

# Using Bubbles To Reduce Toil And Trouble

As seen on  WATER ONLINE

Wastewater management operations often grapple with major challenges such as inefficient sludge activation in lagoons and troublesome grease buildup in wet wells. These problems can result in increased maintenance costs and compliance violations. Traditional systems frequently fail to resolve the problem or require significant amounts of energy and/or chemicals. Reliant Water Technologies has responded to these needs with innovative products that leverage natural fluid dynamics, biology, and aeration principles to reduce labor and energy consumption — the Lagoon Master Aerator and the Wet Well Wizard. These solutions offer advanced-yet-simple approaches to overcoming common water treatment challenges.

## Working With The Water

The [Lagoon Master Aerator](#) was designed to address inefficiencies in sludge activation within lagoons and ponds. Traditionally, many aeration systems struggled to manage large sludge

blankets effectively. Lifting and activating the sludge over a wide area is not easy and hardly energy efficient. Lagoon Master Aerator tackles this through innovative water movement and aeration techniques.

By leveraging the principle of slow-moving water to roll and mix sludge at the lagoon's bottom, this aerator can deliver more than 15 lbs. of dissolved oxygen per hour, equivalent to 3.87 pounds per horsepower hour, while consuming only 4 hp (equivalent to 3 kW) of power. This efficiency is achieved through a carefully engineered mechanism that utilizes the weight of water and the precise control of air and bubble dynamics.

A 2-hp regenerative blower injects air into the water, creating coarse bubbles. These bubbles are then deflected by an inclined baffle, causing the water to move forward in a controlled manner, approximately 25' from the aerator. A secondary 2-hp blower feeds air through eight fine bubble diffusers, which produce 0.8-mm bubbles.

These remain submerged for 25' to 35', ensuring continuous infusion of dissolved oxygen into the water. As the water falls through the fine bubble curtain, it mixes with the sludge at the lagoon bottom, aiding in its fluidization and activating the sludge blanket.

The continuous agitation and aeration help the sludge become more digestible, enabling bacteria to break down organic waste and gases trapped in the sludge. The Lagoon Master Aerator also creates a vertical flow of water that de-stratifies the lagoon, ensuring consistent oxygenation and temperature throughout the water column. This vertical mixing helps to remove surface algae and odors, further improving water quality.

Altogether, the Lagoon Master has the potential to reduce energy costs by up to 90%, as well as cut maintenance costs by 80% to 90%, all while avoiding the need for sludge dredging for decades. Its success worldwide has demonstrated its

effectiveness in enhancing lagoon water quality and reducing operational costs for small towns and industrial plants.

### **Aerobic Workout For Wells**

The [Wet Well Wizard](#) addresses a different but equally challenging problem: grease and odor in collection system wet wells. The industry needed a solution to fats, oils, and grease (FOG) buildup that was easy to implement and maintain.

The Wet Well Wizard works on the principle of vaporous cavitation, in which pressure changes lead to the formation of gas bubbles, similar to when water begins to boil. The device features a patent-pending system that generates high-intensity bubble action through an 18"-by-3" tube. The system produces elliptical bubbles at high velocity which explode upon

contact with the water, breaking down and emulsifying grease. This aggressive bubbling action begins to disintegrate the grease cap, often removing around 95% within the first 24 hours of operation.

Once operational, the continuous bubbling action leads to sustained oxygenation. The resulting high level of dissolved oxygen promotes the growth of aerobic microorganisms in the water. These microbes continue to digest FOG and other organic matter not just in the well but downstream as well, leading to clearer water and less odor, which in turn fosters a thriving population of aerobic microorganisms that cleans interconnected pipes, air relief valves, and downstream lift stations. In addition, the improvement in water quality ultimately reduces maintenance needs and enhances

the efficiency of wastewater treatment processes.

Both the Lagoon Master Aerator and the Wet Well Wizard exemplify Reliant Water Technologies' expertise in aeration and fluid dynamics. The Lagoon Master Aerator's ability to leverage slow-moving water and fine bubble diffusion for comprehensive sludge activation and uniform oxygenation represents a significant advancement in lagoon management. Similarly, the Wet Well Wizard's aggressive bubble action and promotion of aerobic conditions offer a powerful solution for managing grease and odors in wet wells. Together, these technologies not only address complex water treatment challenges but also offer cost-effective and efficient solutions for improving wastewater management. ■