

Draft Standard Operation Procedures and Preventative Maintenance for Aerators and Mixers in Lagoons

Aerators in lagoons may be one or several types. Floating aerators or submerged aerator, similar to those found in a mechanical plant.

Floating Aerators

These are aerators that are on a raft and they are anchored to the shore with guy lines. The lines allow the operators limited movement of the aerators and the ability to move the aerator to the shore for maintenance. There are several kinds of floating aerators.

Turbine

Turbine units consist of pontoons, motor, drive shaft/airshaft, and turbine. You need to check the pontoons visually during each visit to the system to make sure they are not taking on water. Check the turbine to make sure there is an output from the unit. The motors need to be checked yearly and the drive/air shaft must not be plugged. The system should have at a minimum a spare pontoon, and one complete aeration unit on the shelf. Motors may be changed if necessary, and the drive/air shaft – turbine may be replaced as needed. The guy wires should be tight to allow the aeration unit to maintain its position in the lagoon cell. These units may reduce short circuiting if placed statistically in the cell. The electrical panel should be weatherproof and allow starting and stopping the unit in the field. The electrical panel should also have the ability to lock out the unit to adhere to the lock-out Tag-out program.

Submerged Aerators

This type of aerator usually sits off the bottom of the lagoon 18 to 24 inches to keep it out of the space reserved for sludge buildup. There can be several different types of submerged aerators. The system consists of blowers, headers, and aerators. The aerators are all attached to a header system which transfers air from the blower to the individual aerators. Each header that feeds a line of aerators should have a valve which needs to be exercised monthly or as specified by the manufacturer. This valve is used to adjust the flow to the aerators in that line either up or down to maintain the correct DO in the lagoon.

Maintenance needed to be completed on the system includes:

Blowers – record discharge pressures weekly, record run time hours daily or upon each visit to the system, change air filters quarterly or as needed, complete oil changes as required by manufacturer. Pay attention during the spring with the cottonwood trees are sending out their fuzzies these things tend to plug up filters fast. If you have a screen on the air intake check it for plugging also.

The headers need to be marked if they are not visible so they can be found in the winter and so they will not be hit with a mower in the summer. The valve boxes need to be located and identified on a map with coordinates to allow the operator to find them when they are snow covered or buried in vegetation.

The aerators may accumulate debris that is passed through the collection system and into the lagoon. The problem will be greater if there is no headworks installed. The rags and other debris will attach to the piping and can plug off an aerator. This will require the aerator to be either removed and cleaned or the lagoon to be drained. Aerators that are on a single line attached to floats may become plugged off and no longer provide oxygen to the system or moving and not be in the location desired. The inoperable aerator will reduce mixing also and may allow the lagoon to short circuit reducing detention/treatment time in the cell.

Mixers

Mixers are similar to aerators in that they move the water around in the lagoon, but mixers do not add oxygen to the lagoon. All they do is move the water around and allow the bacteria in the system to come into contact with the food. The mixers if placed correctly will also help prevent short-circuiting of the lagoon.

Some of the problems with mixers are rags can collect on the shaft to the propeller and cause the shaft to stop turning. Also, the motor may short circuit or burn out if the torque is too high on the shaft. The cables holding the mixer in place may become loose or disconnected and allow the mixer to move from the required location. The mixer must be observed upon every visit to the facility to check its operation and location. Rag buildup must be removed. Yearly the mixer should have the electrical panel checked for loose wires, high amperage, and insect nests. The floats that support the mixer should allow the mixer to be level and not binding on the cables. The mixer should be observed to make sure the mixer is mixing; the propeller has not fallen off or the electrical is off during each visit.



The operator should upon each visit observe the lagoon for operation of the aerators and mixers. Any aerators or mixers not operating as designed should be noted in the log. If an aerator or mixer is not operating as designed the operator must observe the aerator or mixer operation to determine the cause of inoperability and schedule a repair of the unit.