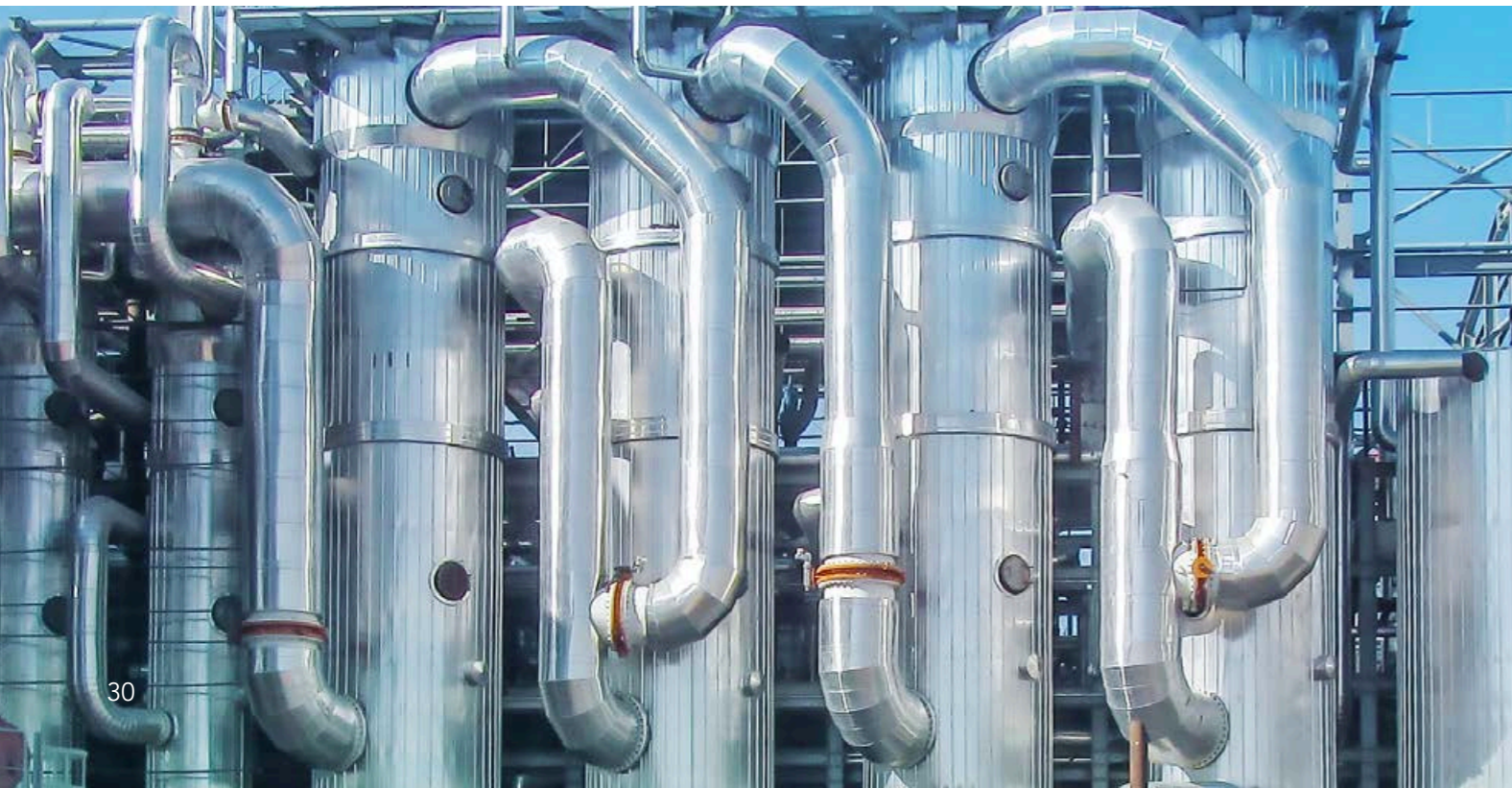
### LITHSOLVENT 803 offers many advantages:

- works at **temperatures up to 80 °C**
- is suitable for **formic, citric and amidosulfonic acid**
- contains a combination of specifically acting inhibitors and special surfactants with a high wetting effect. By reducing the interfacial tension, rapid wetting of the surfaces to be cleaned is ensured
- does not affect the dissolution of scale as well as rolling and annealing scale
- is currently available in the container sizes 60 kg, 200 kg and 1.000 kg

### LITHSOLVENT 803 protects the following materials in the temperature range specified above:

- Standard steels
- Special steels (e.g. superheater and low-temperature steels)
- Copper based alloys

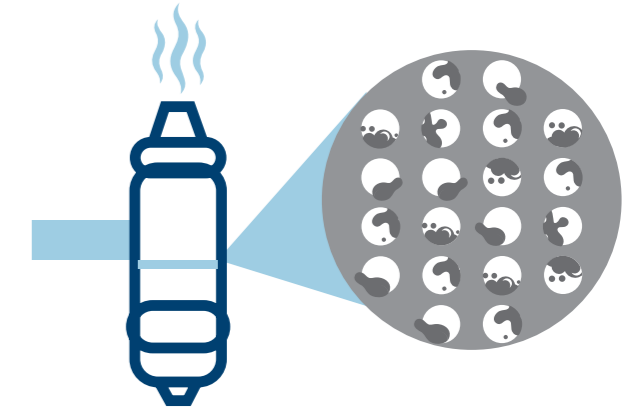
Image source: BMA Braunschweigische Maschinenbauanstalt AG



For the removal of these deposits, KEBOPLEX SC is used as an alkaline additive, as it supports the penetration and infiltration of the deposits.

### The product consists of:

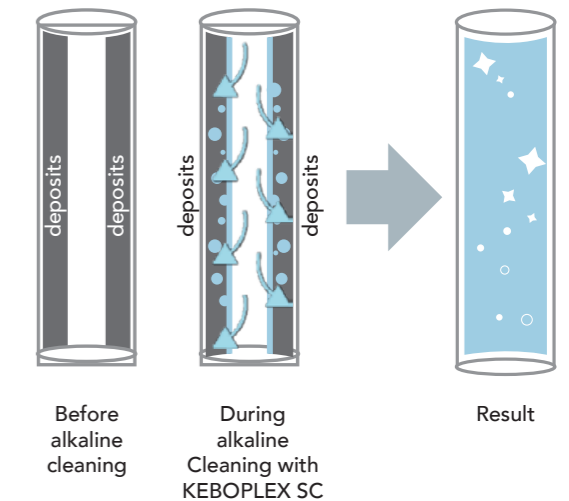
- a mixture of complexing agents and surfactants that dissolves insoluble alkaline earth compounds in a complex and increases the dissolution and dispersion of the sugar carbon



### KEBOPLEX SC offers many advantages:

- the special combination of soft complexing agents and surfactants causes faster removal of the deposits from the metal surfaces
- the surface tension between the phases is reduced
- silicates are dispersed which would otherwise not be removed
- the effectiveness of water jet or acidic cleaning is increased

The non-ionic surfactants of KEBOPLEX SC do not work stoichiometrically, but wet and penetrate the deposits. Due to their small molecular size, they are able to penetrate and infiltrate the deposits and cause them to flake off. As a result, a very good cleaning effect is already achieved with a lower dosage. The additional dispersants and special surfactants can dissolve, soften, and remove organic residues, sugar carbon and organic sugar degradation products more quickly. They also prevent the re-accumulation of deposits formed on the evaporator surface.





This is KEBO

# A COMPANY WITH SPECIAL CONNECTIONS



## Personal service is our element

KEBO has stood for clean solutions for almost 100 years. From the very beginning, it was one idea above all that shaped our current corporate DNA. After all, anyone who deals with rust protection by nature is committed to maintaining the value and care of their customers' equipment.

Over the years, this aspiration has not only given rise to considerable chemotechnical know-how, but perhaps an even more important quality: the ability to listen. It is not by chance that KEBO sees itself today as a solution provider. And above all as a partner with special connections to its customers.





Dr. Alfred Keller



Renate Keller



Galvanizing plant and employees in Portugal 1957

## KEBO combines tradition and innovation in one owner-managed company

Trust, responsibility, reliability, and respect form the guiding principles in dealing with employees, customers and suppliers – today just as 100 years ago.

We see ourselves as an active business partner focused on the needs and values of our customers. Every day, we fight passionately to solve our customers' changing needs and challenges.

KEBO offers its customers a comprehensive product portfolio of specialty chemicals tailored to their individual requirements.

## KEBO: a trusted brand since 1926

Keller & Bohacek GmbH & Co. KG was founded in 1926 as "Rostschutz GmbH" with a focus on the construction of galvanizing plants in Halle. At an early stage, the founder Dr. Alfred Keller, a chemist by passion, decided to enter the production of pickling inhibitors and thus laid the foundation for today's orientation as a specialized chemical company. Alfred Keller's daughter Renate took over the business in the 1970s. From then on, she was the driving force behind the development of innovations and was regarded as the "good soul" of the company.

Parallel to the development of products for chemical plants, steel industry and sugar factories, KEBO worked on the field of cooling water and boiler feed water treatment. The existing vast experience in corrosion protection as well as in encrustation prevention led to the development of effective water conditioning and scale preventing agents.

## Represented worldwide by own subsidiaries and sales partners

Highly effective cleaning, maximum efficiency and lasting protection: Today, KEBO is active worldwide with its partner company KEBO France to meet the challenges of today on behalf of its customers.



Contact us, we will name you your local contact partner.

## KEBO product groups at a glance

In our laboratories, we use state-of-the-art methods and processes to analyze the exact composition of substances and substance mixtures in order to identify the tailor-made product from our specialty chemicals portfolio.

Inhibited cleaners for acidic scale removal	<b>LITHSOLVENT Cleaners</b>
Inhibitors for the protection of metallic materials against acids	<b>LITHSOLVENT</b>
Encrustation prevention in evaporators and cooking stations	<b>KEBO DS</b>
Scale prevention in cooling, evaporation systems and alcohol extraction plants and additive for cleaning in alkaline media	<b>KEBOPLEX</b>
Control of algae and microorganisms in cooling water circuits	<b>KEBOCID</b>
Additives for cleaning in acidic, alkaline and neutral media	<b>KEBOSOL</b>
Corrosion inhibitor for treatment after acidic cleaning and conditioning of water systems	<b>KEBOCOR</b>
Degreasing of metal parts in alkaline as well as in acidic medium	<b>KEBOCLEAN</b>
Defoamer for dry cleaning	<b>KEBOSPUM</b>
Neutralizing agent for treatment after acidic cleaning	<b>NEUTRACID</b>
Pickling inhibitors for hydrochloric and sulfuric acid	<b>ADACID</b>

## Our services for you

- Consultation by our chemists & engineers in application technology and, of course, also in your planning of the necessary apparatus and operating equipment
- Consultation and support before the execution of dry cleaning and pickling by our technical service
- 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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