

# CHEMIE TECHNIK



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PRE-FILTRATION CUTS EXPENSE IN WATER TREATMENT

**PURE, CLEAR  
WATER**

**HYDAC  
SPECIAL  
EDITION**



successful media for experts

EXPERT-GUIDE			
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### For operators

- In order to meet the demand for clean water in all areas of application, the available water needs to be treated in three stages. Pre-treatment can reduce the subsequent stages to a minimum.
- Automatic back-flushing filters remove larger particle contaminants without the operator needing to interrupt the flow of filtrate to carry out cleaning.
- The main reason why pre-filtration is important is to ensure that subsequent cleaning steps are effective in achieving the required quality of the final product.

## Pre-filtration Cuts Expense in Water Treatment

# Pure, Clear Water

Water is a rare commodity. Even though we call Earth „the blue planet“ because much of its surface is covered by sea, the proportion of freshwater – and particularly clean water – is very low, at a figure of 0.3%. Furthermore, the demand for clean water is increasing. The aim of water purification is to produce drinking water as well as clean service water and process water for industry and business. The untreated water comes from the sea or from groundwater wells, but also from surface waters such as lakes and rivers. In times of increasingly scarce water resources, the recycling of service and sewage water becomes even more significant.

Pre-treatment can involve several treatment steps and is designed to produce the required feed water quality for processes downstream

Industrial water purification is a multi-stage process consisting of three stages: pre-treatment, main treatment and post-treatment. As with other process engineering systems, the economic efficiency of the entire process is a key consideration. It is possible to cut the cost of water treatment mainly in the pre-treatment stage since this has a sustained impact on the generally more expensive processes that follow.

The pre-treatment itself can involve several treatment stages to ensure the required feed water quality for the processes that follow. Inadequate retention of suspended solids during pre-filtration can lead to a shorter service life for the fine filters and membranes downstream and therefore to shorter service intervals.

### Diversity of filters

Hydac Process Technology supplies suitable filter technology for this task depending on the application and

the process conditions. One option is provided by the automated filter solutions from the Autofilt series. These are self-cleaning systems which separate particles from untreated water. In the back-flushing filters RF3, robust slotted tube or wire mesh filter elements separate solids from the water. If these filter elements are contaminated, automatic cleaning is triggered – as soon as the differential pressure threshold is exceeded or after a preset time period has elapsed. The flow of filtrate is not interrupted by this.

The back-flushing filters therefore require little maintenance. Designed for retrofitting, they can be installed in new and existing systems. The Twistflow Strainer ATF is a hybrid system consisting of a centrifugal separator and inline filter. The system separates the dirt particles in two stages: while the centrifugal force separates coarse solids from the water, the integrated slotted-tube filter element acts as a guard filter, retaining finer, lighter particles to a defined filtration rating. When it comes to finest filtration, inline filters based on cartridge technology are available. One example of this is the process filter PLF1. Specially developed filter elements achieve high flow rates combined with a high contamination retention capacity. In contrast to conventional cartridge filters, the design of the housing prevents dirt from transferring to the clean side when the filter element is changed.

### Right where it counts

In industrial cleaning systems operators use ozone to kill microorganisms, such as bacteria, viruses and germs, from process water, by destroying their cell



Separating coarse particles by centrifugal force – the Autofilt Twistflow Strainer ATF makes it possible

walls. The ozone also removes any colour or odour from the water. Particle contamination can reduce the disinfectant effect of the ozone and lead to a reduction in product quality. The more suspended solids retained by the filter, the more effectively the ozone can kill germs and clean the water. The ozone saved in this way not only has a positive effect on operating costs, but also on the efficiency of the overall purification process.

UV water treatment units represent a further option. These systems use UV light to inactivate microorganisms by destroying their DNA structure, thus preventing reproduction. Particle contamination can adversely affect UV systems in two ways: on the one hand it leads to a reduction in UV penetration (transmission) of the water being disinfected. On the other hand, larger solids can shield the microorganisms that need to be inactivated by acting like a UV screen, producing a shadowing effect. Targeted pre-filtration increases the ability of UV systems to disinfect water and this can raise the efficiency of the entire purification process.

### Membrane protection

Microfiltration, ultrafiltration, nanofiltration and reverse osmosis are all examples of pressure-driven membrane processes used in water treatment. Here, the smallest particles from the water intake are retained and removed by a membrane. The operator can use these processes to remove bacteria, viruses, germs, colloids, and in the case

of reverse osmosis, also ions such as salt ions when treating seawater. Since all membrane systems become clogged over time due to fouling, the operator must regularly flush and clean them – which entails stopping filtration and adding chemicals. A high proportion of suspended solids in the inflowing water creates additional load for membrane systems, leading to more frequent cleaning cycles and increased energy and chemical consumption. Particle contamination can also damage the membrane filters, leading to potential contamination of the clean water side. By using solid particle filters before membrane systems, the frequency of cleaning cycles is reduced. The operator therefore saves on energy and chemicals. In addition to the positive effects with regard to operating costs, protecting the sensitive membrane filter from particle contamination maintains consistent process reliability and quality of the purified water.

The reasons for using filters during the pre-treatment phase of water purification are therefore not merely technical. Pre-filtration which is tailored to the process as a whole also helps increase the economic efficiency of the entire water purification operation.



You can find more information on filters at [www.chemietechnik.de/1406ct614](http://www.chemietechnik.de/1406ct614) – just scan the QR code!



The process inline filter PLF1 has high flow rates combined with a high contamination retention capacity

The Autofilt RF3 automatically separates particles without having to interrupt operation

Pictures: Hydac

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## HYDAC Filtration Solutions: From coarse to fine filtration, ensuring high performance in your process chain

### 1 Coarse filtration

**TwistFlow Strainer AutoFilt® ATF**  
Coarse separation by centrifugal force -  
with guaranteed filtration ratings

**Back-flushing Filter AutoFilt® RF3 / RF4 / RF5 / RF7**  
Automated coarse filtration  
using proven technology

**Process Screen Basket Filter PRFS**  
Strainer filter,  
easy to operate

### 2 Fine filtration

**Back-flushing Filter AutoFilt® RF3**  
For many years this has been  
the reliable solution in respect of  
automatic filters

**Back-flushing Filter AutoFilt® RF4**  
Tried-and-tested function principle,  
compact design

**Backflushing Filter AutoFilt® RF7**  
The automatic filtration solution  
for low installation height

### 3 Finest filtration

**Process Inline Filter PLF1**  
High contamination retention  
capacity with high flow rates

**Process MultiRheo Filter PMRF**  
Proven candle filter technology  
for finest filtration

