

Energy Efficient Impeller Design for Anoxic Mixing Services

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Abstract

Mixing of anoxic basins in Waste Water Treatment Plants require both a relatively uniform suspension of solids and good blending without disturbing the liquid surface. In order to decompose nitrogen compounds, bacteria must be starved of dissolved oxygen which forces the bacteria to consume the chemically bound oxygen within the nutrients. Hydrofoil impellers are typically used for such service. Since energy costs have increased recently, and will increase further in the near future, impeller efficiency is a key issue. A large waste water plant may have between 30-80 anoxic mixers which will consume a significant amount of energy. This presentation discusses an impeller design that is fabricated using composite plastic materials. The choice of composite plastic materials allows one to have 100% control over the blade geometry, unlike typical industrial hydrofoil impellers, which are made by forming flat steel plate. The composite plastic impeller geometry utilizes novel circular rake technology for improved pumping efficiency. Blades are also hyper-skewed in order to avoid the collection of rags. The impeller performance is reviewed and compared to different impeller technologies used for anoxic mixing in terms of blending and solids suspension.