Picatech Huber AG

Maschinen für die Abwassertechnik im Kommunal- und Industriebereich

HUBER TECHNOLOGY
WASTE WATER Solutions

Quaternary Treatment: HUBER Solutions for the Removal of Micropollutants

- **Micropollutants – a challenge for society!**
- **The quaternary treatment stage on sewage treatment plants – end-of-pipe measure!**
- **Oxidation and adsorption as a solution to eliminate micropollutants!**
- **HUBER solutions guarantee the quality of surface waters and in the long term also that of drinking water!**

The increasing use of pharmaceuticals, industrial chemicals and hormones leads to ever increasing pollution loads in waters. As the substances are present in surface waters in concentrations of µg/l to ng/l, they are referred to as trace substances or micropollutants. Due to the research progress in improving methods of analysis substances of these concentrations can today be identified both quantitatively and qualitatively. To maintain the good chemical status of the surface waters in the future, these ecotoxicologically critical and persistent substances must be eliminated to the greatest possible extent from the point source wastewater.

Many different substances are introduced into a sewer system at many different points (so-called diffuse sources). The concentrations of these substances are gradually increasing on their way up to the inlet to the sewage treatment plant where the maximum concentration of micropollutants is reached. Therefore, adding a fourth treatment stage on the sewage treatment plant seems reasonable from both the technical and financial point of view.

One possible elimination method uses active carbon as powder or optionally as granulate. With both forms of the active carbon the substances to be eliminated from the wastewater are absorbed on the surface of the active carbon and thus reliably separated from the wastewater flow.

Through the combination of the **HUBER Active Carbon Filter CONTIFLOW® GAK** with for example an upstream oxidation stage (ozonisation or AOP) or a **HUBER Sandfilter** the elimination efficiency can be increased additionally.

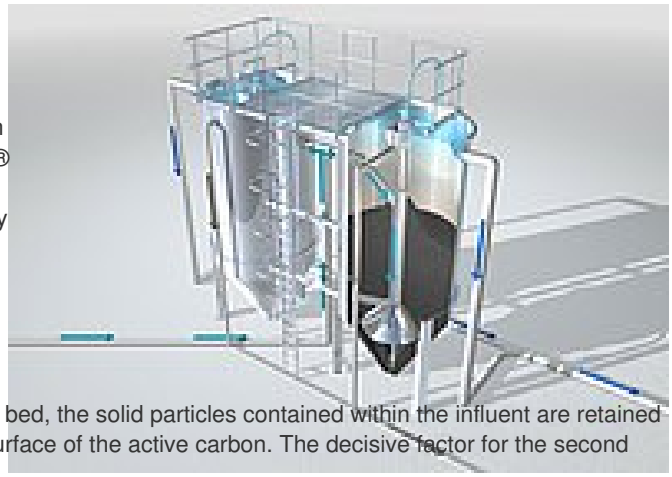
We differentiate the HUBER solutions by the type of wastewater / application:

- **Granulated active carbon filtration : HUBER Active Carbon Filter CONTIFLOW® GAK**
- **Ozonisation + Granulated active carbon filtration**
- **Sand filtration + Granulated active carbon filtration**

Active Carbon Filter

HUBER ACTIVE CARBON FILTER CONTIFLOW® GAK

The HUBER Active Carbon Filter CONTIFLOW® GAK removes micropollutants from the wastewater flow. The system uses granulated active carbon and is installed downstream of the secondary clarifier. An important advantage of the HUBER Active Carbon Filter CONTIFLOW® GAC is that it has no influence on existing process-engineering systems on the sewage treatment plant and can be optimised further by adding a sandfilter or an upstream ozonisation plant.



Functional principle of the HUBER Active Carbon Filter CONTIFLOW® GAK

The HUBER Active Carbon Filter CONTIFLOW® GAK is a deep-bed type upflow filter. The system is highly efficient as no shutdowns for backwash cycles are necessary for the active carbon washing process.

As the influent flows from the bottom upward through the active carbon bed, the solid particles contained within the influent are retained in the filter layer and micropollutants are adsorbed on the large inner surface of the active carbon. The decisive factor for the second process is the residence time of the inflow in the active carbon bed.

The clear filtrate exits over a weir at the top of the filter. The active carbon bed, along with the accumulated solids, is drawn downward to the trough bottom into the airlift pipe, which is located in the centre of the filter. The airlift transports the mix upwards to the active carbon washer. Inside the washer, the solids are separated from the active carbon with a small portion of the filtrate flow. The active carbon is free of solids but still contaminated with micropollutants when it falls through to the filter bed so that an internal active carbon cycle is created. As the filter operation continues more and more micropollutants are adsorbed on the inner surface of the carbon.

Ozonisation + GAC

OZONUNG MIT NACHGESCHALTETER BIOLOGISCHER FILTRATIONSSTUFE

When in contact with ozone [O_3] the micropollutants or comparable substances contained in the wastewater are frequently not completely mineralised to water and carbon dioxide. The attacked substances are only split into smaller transformation products which are indefinable beforehand. Like the micropollutants, also these products can have negative ecotoxicological effects on the receiving water course.

It is therefore essential to have a biological filtration stage after ozonisation (**HUBER Sandfilter CONTIFLOW®** / **HUBER Active Carbon Filter CONTIFLOW® GAK**). This is where HUBER comes into play.

It must be considered that ozone does not only attack micropollutants but also other organic compounds which are harmless and non-biodegradable. High concentrations of DOC and nitrite therefore result in an increased consumption of ozone as both react very quickly with ozone, or have a high ozone consumption respectively.

Sand Filter + GAC

SAND FILTRATION + ACTIVE CARBON FILTRATION WITH CONTIFLOW® GAK

The combination of the two deep bed filtration processes with sand and granulated active carbon represents another possibility to optimise the efficiency of micropollutant elimination.

In the sandfiltration stage, the particulate background load (AFS) is retained. The following granulate active carbon (second stage) is able to adsorb micropollutants efficiently and specifically while the frequency of backwashing is reduced.

Case Studies

- Research project: removal of micropollutants with the use of ozone and granulated active carbon
- Removal of micropollutants: Fourth treatment stage with the HUBER Sandfilter CONTIFLOW®

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