

Removal of micropollutants in the Stockacher Aach wastewater treatment plant

Motive and objective

Since September 2011, the Abwasserverband Stockacher Aach (Stockacher Aach Wastewater Association) has been operating an additional treatment stage in the wastewater treatment plant, which discharges its treated wastewater into Lake Constance via the Stockacher Aach river, in order to eliminate micropollutants. The decision to construct this type of system was made on a voluntary basis for reasons of preventive water pollution protection, especially in view of the importance of Lake Constance for drinking water supply.



Process technology used

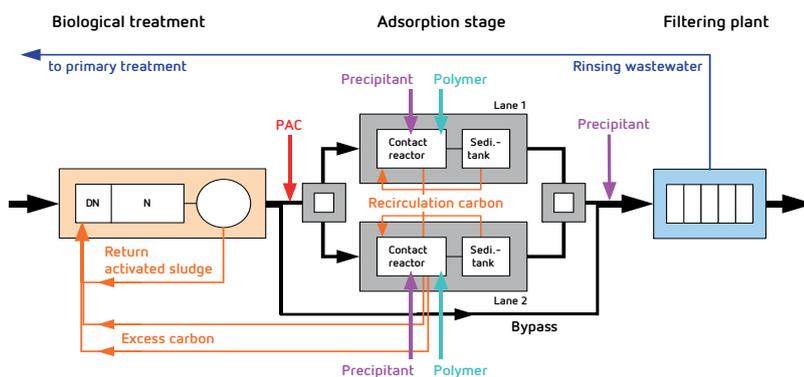


Figure 1: Integration of the adsorption stage into the current process

The Stockacher Aach wastewater treatment plant uses powder activated carbon (PAC) to eliminate micropollutants.

Specifications of the wastewater treatment plant

Treatment capacity and load

Treatment capacity	43.000 PE
Load*	56.300 PE

Inflow volumes

Max. in rainy weather	450 L/s
Biologically treated wastewater volume p.a.	5,7 Mio. m ³

Former process technology

Mechanical treatment	Coarse rack, grit chamber, grease trap, screen, primary sedimentation tank
Biological treatment	One-stage aeration plant
Filtration plant	Two-layer filter (0.60 m quartz sand, 0.80 m anthracite)

* Mean value of 2010 to 2012; determined on the basis of the mean COD value measured in the inlet and the annual wastewater volume.

Process technology used

Essentially, adsorptive treatment of the wastewater succeeds biological treatment and precedes the existing filtration process in a two-lane adsorption stage. Each lane consists of a contact reactor, which is designed as a two-stage cascade, and a downstream sedimentation tank (➔ Figure 1).

Since limited space conditions required the implementation of a space-saving concept, the Stockacher Aach wastewater treatment plant does not use the classic solution of a sedimentation tank to separate the carbon sludge; it uses lamella separators instead (➔ Figure 2). In order to further utilise the adsorbent, the partially loaded PAC is returned into the denitrification zone of the aeration tank as excess carbon.

Since the adsorption stage is designed as a partial flow treatment, it can be loaded with a maximum wastewater volume of 250 L/s. However, this dimensioning, which is able to process approximately 55 per cent of the maximum inflow of combined wastewater, allows for the additional treatment of approximately 90 per cent of the total annual wastewater volume in the adsorption stage.

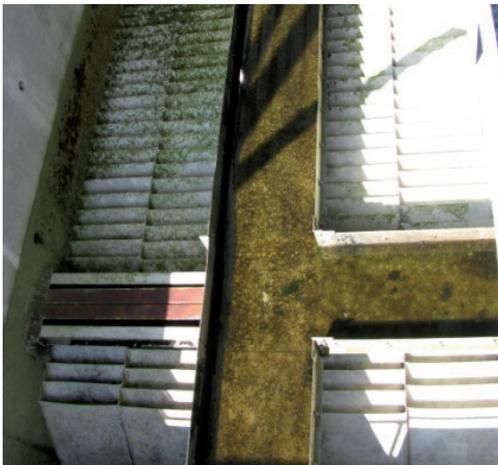


Figure 2 Lamella separator in the sedimentation tank

Operator contact

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Dimensioning of the adsorption stage

Maximum treatable volumetric flow rate	$Q_{\text{max, ads.}} = 250 \text{ L/s}$
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Contact reactor

Number of tanks	2 x 2
Volume per tank	$V_{\text{tank}} = 213 \text{ m}^3$
Total volume	$V_{\text{CR}} = 2 \times 426 \text{ m}^3$
Minimum retention time for dimensioning inflow	$t_{\text{R, CR}} = 57 \text{ min}$

Sedimentation tank

Volume	$V_{\text{Sedi.}} = 2 \times 462 \text{ m}^3$
Actual surface area	$A_{\text{Sedi.}} = 2 \times 102 \text{ m}^2$
Effective surface area	$A_{\text{effective, L}} = 2 \times 552 \text{ m}^2$
Minimum retention time for dimensioning inflow	$t_{\text{R, Sedi.}} = 1,0 \text{ h}$
Maximum surface load for dimensioning inflow	$q_{\text{R, Sedi., L}} = 0,82 \text{ m/h}$

References

Röfle, R.; Weißert, R. (2013): Efficiency and costs of the removal of micropollutants using PAC). Presentation held at the DWA -Landesverbandstagung Baden-Württemberg in Friedrichshafen on 18 October 2013. Published in the conference proceedings.

Rößler, A.; Metzger, S. (2013): Priming operation of the adsorptive wastewater treatment stage in the Stockacher Aach wastewater treatment plant – Recording of the current status and development of an optimisation concept) (unpublished).