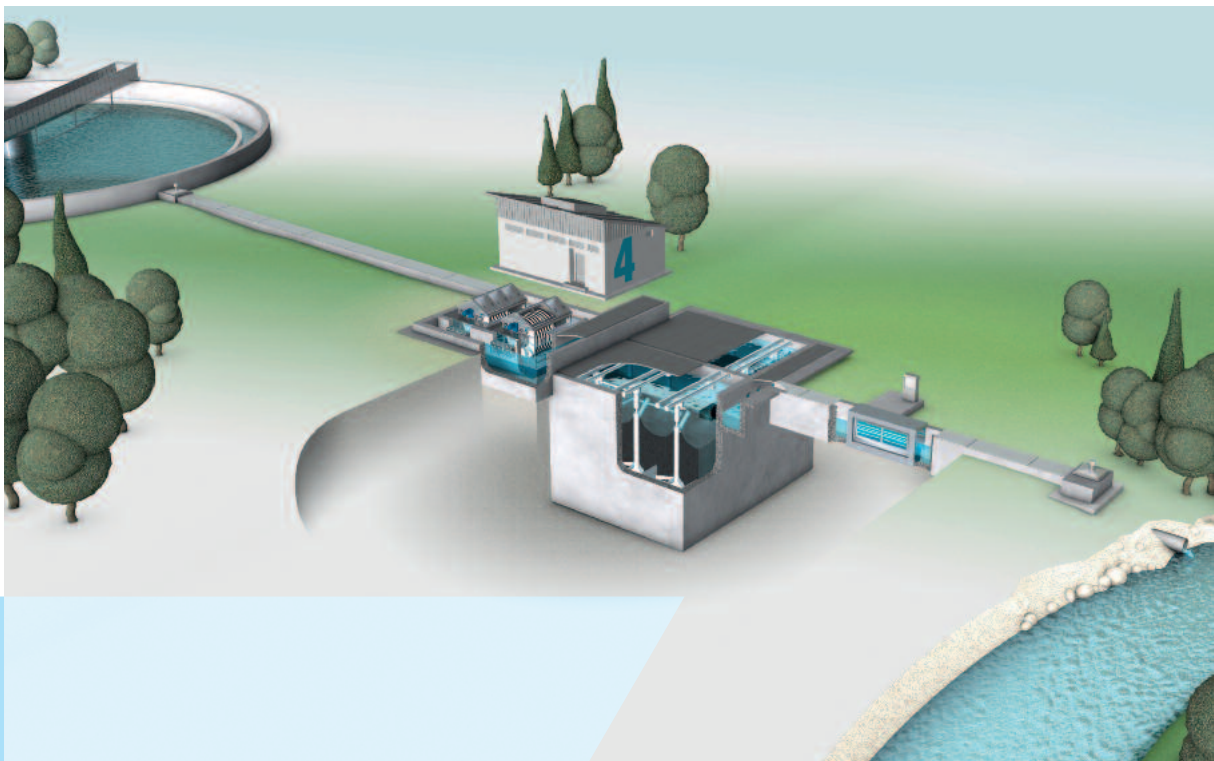


# Solutions for the fourth stage of wastewater treatment



- Reliable machine technology for preliminary treatment
- Reliable separation of powdered activated carbon (polishing filter)
- Simple elimination of trace substances with granulated activated carbon

## ►► The challenge

The demands on the effluent quality of municipal and industrial sewage plants are becoming increasingly challenging and complex, particularly with regard to dissolved organic substances.

Especially municipal sewage plant effluents are among the most critical paths of entry for micropollutants into surface waters. Many of these so-called trace substances are hazardous to the environment and health, are not readily biodegradable and can accumulate in the environment.

The objective of the fourth treatment stage is to reliably and efficiently remove these dissolved organic substances from the wastewater treatment plant effluent.

HUBER offers versatile key modules for this process. Depending on individual requirements and boundary conditions, ideally matched product solutions for pretreatment, adsorption or PAC removal can be provided.

Optionally, further treatment stages such as ozonation, phosphate precipitation (3rd treatment stage) or UV disinfection (5th treatment stage) can be easily and modularly integrated into the respective solution concept, especially if simultaneous elimination of microplastics, phosphorus, trace substances and dangerous pathogens is desired.

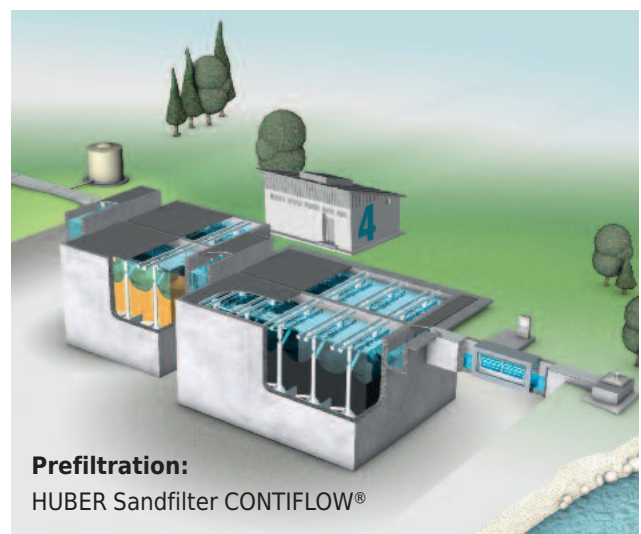
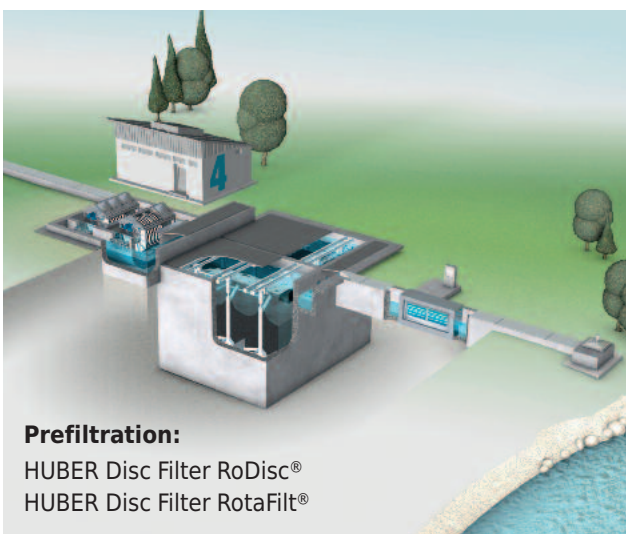
## ►► Primary treatment

Floating matter, impurities and periodic sludge drift can considerably impair the operation of a fourth treatment stage and significantly increase repair and maintenance costs.

The primary goal of upstream filtration or screening is therefore to ensure stable, low-maintenance and trouble-free plant operation on a permanent and reliable basis.

## ►► All advantages at a glance

- Solids reduction (filterable solids < 5 mg/l)
- Phosphorus elimination ( $P_{\text{total}} < 0.5 \text{ mg/l}$ )
- Extensive removal of microplastics
- Stable and trouble-free operation of the fourth treatment stage

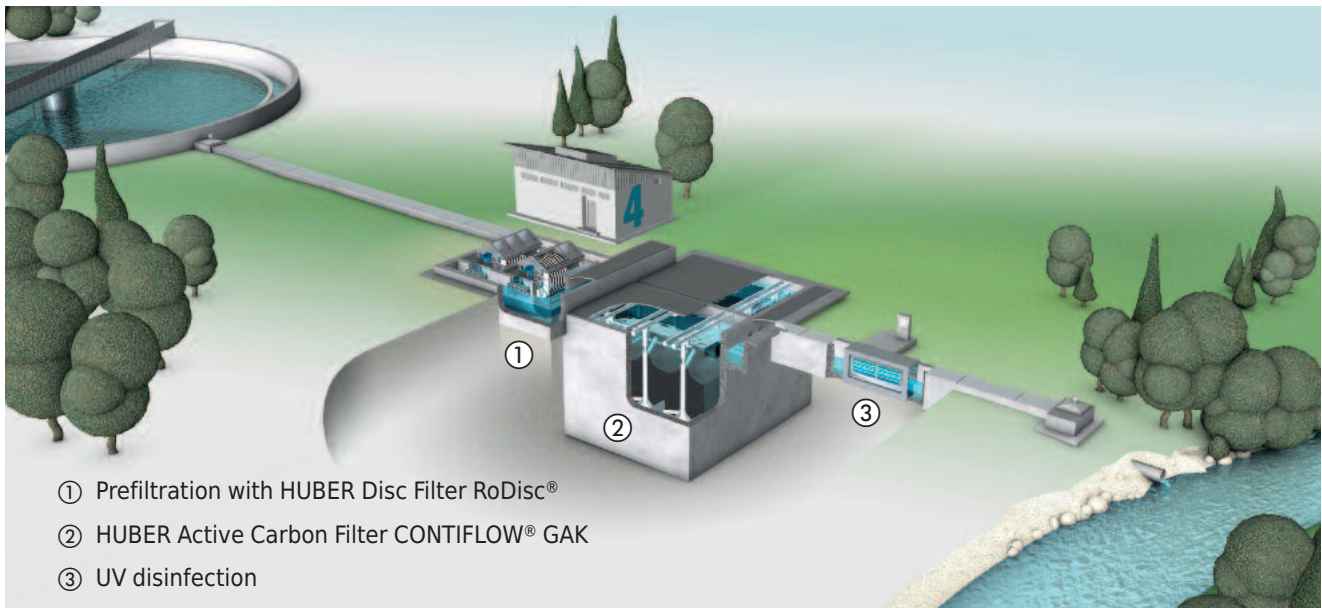


## ➤➤ Adsorption process with granulated activated carbon (GAC)

Adsorption with granulated activated carbon (GAC) is a simple, reliable and, above all, low-maintenance process. Therefore, it is ideally suited as a fourth treatment step for smaller wastewater treatment plants.

The core component is the HUBER Active Carbon Filter CONTIFLOW® GAK, ideally in combination with a HUBER Disc Filter RoDisc® as upstream treatment stage.

Depending on requirements and boundary conditions, the process can be extended by an intermediate ozonation stage. This significantly increases the broadband effect and additionally extends the service life of the activated carbon.



*Combination of disc filtration with activated carbon filtration (GAK) and downstream UV disinfection (5th treatment stage)*

## ➤➤ All advantages at a glance

- Simple, low-maintenance plant operation
- Ideal for smaller wastewater treatment plants (< 50,000 p.e.)
- No complex carbon dosing technology as with PAC processes
- No dirt and dust loads as with PAC processes
- No precautions for explosion protection as with PAC processes
- No secondary filtration required as with PAC processes
- Activated carbon can be regenerated and largely reused

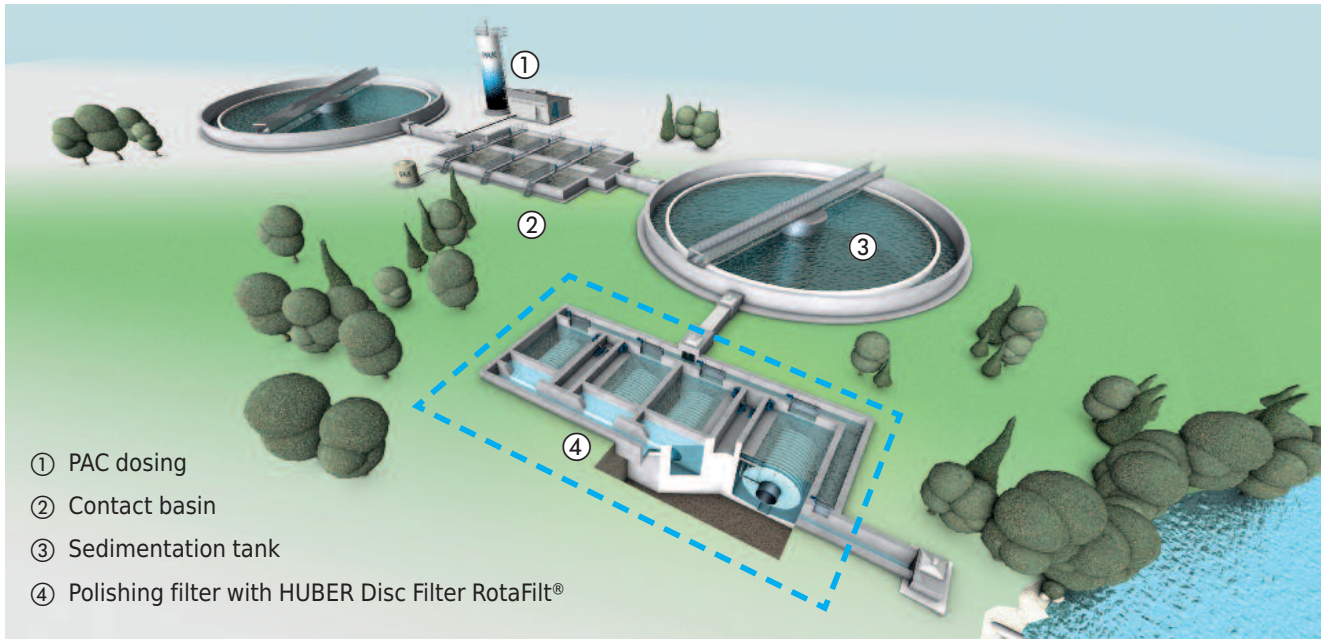


*HUBER Active Carbon Filter CONTIFLOW® GAK as 4th treatment stage on STP Fridingen*

## ➤➤ Adsorption process with powdered activated carbon (PAC)

The adsorption process with powdered activated carbon (PAC) consists of a PAC dosing unit, a contact basin with precipitation and flocculation, and a sedimentation basin. The final stage of the process is a special polishing filter.

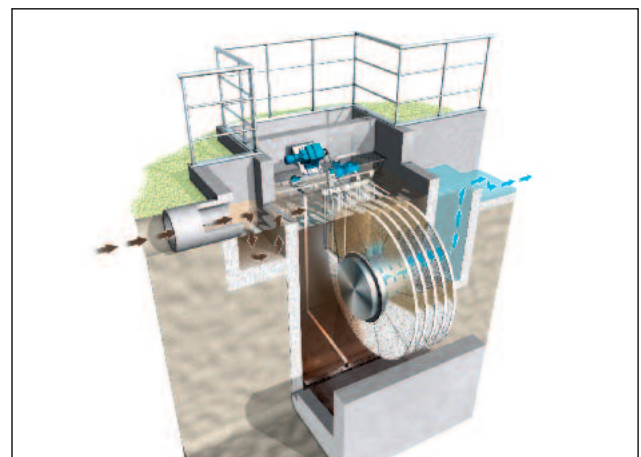
The HUBER Disc Filter RotaFilt® is an ideal product solution for this purpose. It reliably retains even the finest carbon slip that could not be separated in the sedimentation tank.



Fourth treatment stage: Typical process with HUBER Disc Filter RotaFilt® as downstream polishing filter

## ➤➤ All advantages at a glance

- Very reliable, operationally safe process
- Economically interesting especially for large wastewater treatment plants (> 100,000 p.e.)
- PAC dosage can be adjusted to the load
- Exploitation of synergy effects: more effective sludge dewatering and parallel P elimination through addition of precipitant



HUBER Disc Filter RotaFilt®

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Fourth Wastewater Treatment Stage