

## **Planning reliability and energy efficiency for the evaluation of type and arrangement of diffusers by means of CFD**

When renewing the aeration system of an activated sludge tank it is not only of interest to define the type of the diffusers, but it is essential to find the best operational implementation for the tank as well regarding a high performance in combination with an efficient use of energy.

The tank configuration and diffuser type which are most suitable for the application can be evaluated by CFD-simulations.

CFD-simulations cannot only provide information about the flow conditions within the tank and e. g. to evaluate interactions between diffusers and flow agitators, but they offer the possibility to investigate the arrangement of the diffusers and their oxygen input, as well. By this the best arrangement with a maximal oxygen input and the lowest effort can be found.

This possibility is relevant especially in the context of announcements when different diffuser types will be offered.

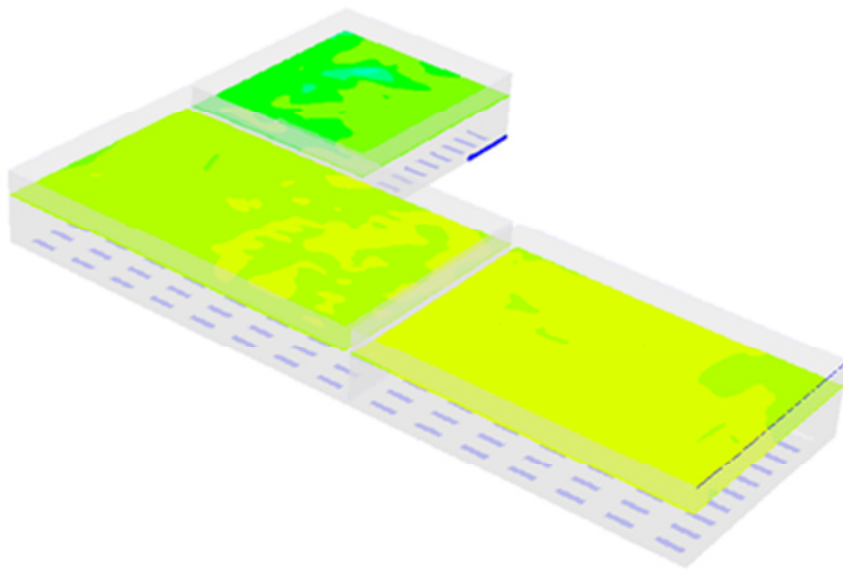
The best diffuser arrangement for the tank of interest can be selected by computing the oxygen input for the relevant provided diffuser configurations and their comparison.

Within a study for the evaluation of the oxygen input in pure water carried out by the FlowConcept GmbH, it was found that the chosen diffuser arrangement results in a homogeneous oxygen distribution.

The following figure illustrates the investigated activated sludge tank with the computed oxygen concentration in mean water depth.

A comparatively homogeneously distributed oxygen concentration can be observed within the three cascades during the observed time. A small gradient is visible along the flow path.

The concentration within the cascade above is slightly lower due to the inflow of unaerated water. Along the flow path the concentration increases up to the third cascade.



*Distribution of oxygen.*

With a manageable effort of costs for the CFD-studies the best arrangement for the investigated tank could be reached.

You are welcome to contact us for more details.

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