

Water & Wastewater Treatment for Aerospace, Transport & General Metal Finishing



Introduction

A wide range of industries produce inorganic wastewater containing a wide range of heavy metals and other chemicals such as acids, alkalis etc. These industries include the automotive and transport sector, electrical and electronics manufacturing, steel, aluminium and copper production and what is commonly described as metal finishing.

Those industries know very well that the wastewater they produce is highly toxic and can cause enormous damage to our environment if it is released without proper, efficient treatment.

Such companies also typically need to produce pure, deionised water, at least for rinsing of the final treated products, so that their finished quality is as good as possible.

H+E has now been designing and supplying both water and wastewater treatment plants for more than 100 years and, in that time, has supplied thousands of treatment plants for both water and wastewater to clients across the world. This means that we do have a great deal of practical experience in all aspects from the basic design of such plants through to their long-term operation and servicing.

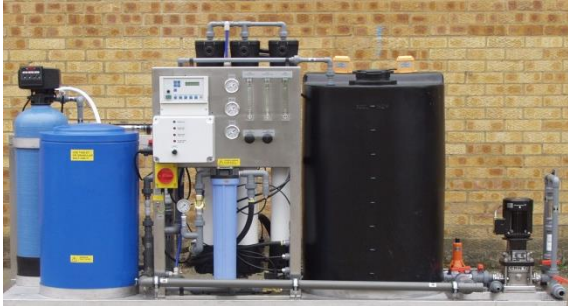


Pre-assembled Chemical Dosing System

H+E has an ongoing philosophy of “Continuous Improvement”. Basically this means that we are never 100% satisfied with what we design and supply; there is always an improvement that can be made, no matter how small. We take this concept seriously, carefully considering any comments from our clients and our own staff so that we can make what we provide just a little better.

Water Treatment systems

It is standard practice now to use deionised water at least for the final rinse at the end of the metal finishing processes. This ensures that, when the finished product is dried, no stains (resulting from dissolved salts in the water) are left on the surface to create “stains”. All finished products need to “look good” as well as performing well in the long term!



Small Softener / RO system



Larger Softener / RO / EDI system

Commonly, the systems we supply are based on water softening and reverse osmosis. This is a very economical and environmentally-friendly way to produce deionised water from mains water. Occasionally, where very high purity water is required, we can simply add a final “polishing” stage to produce the best possible water quality.

Whatever size you need, we can provide a suitable system, big or small.

Wastewater Treatment Plants

Normally, the core objective of your wastewater treatment plant is simply to ensure that what is discharged has been treated sufficiently to conform with the legal requirements of the Consent you have been given.



Chemical Treatment stages, all pre-assembled before delivery to site

For these types of “inorganic” wastewater, the basic stages of the plant that need to be considered are normally quite similar:

Chemical Treatment

Depending on the contaminants present, a number of chemical reaction steps are normally required to ensure efficient treatment of the wastewater. We have extensive experience with the metal finishing production steps required, and choose the best reaction for your needs, resulting in reliable compliance and low chemical cost.

The plant shown above has four treatment steps

Suspended Solids Removal

For these types of effluent, settlement of the suspended solids produced during the chemical treatment is normal. The Tube Settler shown on the right provides highly efficient settlement of the solids produced during chemical treatment.



View down into H+E's highly-efficient Lamella Tube Settler tanks

Sludge Collection and dewatering

The solids collected in either settlement or flotation systems (sometimes used if there is oil present) are typically metal hydroxides and are the toxic part of the wastewater. They form a sludge that must eventually be removed from site. The sludge is collected in a separate tank and either removed from site by road tanker or alternatively dewatered to form a solid "cake" that can be removed off-site in a small container or skip.



Typical small filter press for sludge dewatering

Final Treatment

In some cases, where discharge is to a river or stream rather than the foul sewer, “normal” chemical treatment and settlement is not enough because there are always tiny concentrations of the suspended solids that “escape” settlement. In such cases, a filtration step is required after settlement. Typically, this will be a sand filter. However, occasionally, where the wastewater contains particularly toxic metals (for example mercury or cadmium metals) the discharge limits are “tighter” than for other metals. In these cases, final treatment stages, using ion exchange, and even biological treatment may be required.



Toveko continuous gravity sand filter

Final Discharge monitoring

In most cases you are required to monitor the treated wastewater that you discharge. Commonly the need is to measure the flow rate and also the pH of what is discharged, and to archive those results.

Chemical Storage and Dosing

These are the chemicals that are used in the Chemical Treatment step. For small plants, you may purchase these in 25 litre drums, in which case small storage tanks are provided.

For medium-sized plants you can purchase and use chemicals directly from Intermediate Bulk Containers (IBCs). Our **SecureChem™** system, totally eliminates wastage and ensures 24/7 supply.

For large plants you can get the chemicals delivered by road tanker into Bulk Storage Tanks. Although the capital cost for this is higher, the cost per kg of chemical is lower.



SecureChem™ IBC Automatic Level Control for three chemicals

Wastewater Recirculation

In many cases, especially as product quality requirements become ever more stringent, the volumes of water and particularly deionised water that have to be used to rinse the products increase significantly above those used just a few years ago. Often, particularly in the Aerospace sector for example, the conductivity of the water that must be used in the rinses is specified by the client who is, of course, primarily concerned with the quality of the product.

Clearly, this is good from the perspective of product quality, but can have a number of negative effects:

- High quality deionised water is quite expensive to produce from mains water and therefore there is a clear incentive to use it wisely and not to “waste” it.
- The total flow of deionised water used often increases to the point where an existing wastewater treatment plant cannot handle the flow and needs to be enlarged or replaced. This must be avoided if at all possible!
- The volume of mains water used increases, and therefore so does the cost!



Typical small Ion Exchange system for Rinse Water Recycling

In such cases, the use of rinse water recirculation systems, based on the use of ion exchange technology, can be a very beneficial and economic option to consider.

Typically, such systems can:

- Dramatically reduce overall water consumption (and cost)
- Avert the need to expand or replace an existing wastewater treatment plant
- Avoid the need to enlarge or replace an existing deionisation plant
- Reduce the overall operating cost for that deionisation plant
- Recirculate high quality deionised water throughout the finishing process
- Most importantly, minimise the environmental impact of your business!

H+E has been providing such systems for more than 25 years and they really do have a long life and therefore provide long-term savings. We have clients who are still using their ion exchange plant 25 years after we supplied it!

Long-term support

Our team of engineers is always available to provide support, service visits, troubleshooting and the occasional spare part throughout the life of the plant. We welcome the opportunity to discuss your needs with you and offer you a bespoke package that meets your needs. It doesn't matter whether we have supplied your existing plant or not; we are still very happy to provide this service if you wish.

We have provided such support for many of our clients for 25 years and more and they have confirmed over and over again the benefits they gain from this. We always recommend regular service visits, and frequency can be adjusted to your own needs. For example, it can be just once or twice per year. The point is that you and your staff know in advance when the visit will be and therefore when our Service Engineer will be there to answer any on-going queries, apart from the main purpose of thoroughly checking plant operation.

You will always receive a report following each visit.



General view of a plant treating wastewater from metal finishing processes

Repeat Business

For many of our clients, we have supplied upgrades or replacement of plants that we supplied many years before. We think it is reasonable to assume that such repeat business means that our customers are happy with the equipment and service that we provide.

We would be very happy to discuss your particular needs with you.

Please do contact us!

H+E ranks among the world's leading suppliers in the fields of: water & wastewater treatment, and energy efficiency. Based on its global presence, the **H+E GROUP** has completed projects in over 50 countries.



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