

Pickling and corrosion inhibitors

Efficient and cost-saving



Removing impurities

Indispensable for high-quality metal processing

Pickling is an essential, very complex pretreatment step for high-quality metalworking. The dissolution of metals in acids is an electrochemical process, whereas the dissolution of scale or oxide layers is a purely chemical process.

Liquids dissolve and/or crack oxide layers from metal surfaces.

The removal of inorganic impurities, i.e. scale and non-metallic residues, from the metallic surface is carried out with the help of a liquid, which causes chemical dissolution and/or blasting of all oxidic layers from the metal surface.

Pickling: also necessary for subsequent cold forming or surface finishing.

This operation is essential for subsequent cold forming (cold rolling, drawing and deep drawing) or surface finishing (phosphatizing, fire-metallizing, electroplating, painting, etc.). In addition, the pickling process reveals material defects



Pickling is done in three ways: dipping, flooding or spraying.

The liquids used in this process are (with a few exceptions) more or less diluted mineral acids. Depending on the intended application, a distinction is made between the following pickling processes:

Descaling

Derusting

Pickling

Spent pickling solutions can be reprocessed or reused.

Mainly hydrochloric acid and sulphuric acid are used, which can be adjusted by varying the working temperature or by adding auxiliary substances. If appropriate pickling solutions are used specifically for certain applications, spent pickling solutions can be more easily reconditioned or reused, thus increasing the cost-effectiveness of the overall process.

Pickling time: crucial for the perfect removal of scale or rust layers.

Shorter pickling times can, among other things, lead to under-pickling, i.e. incomplete removal of the oxide layers. Longer pickling times can lead to over-pickling, i.e. to an attack on the base material – resulting in increased material loss and greater hydrogen embrittlement.



Corrosion protection

Protects the material, reduces acid consumption, increases pickling process efficiency and thus reduces 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 the application temperatures generated.

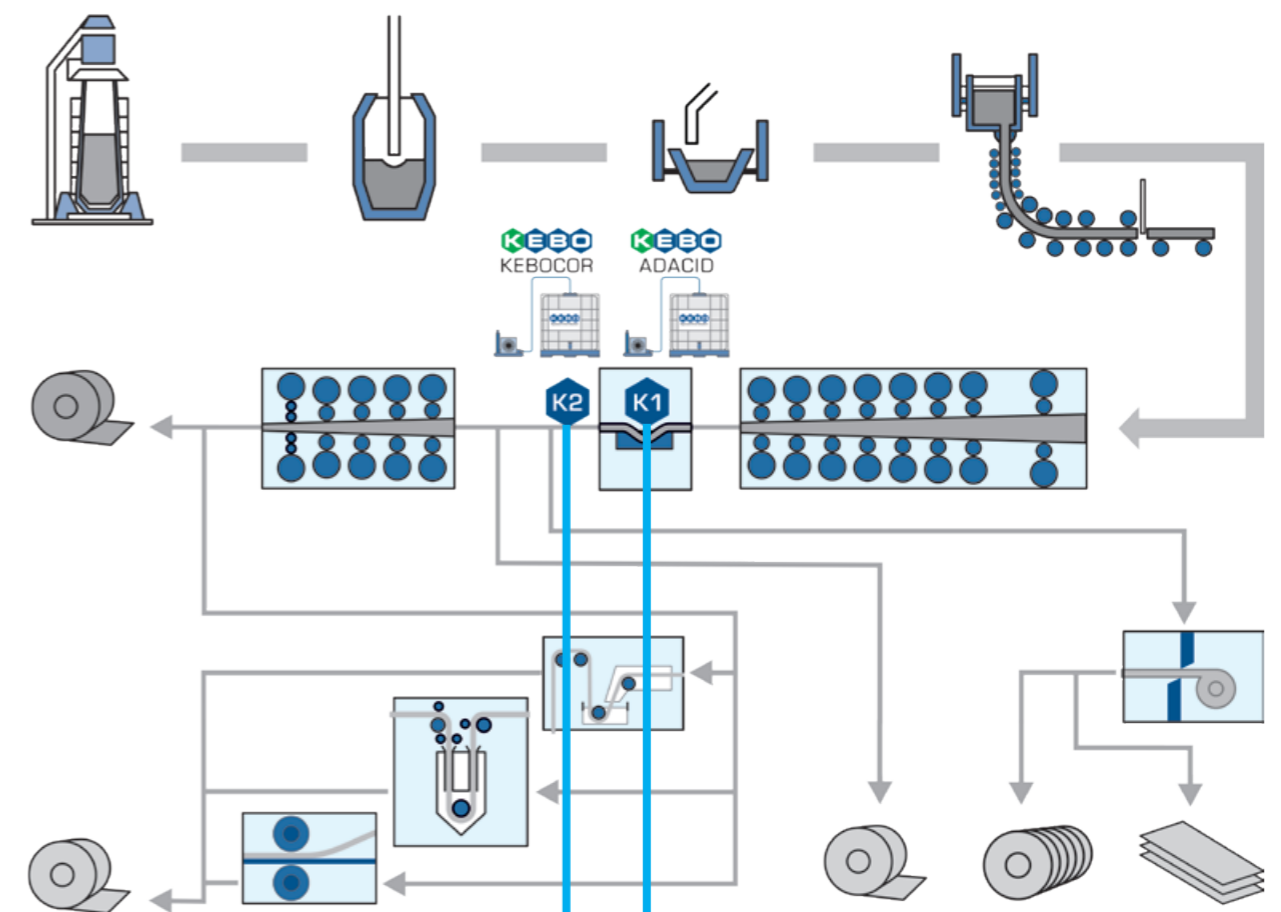
KEBOCOR – for treatment after pickling!

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

This is what KEBO's reliable pickling/corrosion inhibitors do:

- Ensure high inhibition efficiency under all operating conditions
- Reduction of flash rust
- Ensure a consistent pickling speed
- Ensure freedom from disturbances in the regeneration plant
- Easily soluble
- Prevention of hydrogen solubility and embrittlement
- Reduction of acid consumption
- Improved pickling process effectiveness
- Cost reduction

Steel mill scheme



Pickling and rinsing sections



ADACID

Pickling inhibitors for measurable economic success

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 reaction with atmospheric oxygen). This layer interferes with further processing of the material. In the process, the base material is also undesirably attacked. Material losses, unnecessary acid consumption as well as pickling damage, i.e. pore formation, overheating, hydrogen embrittlement, poor pickling atmosphere etc. often are the costly consequences.

Highly effective ADACID inhibitors from KEBO.

Our inhibitors meet the requirements of good inhibitors in terms of acid concentration, iron content, etc. **While the metal dissolution rate is reduced, the oxide dissolution rate is only slightly reduced.**

Produced by us for hydrochloric and sulphuric acid, they greatly reduce the dissolution rate of the metal, while the dissolution rate of the oxides is only slightly reduced.

The economic advantages in operation are clearly proven:

- Material savings
- No over-pickling
- Quality improvement
- Acid saving
- No foam formation in regeneration plants

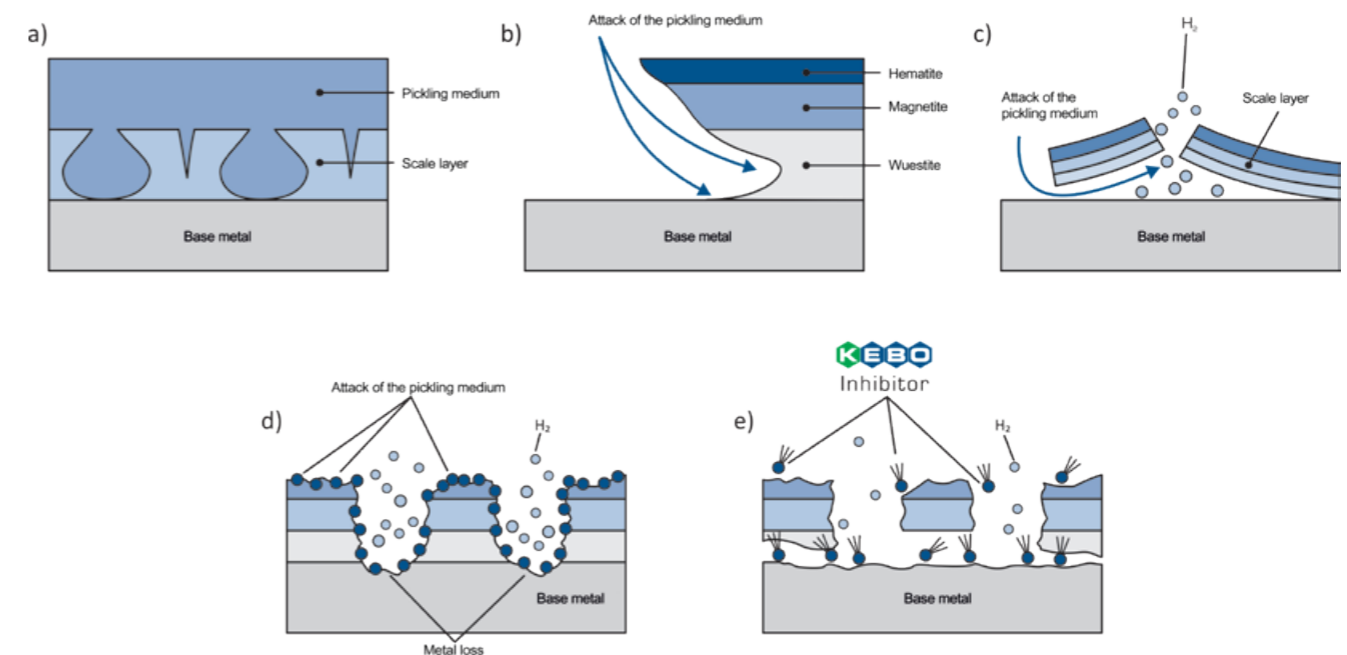


Photos: © thyssenkrupp Steel Europe

Therefore, ADACID inhibitors have become indispensable in many applications.

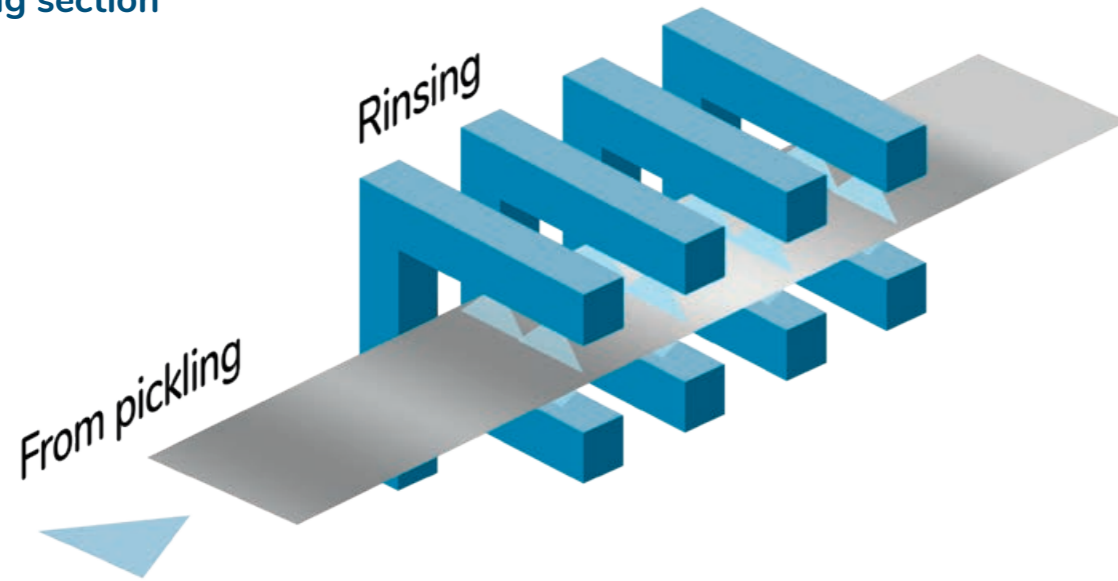
We develop pickling processes, the fundamentals of which are determined by examining the surface states of metal samples.

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



KEBOCOR Highest quality for clean and protected surfaces

Rinsing section



The advantages of passivators added to the rinse water:

- ➔ prevent corrosion phenomena
- ➔ form a protective layer
- ➔ prevent predominantly cathodic partial reaction

Clean and protected surfaces guaranteed:

Our KEBOCOR grades are the suitable neutralizing agent wherever value is placed on clean and protected surfaces.

1. Optimal sustainable material protection

KEBOCOR types prevent tarnishing and rusting of steel surfaces during the rinsing process after acid pickling.

2. For reliably fast drying after treatment

To achieve optimum results, the rinsing and neutral baths must be run as hot as possible to ensure rapid drying of the material after treatment.

3. Buffer capacity prevents rust pustules on metal surfaces

The buffer capacity of KEBOCOR types prevents the formation of different pH ranges on the surface, so that stable local anodes that lead to rust pustules cannot form.

4. Rinsing neutralizes acid residues

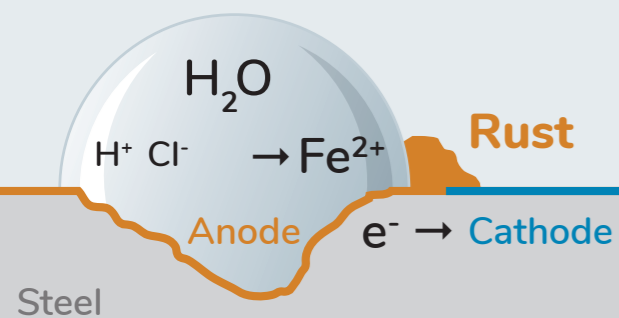
Pickling and rinsing are followed by neutralization. During this process, the acid residues remaining on the surface and in the pores are neutralized. It is expedient that a good neutralizing agent also contains passivating substances to effectively prevent subsequent rusting during storage for a certain period of time.

5. The perfect pH range is important

Optimally, neutralization takes place in the pH range of 10 - 11. In this range, the neutralized surfaces get a nicer and brighter appearance than when working in the pH range of 13 - 14, i.e. in solutions containing caustic soda.

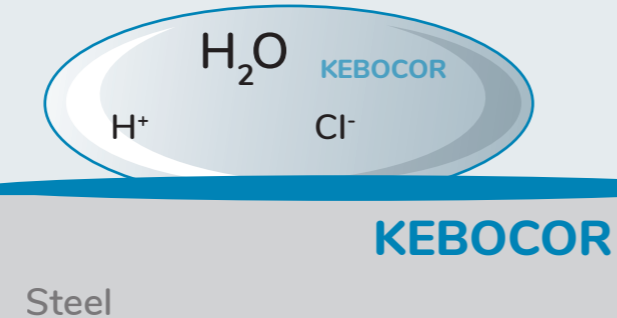
Without KEBOCOR

Oxygen



With KEBOCOR

Oxygen



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 regeneration system.

Other pluses: they avoid over-pickling and reduce acid consumption. The positive consequences: quality improvements and cost savings. Subsequent surface finishes are also not affected.

Here an excerpt from our program:

ADACID 328 For pickling in **hydrochloric acid baths, up to 90 °C**

- ➔ Soluble without residue in water and in the pickling bath
- ➔ The liquid form allows 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 easy dosage
- ➔ Features excellent inhibition values even at high Fe contents, while not affecting scale dissolution
- ➔ Contains no hexamethylenetetramine and does not attack rubber and plastics
- ➔ Bright and clean metal surfaces are achieved

ADACID SUL For pickling in **sulphuric acid baths, up to 100 °C**

- ➔ Soluble without residue in sulphuric acid solutions
- ➔ The liquid form allows 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

Prevents reoccurring corrosion and staining 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 weight and thus possess buffering, complexing and film-forming properties. In addition, they do not contain diethanolamine.

One of our KEBOCOR product highlights:

KEBOCOR 238 A Can be used at any temperature

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



Chemistry is our passion



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

KEBO 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 production plants, KEBO products and services ensure clean efficient processes. We meet all challenges related to chemical cleaning processes, water treatment and corrosion protection (whether for the sugar industry or for the production of ethanol, starch, yeast or for the steel industry). 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. For Example : cleaning aids, biocides, antifoams, seed crystals & viscosity reducer, antiscalants, decolorants.

We see ourselves as partners of 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:

- 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

Keller & Bohacek GmbH & Co. KG
Liliencronstraße 64
D-40472 Düsseldorf
Tel. +49 211 9653 0
www.kebo.de
info@kebo.de