AERATION TECHNOLOGY

Biological treatment systems require oxygen to function properly. The actual oxygen requirement is used to identify the oxygen demand for a system. Each plant is specific, but usual important parameters include temperature, dissolved oxygen level, plant elevation, and the design of aeration equipment.

Either for industrial wastewater or for domestic sewage, the purification is carried out by biological aerobic activated sludge process. In aerobic processes the pollutants in the wastewater are removed by living microorganisms. While the presence of nitrogen is essential for the growth of the microorganisms that treat the waste stream, the presence of nitrogen compounds in the effluent stream can exert an oxygen demand and lower the dissolved oxygen content of the receiving water. It can also promote detrimental plant growth such as algae. In order to accomplish this efficiently, the aeration equipment must not only be capable of transferring oxygen, but also maintain sufficient uniform mixing of the micro-organisms with the oxygenated wastewater without breaking up the activated sludge flocs.

Therefore, the aeration equipment is the most important part of an activated sludge process. Astim Vertical or Horizontal type Mechanical Surface Aerators as well as Jet Nozzle and Diffused Aeration Systems can be used for all types of aeration tanks with minimum overall costs.

VERTICAL SHAFT
TURBINE AERATORS

Astim Vertical Shaft Turbine Aerator is one of the most efficient mechanical surface aerators available. The aerator impeller consists of an inverted shallow cone with blades attached vertically to the underside of the cone. As the aerator rotates, the air is drawn into the liquid behind the blades and mixes with the wastewater in the region of the greatest turbulence. The front side of the blades disperse the oxygenated wastewater outwards over a large surface area in order to increase the oxygenation. This kind of action of the impeller creates an upward motion of the wastewater in the tank resulting the concurrent activities of the aeration, mixing and circulation of the whole tank content.

DESIGN
FEATURES

- Vertical Shaft Turbine Aerator consists of electrical motor, gearbox, rigid coupling, impeller, shaft and turbine type impeller.
- The wet parts of the aerator are manufactured in mild steel. All mild steel surfaces are finished by sand blasting and coating with epoxy paint. For corrosive liquors, aerator can be manufactured in stainless steel.
- The impeller is designed considering the power, speed, diameter and shearing forces, which will mix the liquor without breaking up the activated sludge flocs.
- Specially designed blade curvature of impeller yields high pumping effect with minimal power requirement and in many cases eliminates the necessity of draft tube. For very deep basins, hydraulic stabilizer and draft tube can be optionally added.
- The Vertical Shaft Turbine Aerator can either be installed to reinforced concrete or steel bridges. Or can be supported on a pier platform with an access walkway.
- Vertical Shaft Turbine Aerators are certified by aeration test witnessed by TÜV with 2 kgO_2/kWh

Vertical Shaft Turbine Aerators during efficiency test

Vertical Shaft fixed type Turbine Aerators

Vertical Shaft Turbine Aerators on floating pantoons during operation

HORIZONTAL BRUSH
AERATORS

Horizontal Brush Aerators are cost effective solutions for the oxidation ditches and carrousel systems, for which nitrification and de-nitrification is carried out in the same tank volume without any additional tank and pumping. They can also be used in compact plants in annular aeration tanks, surrounding the circular clarifiers. When using the Horizontal Brush Aerators with basins of about 3,5m depth the mixing performance is generally sufficient for the requirements of biological treatment. For large sized sewage treatment plants with deeper basins, submersible mixers are additionally used to reach the required flow speed. Astim Horizontal Brush Aerators provide simple and efficient oxygenation process for a wide range of application from small town oxidation ditches to large city plants and industrial wastewater treatment processes.

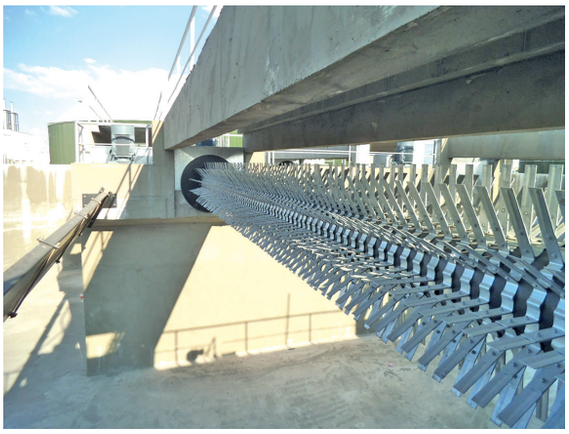
When the rotor is running, the blades positioned in sequences immerse into the water in a screw pattern preventing the vibrations of the system, Therefore the durable construction provides years of reliable service.

DESIGN
FEATURES

- Horizontal Brush Aerator consists of a drive unit, gearbox, torsion coupling and a horizontal rotor fitted with aeration blades. The rotor has a tubular section and is supported at one end by the drive unit and the other end by a loose bearing assembly, which compensates linear movement.
- All wet parts of the aerator are manufactured in mild steel with hot dip galvanized and/or coal-tar epoxy painted.
- The Horizontal Brush Aerator is installed below a reinforced concrete or a steel bridge. In order to reduce of running noise and aerosols, a special movable cover can be used.
- A special designed torsion coupling between gear reducer and horizontal shaft absorbs the running vibrations and eliminates the misalignment installation of rotor.
- In order to control the surface velocity of flow and to increase the oxygen transfer zone velocity guide plates can be added to the downstream side of the rotor bridge

Horizontal Brush Aerators during installation

Horizontal Brush Aerators during operation



Blades, installed in a screw pattern prevents vibration

ASTİM

Diffuser Type Aeration System during operation

Installation of Diffuser Type Aeration System

JET NOZZLE & DIFFUSED AERATION SYSTEMS

Jet nozzle Aeration and Diffused Aeration systems are also in Astim design and manufacturing capability.

The technology of Jet Nozzle Aeration involves combining two fluids streams in a common mixing chamber. Astim Jet Nozzle Aerator is designed to mix the water and the pressurized air. The efficient mixture is obtained while flowing through the special designed outlet nozzles.

Astim also manufactures necessary pipe lines for Diffused Aeration systems. With Diffused Aeration, compressed air is released through the holes in diffusers. The rising bubbles from the diffusers transfer the oxygen to the water and by this way liquid at lower levels of the tank is carried to the surface. The submerged branches can be manufactured as fixed type or with lifting system for easy maintenance.

Jet Nozzle Aerators during installation

Installation of fixed type Vertical Shaft Turbine Aerators

Vertical Shaft Turbine Aerators in operation

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