



## PRETREATMENT

Economic product solutions  
for metal pretreatment



Harmony in  
Chemistry



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## KLUTHE AT A GLANCE

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Chemical pretreatment is a complex process and contains regularly several products. A sequence, that we master like no one else. Since almost 70 years. Since we invest our expertise and competency into the pre-

cise understanding of our customers' processes and the development of tailor-made, highly efficient solutions. Together we boost your business.

## KLUTHE COMPACT

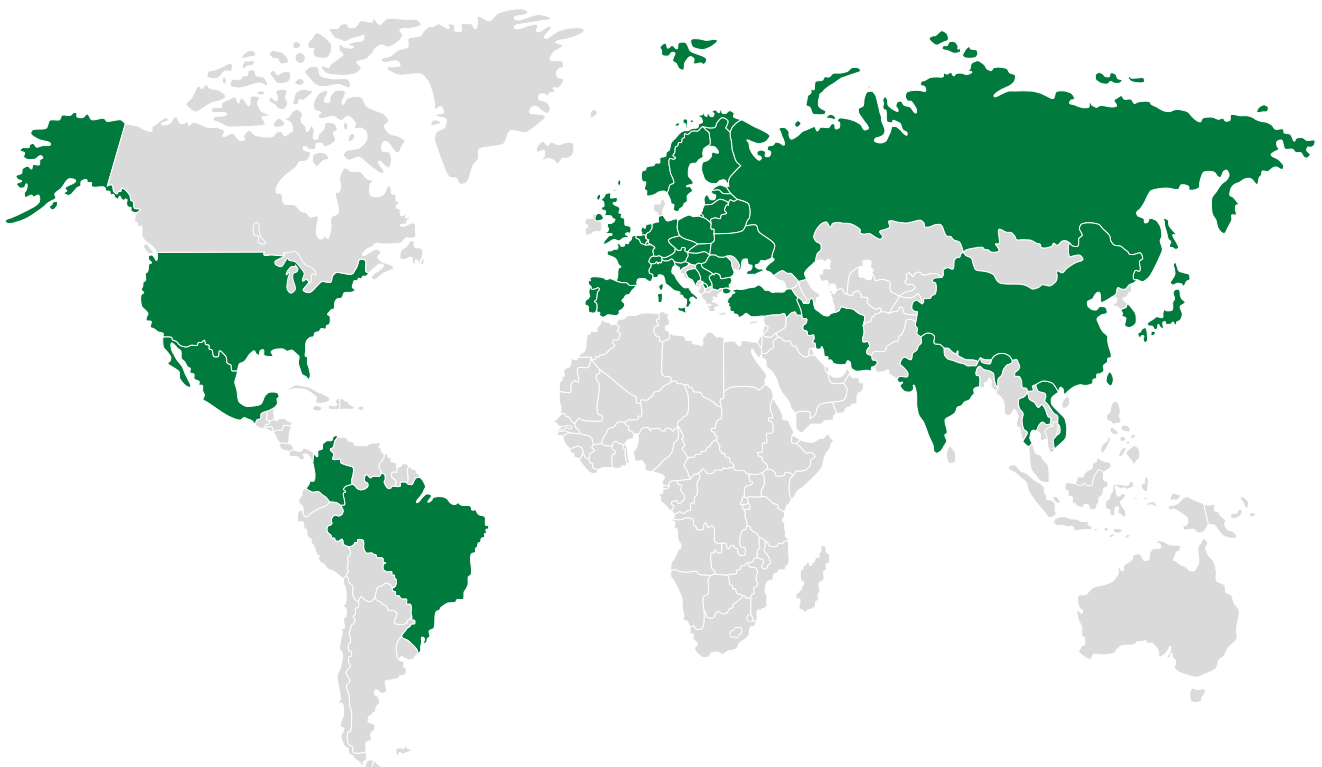
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- Since the foundation in 1950, we are a family-owned enterprise with experience in development, manufacturing, sales and service of process chemicals
- Market segment and technology expertise concentrates in three Business Units: Metalworking & Cleaning, Pretreatment and Paint Shop Materials
- More than 80 specialists in research & development
- Kluthe is certified according to ISO 9001:2008, ISO 16949:2009 and ISO 14001:2004
- More than 570 employees care to service you

## 44 LOCATIONS GLOBALLY AND ALWAYS CLOSE TO YOU

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That means for you: short distances, local expertise, partnership at eye level.





Technical specifications and safety information label on the top of the drum.

**Kluthe**



Continuous spray line for thin film technology application.

## CHEMICAL PRETREATMENT

The chemical pretreatment of metal substrates is one of the core steps to add value to our customers' manufacturing. Parts produced in sophisticated processes are upgraded by a paint coating. Kluthe's DECORRDAL pretreatment products protect metal surfaces from corrosion and support the long-life value of our customers' goods. Even under most difficult climatic conditions the parts may not show corrosion or loss of paint adhesion. Different processes are available to align with the specific application technology and the substrates to be pretreated.

## OUR SERVICES

Decisive for success is the proper product selection. To find the best fit, we pretreat original parts in our technical center, and paint them with different paint systems according to the request of our customers. Painting includes electro-coats, powder paints and liquid paints. Then, quality testing and evaluation is performed following customers needs (e.g. salt spray test, climatic test, paint adhesion tests). You receive an individual process instruction to allow you to lead and control your pretreatment. Furthermore, we support with our skilled technicians on-site and train your associates.



Central Research & Development laboratory at Heidelberg.

### DECORRDAL

- Acidic pickling for different metal surfaces
- Phosphate-based pretreatment
- Phosphate- and chromate-free products

### ADVANTAGES

- Economic and ecologic smart alternatives to the traditional phosphating products (iron- and zinc phosphatation)
- Heavy-metal free systems called DECORRDAL ZT-series meet the latest technical state-of-the-art. They combine high protection level of substrate surfaces with low make-up concentration and low chemical consumption
- DECORRDAL ZT-processes can be applied prior to all common paint systems
- Particular requirements, e.g. to replace chrome (VI)-processes are matched by special formulations, which meet the actual legal requirements regarding limitation or ban of hazardous substances



## POSSIBLE PROCESSING OPERATIONS

### Application

- ▶ Spray and dip processes
- ▶ Manual application by pressure lance
- ▶ Temperature ranges from 45 - 65 °C
- ▶ Degreasing bath maintenance e.g. by ultra filtration

### Application areas

- ▶ Acidic pickling for welding constructions
- ▶ Degreasers for steel
- ▶ Multi-metal degreasers (silicate free)

Car body cleaning and degreasing.





## DEGREASING AND PICKLING PRODUCTS

Besides the formation of a conversion layer on the metal substrate, the pretreatment process quite often comprises additional process stages. The most important step to prepare the metal surface is degreasing. Adhering contamination from upstream manufacturing processes like e.g. machining oils, emulsions, metal flakes or other scale is removed. Welding constructions or partially corroded surfaces besides bended or stamped panels may need an acidic pickling step. Kluthe offers alkaline degreasers, acidic pickles DECORRDAL 29 series or DECORRDAL 35 series as well as several special formulations.



### ADVANTAGES

- State of the art degreasers
- Tailor-made process solutions to meet individual customers' requirements
- Achieve high quality surfaces even after strong thermal load (welding, laser cutting, ...)
- Automated process control feasible
- Emulsifying / de-emulsifying processes



Exit of a pretreatment line.



## ADVANTAGES

- Balanced process chemicals for degreasing / activation / phosphatation
- Best paint adhesion results in combination with organic coatings
- Homogeneous zinc phosphate layers with small crystals
- Resistant conversion coating

## ZINC PHOSPHATATION

The so-called tri-cation low zinc phosphatation is still state of the art, e.g. in the area of car body pretreatment. This process, like the iron phosphatation, precipitates metal phosphates on the part's surface. Zinc-, nickel- and manganese phosphates form the conversion layer. The crystalline coatings are thicker and more dense than an iron phosphate layer. This results in increased corrosion performance.

In car body painting, the zinc phosphatation is mostly combined with a cathodic electrocoat applied in an immersion process. However, powder paints or wet paints in combination with zinc phosphate produce high performance levels as well. On steel, corrosion results in neutral salt spray test are between 750 and 1000 hours with a paint undercreepage of less than 1 mm.

Besides nickel-containing tri-cation zinc phosphatation, we offer also nickel-free systems for steel surfaces. Such systems produce a crystalline zinc phosphate layer as well to increase corrosion protection and paint

adhesion. The DECORRDAL-500-series has been developed for chemical pretreatment of steel substrates. The nickel-free processes can be combined with different paint systems. Cathodic electro coating is the most frequent painting.

Additionally, nickel-free phosphatation systems are combined with powder paints. Achievable corrosion protection ranges between 750 and 1000 hours neutral salt spray test with an undercreepage of below 1 mm.

For the optimal formation of a zinc phosphate layer – doesn't matter if it is a nickel-containing or a nickel-free system – the application of a grain refiner, the so-called activator or rinse conditioner is mandatory. Kluthe offers activators based on titanium phosphate, e.g. AKTIVATOR 1, and activators based on zinc phosphate, e.g. AKTIVATOR 3. By using these activators, both crystal size and coating weight of the phosphate layer can be well controlled.

### DECORRDAL 500

- Nickel-free zinc phosphate
- Small phosphate crystals
- Very good adhesion promoter for organic coatings

### AKTIVATOR 1

- Colloidal titanium phosphate
- Powder
- Free-flowing
- Easy to dose

## POSSIBLE PROCESSING OPERATIONS

### Application

- ▶ Spray and dip application
- ▶ Adhesion promoter for organic coatings (preferably electro coatings)
- ▶ Meets high corrosion requirements in difficult climates

### Application areas

- ▶ Automotive industry
- ▶ Automotive component manufacturers
- ▶ Agricultural / construction / earth moving

## THIN FILM TECHNOLOGY

User demand for eco-friendly processes and lower processing costs has led to the development of a new generation of products and processes. As a result, innovative processes that are phosphate-free and based on zirconium have become available in recent years, in addition to the common phosphate-based process.

These processes have a variety of different designations. Based on the position of zirconium in the periodic table, these processes are called "TMC," which essentially stands for Transition Metal Coating.

Other common terms for these pretreatment products are "thin film technology" or "nano technology," which refers to the thickness of the conversion layer. What all processes have in common is that they produce a very thin conversion layer consisting of oxides and zirconium, which is deposited on all metal surfaces.

This means that, as an alternative to the widely used zinc phosphating process, high-quality and powerful multimetal processes are available, which have already been widely accepted in the agricultural machinery industry, for example. Processes such as DECORRDAL 950 or DECORRDAL 660 are characterized by a low make-up concentration and thus a low salt load, low consumption, and usability at low temperatures through to room temperature. Another advantage is the nearly complete absence of sludge in the processes. This considerably simplifies cleaning, maintenance, and desludging of the pretreatment plants, which saves costs.



The thin film technology is used both for printing presses....

### ADVANTAGES

- Environmentally friendly process
- Multimetal-capable pretreatment
- Almost sludge-free system
- Reduced maintenance



## POSSIBLE PROCESSING OPERATIONS

### Application

- ▶ Spraying and immersion process
- ▶ Works on steel, galvanized and alloy-galvanized steels and aluminum
- ▶ Particularly in combination with powder and wet paint coatings
- ▶ As an alternative to iron and zinc phosphatation processes

### Application areas

- ▶ Agricultural machinery
- ▶ Haulage vehicles
- ▶ Medical technology
- ▶ Printing presses

.... as well as for agricultural machinery.

## POSSIBLE PROCESSING OPERATIONS

### Application

- ▶ On aluminum and galvanized surfaces
- ▶ For spraying and immersion
- ▶ For exterior coating systems
- ▶ For GSB- and QUALICOAT-certified coaters

### Application areas

- ▶ Contract coating
- ▶ Manufacturer of facade cladding
- ▶ For aluminum finishing area
- ▶ In batch galvanizing plants

## CHROMATE-FREE TECHNOLOGY

The chromate-free pretreatment process is state-of-the-art for the pretreatment of light metals such as aluminum or magnesium, but also galvanized steel. Due to the ban on toxic chromate compounds currently under discussion, the remaining chromate-containing products are also likely to disappear from the field of surface technology. There are various product alternatives for the treatment of the above-mentioned metal surfaces, which are based on different concepts.

On the one hand, chromium (III)-containing pretreatment systems such as DECORRDAL ZN 320 or DECORRDAL AL 325 are used. Both are very solid in their application. But unlike the chromium-free processes that are available, these offer decisive advantages when it comes to bare corrosion protection, meaning in those instances where no organic coating is applied to the surface.



## ADVANTAGES

- Equivalent replacement process for toxic chromate systems
- Permanently tested quality systems, monitored by quality associations
- Excellent corrosion and adhesion results
- Can be combined with many exterior paint systems (also highly weather resistant systems)

On the other hand, zero-chromium products are also used. These include DECORRDAL AL 240 A, which has been tried and tested for many years and certified by the **GSB** and **QUALICOAT** quality associations.

## IRON PHOSPHATATION

Another pretreatment method that is still very popular is the traditional alkali phosphating process, also referred to as iron-phosphating, because it leaves a layer of iron phosphate on the steel surface. This process entails a combination of degreasing and phosphating. Both steps are carried out concurrently in an active zone. The products are easy to handle and can be conveniently driven by a pH-controlled dosing pump. In addition to steel and iron workpieces, even aluminum surfaces and galva-

nized steel surfaces can be treated through the combination of various ingredients. The attainable corrosion protection results under paint in an NSST (neutral salt spray test) range from 120 to 240 h. Iron-phosphating is frequently used before powder coating.



### ADVANTAGES

- Sludge-reduced phosphating systems
- High degreasing performance
- Simplest bath control
- Long bath life
- For various temperature ranges (35 - 65 °C)





Iron phosphating is widely used in mechanical engineering.

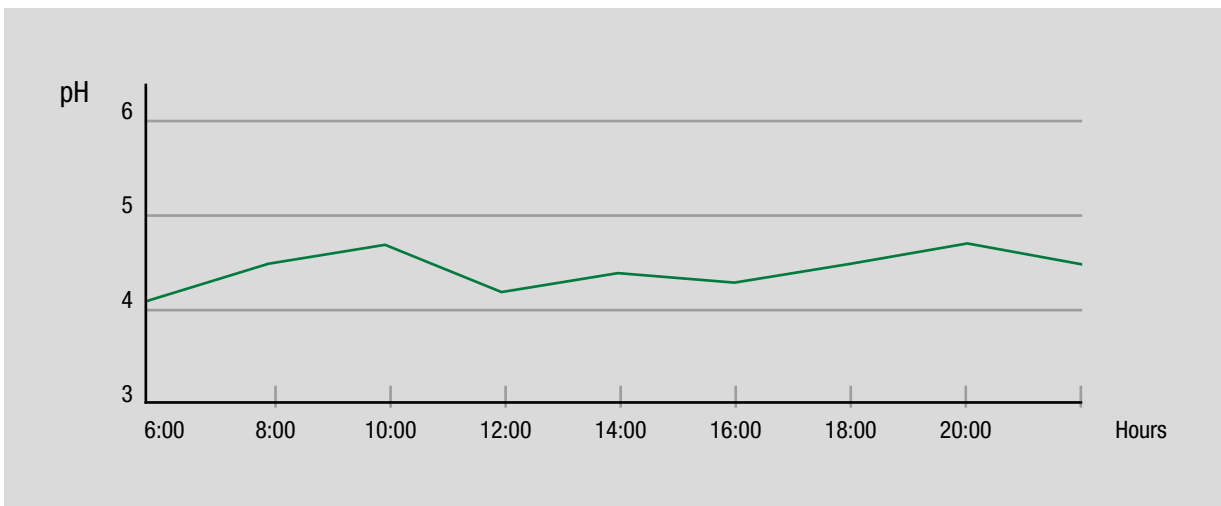
## POSSIBLE PROCESSING OPERATIONS

### Application

- ▶ Spraying and immersion process
- ▶ Manually by means of high pressure lance
- ▶ Can be combined with common coating systems (powder, wet, and electrodeposition paints)

### Application areas

- ▶ Mechanical engineering / electrical industry
- ▶ Furniture industry
- ▶ Agricultural machinery



Consistent parameter analysis and adaptation reduce process deviations.

## AUTOMATIC PROCESS PARAMETER CONTROL AND REGULATION WITH THE KLUTHE MINI-SCUID

In addition to well-balanced products that are perfectly suited to a given application, it is important to work with the proper process parameters to ensure the quality of the pretreatment process. Normally, this would require regular and, at times, manual checking.

In cooperation with **ProMinent**, Kluthe developed a measuring and control system called Mini-SCUID, which enables the user to automatically record the specified process parameters and regulate them by

controlling the dosing pumps. An optional online connection to our application engineers in the lab enables immediate intervention if an error occurs.

This ensures that the quality of your end product remains at a high level, and it helps mitigate human error.



### ADVANTAGES

- Automatic reading and control of process parameters such as pH / conductivity, conductivity / refractive index or pH / refractive index and temperature
- Personalized access data
- Continuous monitoring of process parameters
- Data protocol via SD card
- Effortless configuration of limits
- Various warning tones can be set
- Online tracking and changing of dose settings



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