

About the suspension of plastic media in activated sludge tanks

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Abstract

In wastewater treatment so called moving bed bioreactor processes have become more and more accepted over the past years. These processes rely on plastic carriers, which are put into the activated sludge basins to allow the biologically active sludge to attach and grow onto them. This results in a higher sludge concentration in the activated sludge tanks and therefore a higher purification capacity can be achieved.

There are various types of media available on the market from different manufacturers, which vary in shape and material. The density is normally slightly lighter than water so that the carriers will float in normal conditions. Typical volume concentrations of carriers are 40 to 60 %.

The mixing task can be defined as the suspension and homogenization of floating particles in activated sludge. At the moment the most common approach to fulfill this mixing task in the field is to put a series of submersed mixers in the activated sludge tank and to introduce high energy densities. This is a very cost and maintenance intensive approach which also is difficult to layout and design especially because the positioning of the mixers is a challenging task. The paper at hand will present an alternative solution to the common approach, which firstly reduces the number of individual mixers required in such processes and secondly relies on a sound design basis.

The following paper will begin with a detailed analysis and definition of the mixing task and present the results of extensive pilot-scale experiments with different media. Then a simple scale up approach based on an equilibrium approach will be derived and validated with results from large-scale measurements in a real wastewater treatment plant.

The following Figure 1 shows a photo of the lab scale experiments with plastic carriers.



Fig. 1.: Side view of suspension experiment with plastic carriers

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Would prefer oral presentation

Do you anticipate submitting a full paper to the special Mixing issue of the Canadian Journal of Chemical Engineering? Yes