



DI rinse water for surface pretreatment

EUROWATER
A GRUNDFOS COMPANY

Why water treatment?

Corrosion protection, optimal coating adhesion, superior optics and durable surfaces. The purpose of a pretreatment system is to ensure some or all of these factors. Having proper rinse water quality is crucial.

Water quality is crucial

The pretreatment system performs cleaning, rinsing and preparation of the product surface. It is important for the product surface to be thoroughly cleaned of all dirt, oils, and contaminants before the surface coating process.

There are many technical as well as cosmetic purposes for surface treatment prior to powder coating, liquid painting or electrocoating. Some of the most important are corrosion protection, optimal coating adhesion, superior optics and durable surfaces, and having the proper rinse water quality is crucial.

Water treatment designed for the surface treatment industry

EUROWATER has its own engineering and design department as well as production facilities. This unique situation provides an agile development process making us able to follow the advancements in the surface treatment industry and offering concepts and solutions targeted special applications.

EUROWATER offers a wide and complete product program of water treatment units based on modular standard systems. The units can be individually combined and extended according to the project. We can also easily adapt the modules for the individual customer's requirements.

Your benefits

A comprehensive solution from EUROWATER provides:

- High surface finishing quality of your metal or plastic products
- Trouble-free operation based on decades of experience
- Low water consumption with rinse water recirculation
- Products free of paint-wetting impairment substances, including silicone
- Ease of installation due to factory skid-mounting, pre-wiring and documentation package
- Broad range of after-sales services



Powder coating: After a series of rinse zones, the workpiece is finalized with an electrical charge, that is highly dependent on the purity of the water. The correct water quality is essential for the pretreatment process, regardless if it is for e-coat, powder coating or liquid paint.

Rinse zones

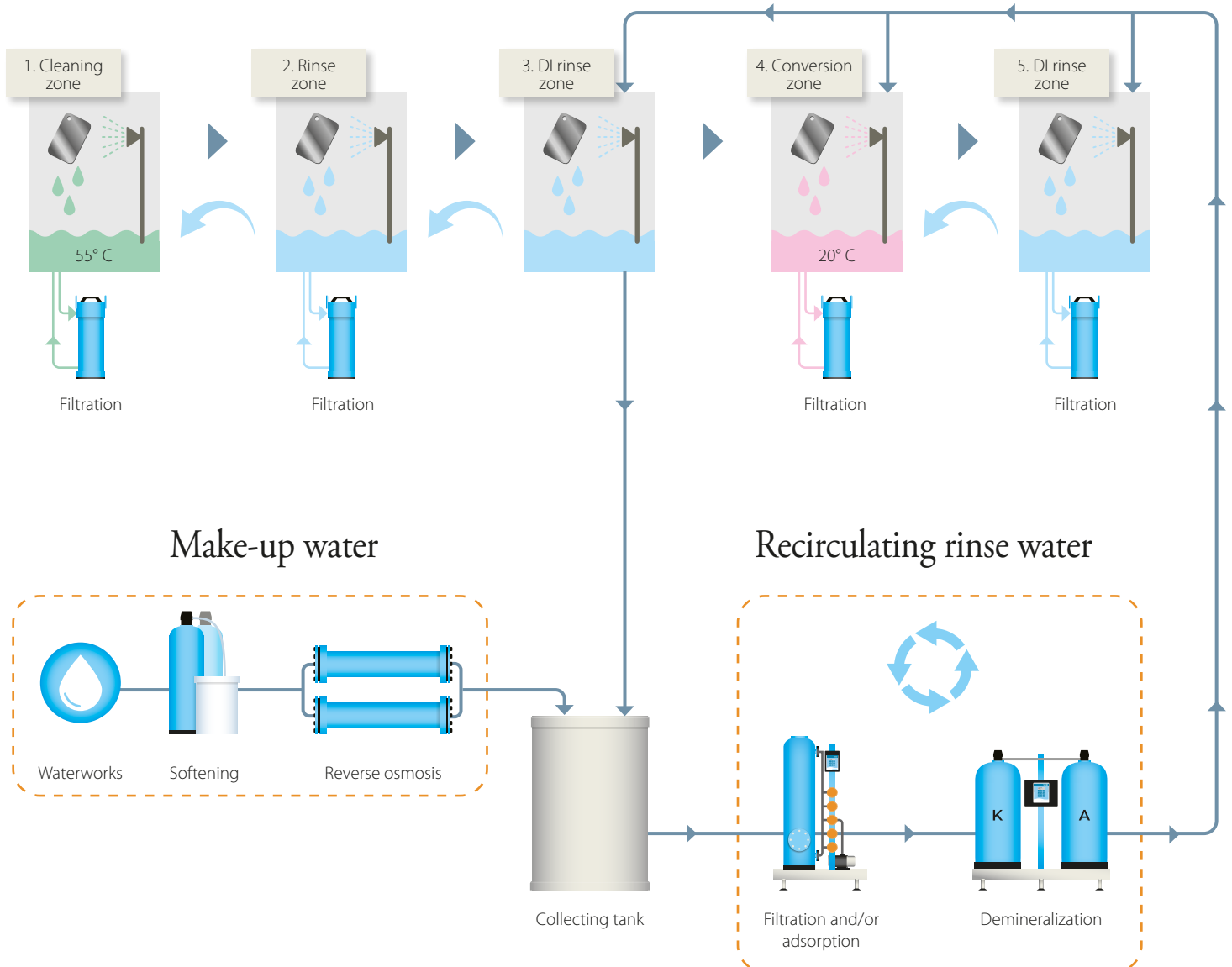
The workpieces are treated in a series of zones. The number of zones, types of chemicals and how they are applied by spray or immersion all depend on the product, and determine the design of the water treatment solution.

DI water for rinse zones

In almost any pretreatment process, the last rinse before drying and coating is done with demineralized or deionized water, typically described as DI water. In some processes, several rinse zones are supplied with DI water, and some chemical suppliers even recommend filling the conversion bath with DI water.

The purpose of the last rinse is to remove any residual chemicals, avoid any salt deposits and to provide a clean surface for coating. A continuous supply of DI water ensures that the water quality is properly maintained.

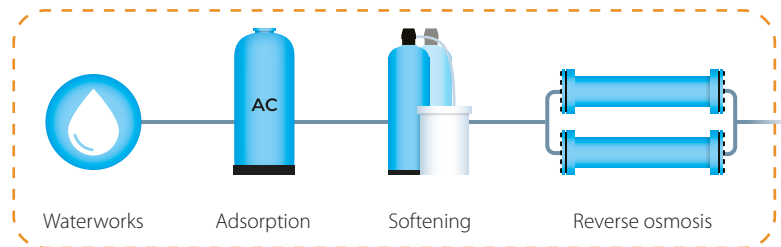
Consequently, the water treatment solution is directly related to the quality of the pretreatment process. With our many years of experience as a supplier of water treatment units to the surface treatment industry we know how to design the optimum solution.



Example solution: A five-zone pretreatment process with zirconium based conversion.

Make-up water

Make-up water must be demineralized water with low salt and silica content. EUROWATER offers a comprehensive product program to cover your needs.



Demineralized make-up water

In all water-based pretreatment systems there is a need to add fresh make-up water due to evaporation, drag-over, renewal of the water in the different baths, etc. If available, the distillate from a vacuum distillation system can serve as a feed-water source. The requirement for the make-up water is demineralized water with low salt and silica content. Reverse osmosis (RO) units are used for producing demineralized water. They retain more than 99 % of the salts in the water and remove

microorganisms as well as particles. The process is chemical-free. A single-pass RO unit can typically supply water quality with conductivities between 10 and 15 $\mu\text{S}/\text{cm}$.

Water saving technology

RO-PLUS units are designed for a high recovery rate, compromising neither the reliability nor the water quality, resulting in up to 60 % water savings, compared to conventional RO systems.



Smooth system operation

Proper pretreatment of the inlet water is the key to a continuous, smooth system operation. The purpose of pretreatment is to prevent clogging of the membranes with precipitations and suspended solids and to remove free chlorine. Hardness minerals clogging the membranes are removed in a softener. Softening can also be achieved through dosing of antiscalants that keep hardness minerals dissolved. Free chlorine in the water can be removed in an activated carbon filter.

The all-in-one CU:RO compact unit is an excellent make-up water solution that carries out softening and reverse osmosis with only a small footprint and easy installation.





Chromium-free pretreatment of aluminium with DI water. The make-up water solution consists of softening and RO. The recirculation part includes activated carbon filtration and demineralization through ion exchangers.

Consider the inlet water quality

Not all water sources are equal

The inlet water must be of drinking water quality: Clear, colourless and without iron, manganese, mechanical impurities and free chlorine.

For water sources containing free chlorine, a filter with activated carbon is essential. Chlorine has many detrimental effects on machines as well as coatings and simply must be removed before further treatment.

For sources with insufficiently treated or untreated water, such as private wells, a pressure filter or similar is absolutely necessary to remove iron and manganese before further treatment.

Activated carbon filter in front of softening and double-pass RO in operation at a manufacturer of auto parts in Russia.



Flexibility with modular design



400 l/h

800 l/h

1200 l/h

1600 l/h

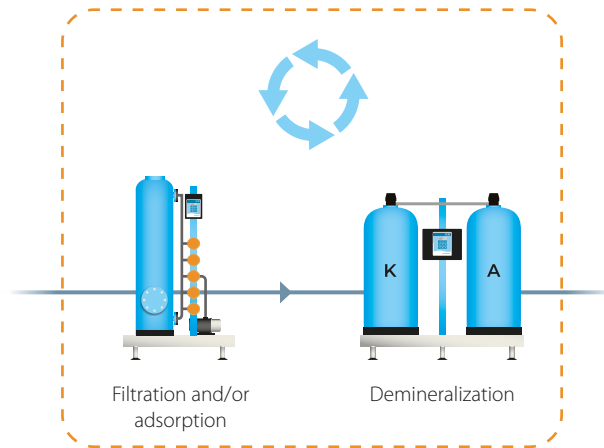
2000 l/h

2400 l/h

An example from the modular product portfolio. The RO B1 series is available in six versions. Extensions kits are available for easy upgrading with more membrane pressure vessels and thereby higher flow.

Recirculating rinse water

Recirculation over ion exchange resin reduces the amount of fresh make-up water needed. EUROWATER offers a comprehensive product program to cover your needs.



Water is a valuable resource

Rising water costs and environmental sustainability are clearly factors promoting water savings as a focus area.

Water-saving measures

Rinse water from the pretreatment is typically conducted through the pretreatment system in a reverse cascade to minimize water consumption. Another recognized and very important technique to save water is recirculation of the rinse water. To ensure trouble-free operation, this requires careful treatment. Rinse water from the pretreatment process is collected

in a tank. From here the water is treated in several steps.

Filtration

The first step is removal of mechanical impurities. The available technologies are filter bag filtration or automatic backwashable gravel filters.

Adsorption of organics

The second step focuses on the removal of organic substances, if they are present, and activated carbon is used for adsorption of them. Again, the available technologies are filter bags wound with special activated

carbon fibres or automatic filters with activated carbon media.

Demineralization with ion exchangers

In the third step, the water is demineralized by an automatic or semi-automatic two-tank ion exchange plant. In a demineralizer, the water first passes through a cation column in which the cations in the water are exchanged for hydrogen ions, H^+ . Then the water passes through the anion column in which the anions of the water are removed by exchange for hydroxide ions, OH^- . The H^+ and OH^- ions are then recombined to form pure water, H_2O .

DI water for chromium-free pretreatment. The rinse water is recirculated over ion exchange demineralizers. In front are two bag filters for removal of mechanical impurities. If organic substances are present, special filter bags with activated carbon fibres are available.





DI water for rinse zones in surface pretreatment of alloy wheels. A properly designed water recycling process reduces the demand for fresh water as well as the demand for wastewater treatment. The water from the rinse zone is reused through automatic gravel filters and two parallel automatic demineralizers. EUROWATER products for surface treatment systems are free of paint-wetting impairment substances, including silicone.

Important factors to consider for recirculation systems



DI water quality

The water quality requirement for surface treatment machinery and processes varies, but here are some findings according to our own experience:

- The conductivity of the DI water must not exceed a maximum of 30 $\mu\text{S}/\text{cm}$ at 20° C.
- Some coating companies require that the dripping water must not exceed a maximum conductivity of 2 $\mu\text{S}/\text{cm}$.
- A demineralizer can normally produce a water quality of 5-20 $\mu\text{S}/\text{cm}$. With counter-current regeneration it can be as low as 1-5 $\mu\text{S}/\text{cm}$.

Bacteriological control

Bacteria do not pose a health risk for surface treatment. But microbial growth can be the source of mechanical impurities and can contaminate vital elements in the surface treatment system leading to poor coating quality.

This can be avoided by continuously circulating the rinse water through a UV-disinfection unit that efficiently kills 99.9 % of microorganisms.

Extended bath lifetime

Continuously recirculating each bath through a bag filter retains mechanical impurities, metal shavings and deposits. This reduces how often the baths must be discharged.

The bag filter module consists of a filter house with cover and a support screen for the exchangeable filter bag.

Filter bags are available in a wide range of variations, including special ones with activated carbon fibres for removal of organics.

Reliable and robust water treatment since 1936

A water treatment plant is a long-term investment, and naturally we use the best materials available. The life expectancy of our water treatment solutions are often 25 years.



INDUSTRY EXPERIENCE

Water treatment units from EUROWATER are reliable and robust and have proven their effectiveness over many decades. Over time, surface treatment technologies have been developed and improved to meet ever increasing market demand - so have our solutions. Therefore, we have experience with all the different water-based surface treatment technologies; from electroplating and galvanizing to multi-metal thin-film technologies.

Multiple DI water production lines for pretreatment of light alloy wheels.

After-sales service

EUROWATER has an international sales and service organization with an experienced staff of engineers and specially trained service technicians. Our service is fully documented, characterized by a short reaction time

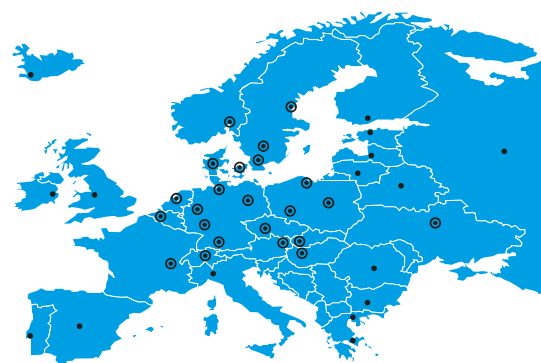
and our goal is to be easy to work with in all situations. We offer customized service agreements, high quality consumables and modernizations. To keep your critical systems running, EUROWATER offers call-out service for urgent needs, individual

service agreement on preventive maintenance, access to high-quality spare parts and consumables as well as modernizations in all shapes and sizes.

International network

EUROWATER is an international group with subsidiary companies in 14 countries servicing our customers through 23 local offices. We have more than 400 highly qualified employees in consulting, sales, engineering, production, installation, commissioning

and after-sales service. Moreover, the company is represented in most of the other European countries through distributors, who are all water treatment specialists. Find your local sales and service office on our website.



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