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Removal of micropollutants in the Kressbronn-Langenargen wastewater treatment plant

Motive and objective

Since July 2011, the Zweckverband Abwasserreinigung Kress-Langenargen (Kress-Langenargen Wastewater Treatment Association) has been operating an additional treatment stage to eliminate micropollutants in the wastewater treatment plant, which directly discharges treated wastewater into Lake Constance. 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

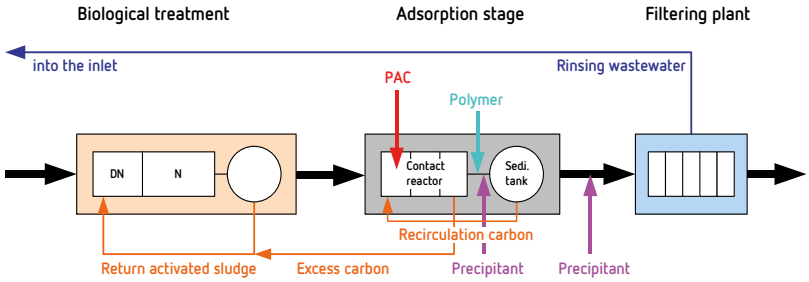

Figure 1: Integration of the adsorption stage into the current process

In the Kressbronn-Langenargen wastewater treatment plant, powder activated carbon (PAC) is used to eliminate micropollutants.

Specifications of the wastewater treatment plant

Treatment capacity and load

Treatment capacity	24,000 PE
Load*	25,600 PE

Inflow volumes

Max. in rainy weather	252 L/s
Biologically treated wastewater volume p.a.	2.3 Mio. m³

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 (0.65 m quartz sand, 0.65 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 the biological treatment and precedes the existing filtration process in a one-lane adsorption stage consisting of a contact reactor that is designed as a three-stage cascade and a circular sedimentation tank (➔ Figure 1). In order to further utilise the adsorbent, the partially loaded PAC is returned to the biological treatment stage as excess carbon.

The plant has been constructed for treatment of the total flow rate. The maximum wastewater volume that can be treated in the adsorption stage amounts to 265 L/s including the rinsing wastewater returned to the inlet of the wastewater treatment plant.

Operator contact

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Dimensioning of the adsorption stage

Maximum treatable volumetric flow rate	$Q_{max, ads.}$ = 265 L/s

Contact reactor

Number of tanks	3
Volume per tank	V_{tank} = 184 m³
Total volume	V_{CR} = 552 m³
Minimum retention time for dimensioning inflow	$t_{R, CR}$ = 35 min

Sedimentation tank

Volume	$V_{Sedi.}$ = 2,540 m³
Surface area	$A_{Sedi.}$ = 615 m²
Minimum retention time for dimensioning inflow	$t_{R, Sedi.}$ = 2.6 h
Maximum surface load for dimensioning inflow	$q_{R, Sedi.}$ = 1.6 m/h

References

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