



Wastewater Aeration Systems

All wastewater treatment systems have one thing in common...they need dissolved oxygen, and LOTS of it. The good news is that there has been a breakthrough in aeration technology resulting in an affordable, highly effective aerator. This aerator, offered by PAS and sometimes referred to as an air turbine, holds the promise of being the most efficient aerator on the market.

Does your waste treatment system need a boost in performance? Do you need low-cost help in meeting regulatory requirements for wastewater discharge? Do you need an affordable back-up system to keep your operations underway when your main facility is down for repair?

Precision Aeration Solutions air turbine is your answer. It generates an unbelievable barrage of entrained oxygen molecules and then injects them into your treatment stream or lagoon. The unit is quiet, light weight, and virtually maintenance free. Plus, it can be moved from place to place as needed within your treatment system.

The air turbine is typically operated with a 5-horsepower motor, yet its performance can match that of aerators having up to 20 horsepower. No longer do you have to strain your operating budget just to pay the electric bill.



There are many different types of wastewater treatment systems in use today. One of the most common is an aerated lagoon. Here, artificial aeration is used to inject air (dissolved oxygen) into the wastewater to bio-treat the pollutants. Along with dissolved oxygen and organic matter (pollutants) all treatment systems need microbes to complete the digestion process. Microbes can either be “air-breathing” (aerobes) or “non-air-breathing” (anaerobes.) Aerobes tend to be more highly efficient and produce lower odors as compared to anaerobes. The benefit of injecting air beneath the surface is to allow aerobes to live and process waste directly in the water.

Aerators fall into several different categories as follows:

Floating Surface Aerators

Submerged Aerators

Fixed-in-Place Surface Aerators

Compressed Air Diffusers

The PAS air turbine is a hybrid aerator in that it can float on the surface or else be attached to a wall. Regardless of how it is installed, it always releases dissolved oxygen beneath the surface of the water. Using a rotating disc that operates on the principle of precession, it discharges a plume of oxygenated water in both a downward and a 360-degree lateral direction. Compared to other subsurface aerators, the air turbine produces very little surface frothing. The reason is that the particle size of the entrained air is sufficiently small that a greater percentage of the air (dissolved oxygen) is held in suspension beneath the surface. The suspension of such small particle sizes of dissolved oxygen is critical to the efficiency of any treatment system because it permits a more rapid explosion in the subsurface growth of aerobic microbes.

In a clear water demonstration Precision Aeration Solutions air turbine, it appears that a white cloud is forming beneath the water. This visual image is a testimony to the high percentage of small oxygen bubbles being created and held in suspension.

Besides aeration lagoons, many small municipalities use stabilization ponds to treat municipal wastes. These lagoons are shallow, man-made basins from 30 inches to five feet deep.

Usually, they comprise two or more basins in series where the wastewater flows via gravity from one basin to the next. The main treatment takes place in the first basin which acts as an anaerobic pond in which suspended solids drop to the bottom.

While stabilization ponds are inexpensive to build and are low-tech, they sometimes become non-compliant with regulatory authorities during the cooler months of the year. Though specific causes might be at work, the general cause is that the intensity of sunlight and the lagoon water temperature are not at their peak in cooler months.

In prior economic times government regulators were reluctant to impose fines on small, non-compliant municipalities, preferring instead to work patiently with them. However, with ongoing budget cuts at the government level, there is always the possibility that more and more regulators will now impose fines as a means to raise revenue for their own operations.

When a municipality finds itself facing a fine, a dilemma arises. Severe budget shortfalls preclude upgrading the treatment basin to a high-tech operation. What these smaller municipalities need is a means for boosting the treatment process, particularly in the cooler month. PAS turbine aerator provides an affordable way to increase treatment efficiency without violating or in any way changing the permit rules under which the system is licensed. In many cases the cost of installing an air turbine is less than the imposed regulatory fine.



The air turbine is a self-aspirating aerator. This means that it draws air by suction from the atmosphere. It does not need high-dollar canister oxygen or a compressed air system to generate and inject oxygen into the body of water. Also, due to its design, it is virtually impossible for the turbine to clog.

Precision Aeration Solutions turbine aerator can be installed in many different locations within a treatment system. For example, it can be placed in the last basin of a stabilization system for final treatment before the wastewater is discharged into the environment. In the alternative, it can be placed in the first basin to jump-start the aeration process. A sufficient number of air turbines can actually help aerobes attack and dissolve the solids which have dropped to the bottom of the first basin. Such action can prolong or hopefully eliminate the need for dredging the basin.

The air turbine also works well in systems where sewage is treated close to where it is created. An example would be an onsite package plant. Other examples include large septic tanks and bio-filters. The air turbine is particularly cost effective in tertiary treatment systems where water is to be discharged into environmentally sensitive eco-systems. Such treated water is sometimes disinfected chemically prior to release into a stream or into a groundwater recharge zone for agriculture purposes.

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