

## Solutions for advanced wastewater treatment

- ▶ Proven filter technologies for phosphorus elimination
- ▶ Reliable separation of powdered activated carbon (polishing filter)
- ▶ Simple elimination of trace substances with granulated activated carbon

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## The challenge

With the new EU municipal wastewater directive, the discharge criteria for many municipal wastewater treatment plants are becoming significantly more demanding. The focus here is on the extensive elimination of dissolved organic trace elements ("fourth purification stage") and the increased reduction of phosphorus ingress into the water.

Tried-and-tested as well as innovative solids, phosphorus and trace element elimination processes are used for this purpose, which take all local conditions into account and ideally enable additional synergy effects.

HUBER offers versatile and reliable product solutions for these individual applications with its coordinated product portfolio consisting of fine screening, cloth filtration, sand filtration and activated carbon adsorption.



*HUBER Pile Cloth Media Filter RotaFilt®, Ozonation and HUBER Active Carbon Filter CONTIFLOW® GAK.*

## Filter technologies and their synergy effects

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 is therefore to ensure stable, low-maintenance and trouble-free plant operation on a permanent and reliable basis.

At the same time, the use of a filter stage results in numerous other synergy effects for the operator.

### All synergy effects at a glance:

- ▶ Retention of suspended solids (filterable solids < 5 mg/l)
- ▶ Phosphorus elimination ( $P_{\text{tot}} < 0.2 \text{ mg/l}$ )
- ▶ Extensive removal of microplastics
- ▶ Stable and trouble-free operation of the fourth treatment stage
- ▶ Reduction of ozone consumption in ozone layers



**Pre-filtration:** HUBER Pile Cloth Media Filter RotaFilt®.



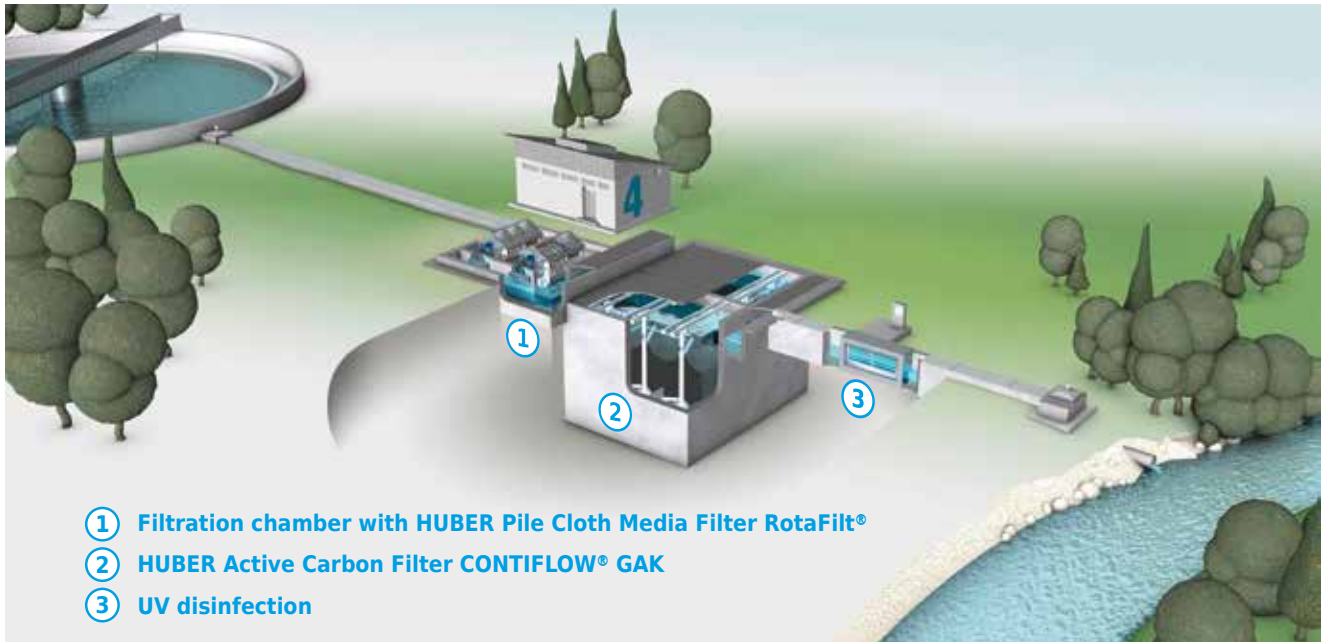
**Pre-filtration:** HUBER Sandfilter CONTIFLOW®.

## 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 Pile Cloth Media Filter RotaFilt® 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 cloth filtration with activated carbon filtration (GAK) and downstream UV disinfection (5th treatment stage).

## All advantages at a glance

- ▶ Simple, low-maintenance plant operation
- ▶ Advantages over PAC procedures:
  - ▶ No complex carbon dosing technology required
  - ▶ No occurrence of dirt and dust loads
  - ▶ No precautions for explosion protection required
  - ▶ No post-filtration required
  - ▶ Activated carbon can be regenerated and largely reused



Concrete basin variant of the HUBER Active Carbon Filter CONTIFLOW® GAK.



Tank version of the HUBER Active Carbon Filter CONTIFLOW® GAK.

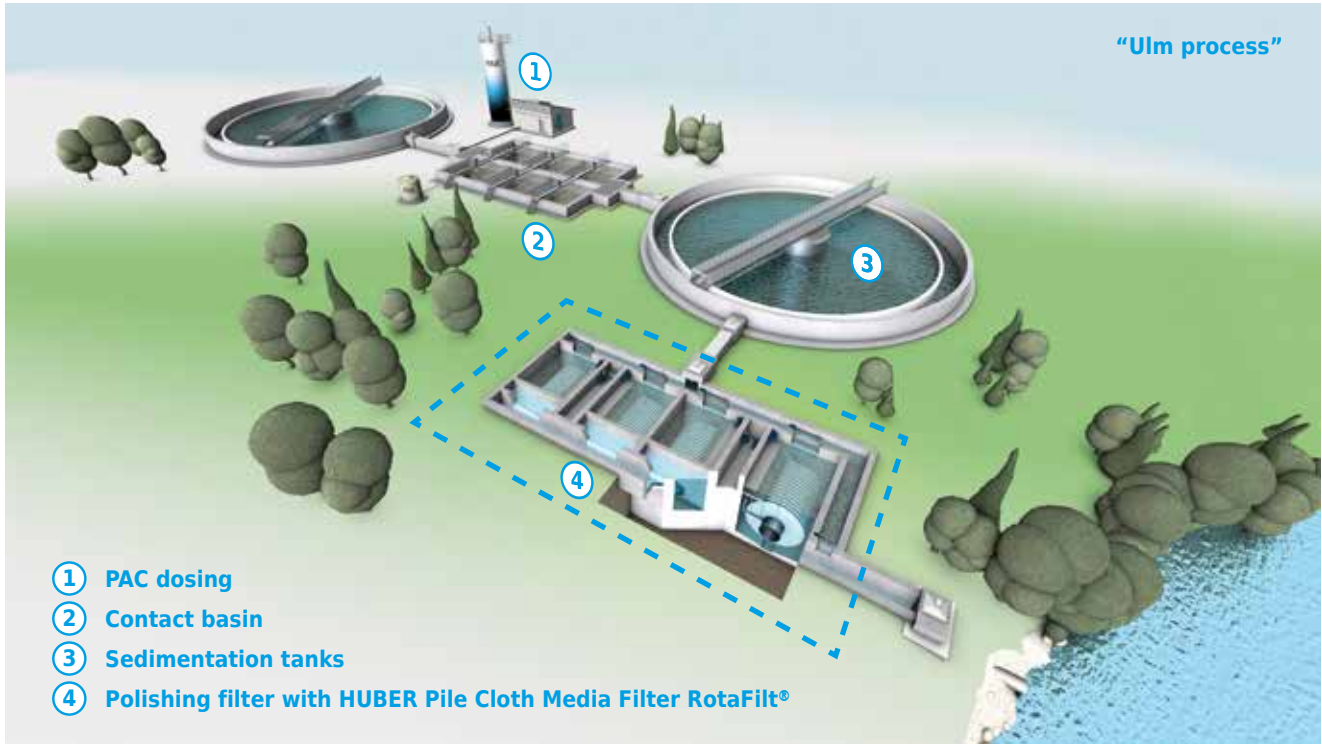
## Adsorption process with powdered activated carbon (PAC)

There are various methods for removing trace elements using powdered activated carbon (PAC). In direct filtration, the powdered activated carbon is added to a contact basin directly in front of a pile cloth media or sand filter.

In the "Ulm process", an additional sedimentation tank is connected upstream of the filter stage.

If final filtration is planned after secondary clarification, the PAC can also be added directly to the biological stage.

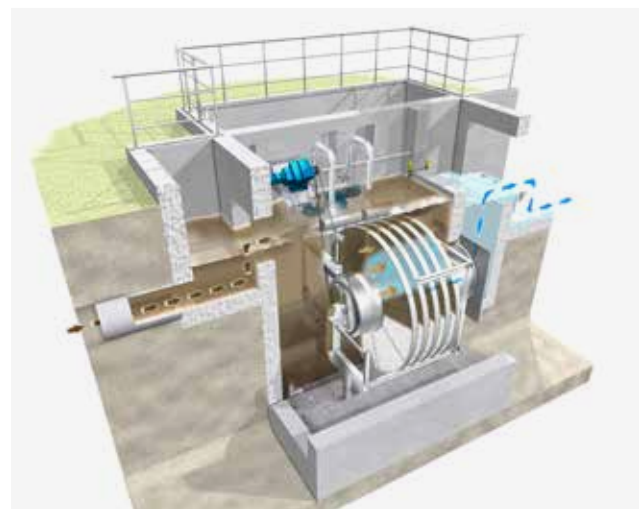
The HUBER Pile Cloth Media Filter RotaFilt® is an ideal product solution for all three variants, which reliably retains even the finest carbon sludge.



PAC process ("Ulm process") with downstream HUBER Pile Cloth Media Filter RotaFilt® as 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
- ▶ Synergy effect: additional P elimination without increasing the total precipitant requirement



HUBER Pile Cloth Media Filter RotaFilt®.

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Solutions for advanced wastewater treatment  
Subject to technical modification | 0.1 / 3 – 02.2024 – 3.2020