

## Energy efficient mixing in anaerobic and anoxic tanks

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### Abstract

In wastewater treatment more than 70% of the energy consumed is used for mixing and aeration processes. Especially in full nutrient removal plants in which anaerobic and anoxic processes are used to remove not only TOC but also Nitrogen the unit process of suspension and homogenization of activated sludge floc is a very important one beside the aeration process. The mixers installed in anaerobic and anoxic basins are in operation 24/7 and therefore a sound analysis of the mixing task and the required energy for mixing is essential to save energy in wastewater treatment.

The paper at hand defines the mixing task and derives an approach for the calculation of the required mixing energy in anaerobic and anoxic basins. It is shown how this approach can be used to layout and design mixers in a simple way.

For the validation of mixer designs in the field the measurement of sludge concentrations in different locations is proposed. This method is simple, easy to use and verifies safely whether the mixers are performing to the client's needs or not. In the past the specification of minimum bottom velocities often has led to high energy mixer designs in wastewater treatment plants.

The results of two measurement campaigns on wastewater treatment plants at the East coast are presented and discussed.

The following Figure 1 shows a representation of sludge concentration measurements in anaerobic and anoxic basins on a treatment plant in Berlin.

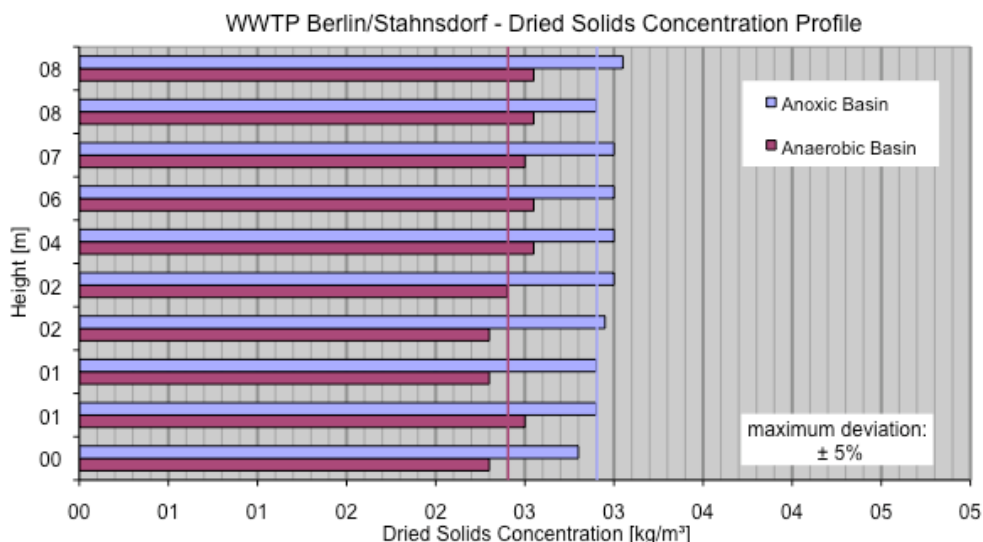


Fig. 1. Results of sludge concentration measurements