

Abstract

For years the waste water aerated lagoon system has provided secondary treatment performance to many small to medium sized communities. The attributes of this process have been attractive as cost effective option for the treatment of municipal wastewater. The aeration segment is the most critical component and is the core of the biological treatment process. A lagoon system's ability to aerate the incoming sewage has a direct impact on the level of wastewater treatment it achieves.

An ample oxygen supply in a wastewater treatment pond is the key to rapid and effective wastewater treatment. Oxygen is needed by the bacteria to allow their respiration reactions to proceed rapidly. The oxygen is combined by the bacteria with carbon to form carbon dioxide. Without sufficient oxygen being present, bacteria are not able to quickly biodegrade the incoming organic matter. In the absence of Dissolved oxygen, biodegradation must occur under septic conditions that are slow, odorous and yield incomplete conversion of pollutants. Under septic conditions, some of the carbon will be reacting with hydrogen and sulfur to form sulfuric acid and methane. Other carbon will be converted to organic acid that create low pH conditions in the pond and make the water more difficult to treat. For example treated ponds deigned to biodegrade wastewater pollutant without oxygen often must hold the incoming sewage for six months or longer to achieve acceptable levels of pollutant removal. This is because of the biodegradation of organic matter in the absence of oxygen is a very slow kinetic process.

Adequate aeration is also an important element in keeping the lagoon content mixed and in suspension. Even in a partially mixed hydraulic regime, mixing is very important to the overall process. With the adequate mixing, incoming pollutants and wastewater are better distributed throughout the entire lagoon volume. This results in more uniform and efficient treatment. In addition, solids that settle can be re-suspended by the aerator's mixing action and brought back into contact with the microbial population floating throughout the pond. Conventional aerators such as diffused and mechanical aerators consume more power for keeping all the biomass in suspension and for maintaining complete mixing conditions.

Key Words : Aeration, Aerators, Biological Water treatment, Venturi aeration