

Aeration & Methods of Aeration - Types of Aeration

- Activated Sludge

What is Aeration

The **process** of **absorbing oxygen** from air is **known as aeration**. High amount of O^2 is provided in the aeration tank because of high BOD in sewage. This cannot be provided naturally therefore aerators are used to provide O^2 artificially. When the dissolved oxygen level (D.O) falls below 2mg/l anaerobic activities starts.

Aeration Methods in Activated Sludge Process

There are three **methods for aeration** in activated sludge process.

1. Diffused air aeration
2. Mechanical aeration
3. Combine aerator

1. Diffused Air Aeration

In diffused air aeration method compressed air is blown through the sewage and air is diffused in sewage by diffuser. Diffusers are of two types: **Plate diffuser** and **Tube diffuser**

Plate Diffuser

They are rectangular/square plates made of crystalline alumina or high silica sand. In this method the compressed air is blown through a perforated plate diffuser. The air comes out through the holes of the diffuser plate and rises upward in the form of bubbles. Thus the sewage absorbs oxygen from the air.

Tube Diffuser

It consists of a perforated tube suspended in the waste water near the bottom and can be taken out while cleaning. The compressed air is sent through the tube. The air comes out through the holes with great force and agitates the sewage.

2. Mechanical Aeration

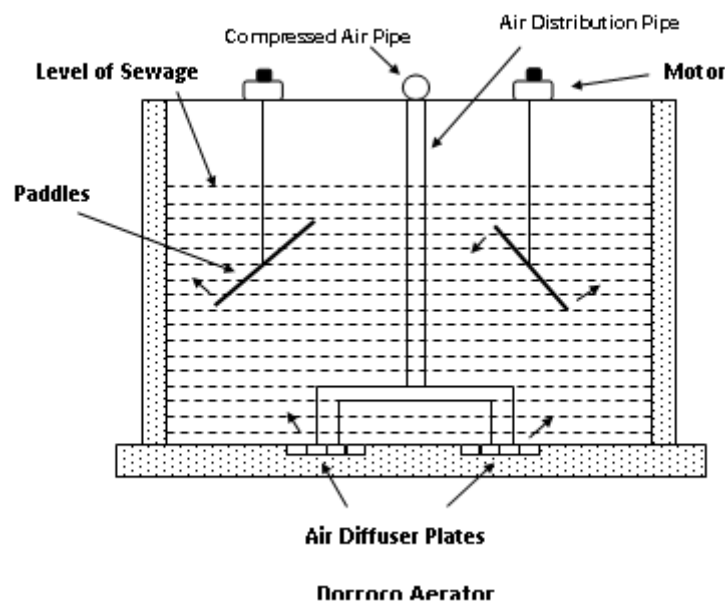
In this method the surface of sewage is agitated violently with the help of some mechanical equipment to encourage absorption of oxygen from atmosphere. There are two well known forms of mechanical aerator. **Vertical surface aerator** and **Horizontal surface aerator**

They consist of electrically driven propellers (vanes) mounted in either a floating or fixed supports. They throw the bulk liquid (sewage) through air and oxygen transfer occurs both at the surface of the

droplets and at the surface of the bulk liquid and is then mixed by the currents produced by agitation. In this method the performance is seriously affected by ice formation in winter.

3. Combine Aerator

In this system, diffused air aeration and mechanical aeration are combine in a single unit. The well known type of such combination is **Dorrco aerator**. The aeration of sewage is done by air diffusers as well as mechanical aerators. Air diffuser plates are located at the bottom of tank and the submerged paddles rotate in the direction opposite to that in which the compressed air rises up from the air diffusers. Paddles are rotated by a motor on a horizontal shaft with a speed of 10-12 rpm.



Advantages of Combine Aerator

1. **Aeration** is very efficient
2. Detention period is reduced (3-4 hrs)
3. Quantity of compressed air required is less as compared to the diffused air aeration.