

Endurance Test of Vacuum Bubble[®] Technology (VBT[™]) Aerator - A Case Study

Introduction

Vacuum Bubble[®] Technology (VBT[™]) creates micro bubbles of air that are neutrally buoyant. The bubbles are created under a partial vacuum and, as a result, the internal pressure of the bubbles is lower than that of the surrounding water. Consequently, the bubbles collapse to an average dimension of 0.25 mm in diameter. Because of their small size and neutral buoyancy, the bubbles remain in the water for many minutes. These micro bubbles increase the oxygen transfer potential in the water which, in turn, enables aerobic bacteria to consume the organic waste in the water.

The Problem

A chicken processing plant in the North Eastern US had become concerned about the surface aerators in use at its facility. These were 75Hp units and their effectiveness per Hp was in question. The possibility of using Vacuum Bubble[®] Technology (VBT[™]) aerators was presented to the company. This was met with a degree of cynicism since the VBT[™] unit proposed, the Model 600 Series aerator, had only a 3Hp motor. An additional concern was focused on the VBT[™]'s air plate which has a large number of small holes in it. In the context of wastewater treatment at this facility, the risk of clogging of these holes was thought to be high. It was clear that if this should occur, the aerator would lose its effectiveness.

The Test

It was decided to test the technology to determine its ability to operate in this somewhat hostile environment. In other words, the first test was to be an endurance test of the technology. One Model 600 Series aerator with a 3Hp motor was installed in the oxidation ditch at the chicken

processing plant. The oxidation ditch has a capacity of 5.0 million gallons of wastewater containing organic waste material from the chicken processing plant. The retention time in the Ditch is approximately 5 days and the inflow into the tank is 1.0 million gallons per day (gpd).



Measures of BOD₅ and TSS were taken before installation of the aerator, and during operation at regular intervals. As indicated above, the purpose of the study was not to determine the effectiveness of the aerator in treating the wastewater, therefore this data was supplemental to the endurance test. Measurements indicated no change in treatment as a result of the VBT™ addition. To adequately stress the VBT™ and provide the most severe environment for the endurance test, the VBT™ ran continuously without any maintenance or operator intervention. The holes in the air plate (critical to the unit's operation) have remained clear of obstruction throughout the test period. Testing began on May 9, 2007 and ended on November 11, 2008. The VBT™ was subjected to all weather conditions during this test period. The unit has not required maintenance – it has run trouble free throughout the 18 months.



VBT™ and Surface Aerator in Oxidation ditch



VBT™ on Float
in
Oxidation Ditch