

Diffuser (sewage)

An **air diffuser** or **membrane diffuser** is an **aeration** device typically in the shape of a disc, tube or plate, which is used to transfer air and with that oxygen into **sewage** or industrial **wastewater**. Oxygen is required by microorganisms/bacteria residents in the water to break down the pollutants. Diffusers use either rubber membranes or ceramic elements typically and produce either fine or coarse bubbles.

1 Types

Diffusers are generally referred to as either:

1. Fine Bubble/Fine Pore
2. Coarse Bubble

Other diffused aeration devices include: **jet aerators**, **aspirators**, and U tubes.^[1]

2 Design specifications

Typical efficiency of a full floor coverage diffused aeration system in clean water is 2%/ft submergence or 6.6%/m submergence. When converted to mass transfer into process or dirty water, it is typically closer to about half of those figures. Manufacturers of fine bubble systems have supported claims that the type, number and size of “pores” have a great effect on efficiency of a diffused aeration system.^[2]

3 Types of diffused aeration systems

Diffusers are typically connected to a piping system which is supplied with pressurized air by a blower. This

system is commonly referred to as a **diffused aeration system** or **aeration grid**.

There are two main types of diffused aeration systems, retrievable and fixed grid, that are designed to serve different purposes. In the case of a plant with a single tank, a retrievable system is desirable, in order to avoid stopping operation of the plant when maintenance is required on the aeration system. Fixed systems, on the other hand, are typically less costly, and often more efficient because it is easier to make full use of the floor.

Automated software is available on the web to assist with drafting of aeration systems in CAD, as well as calculation software to help determine diffuser requirements for a given wastewater.

- Fine bubble membrane diffusers in a state-of-the-art treatment plant.
- Tube diffusers at a sewage treatment plant in Hungary.
- Tube-type diffuser.

4 Developments in membrane coatings

A developments in recent years has been surface coatings of **PTFE** on **EPDM membranes**. This provides a buffer between the EPDM substrate and wastewater, hence reducing the likelihood of chemical attack and oxidation, and also providing better resistance to biological fouling and calcium scaling (manufacturers claim).^[3]

5 See also

- List of waste-water treatment technologies

6 References

- [1] U.S. Environmental Protection Agency, Washington, D.C.(2009). "Fine Bubble Aeration." Wastewater Technology Fact Sheet. Document No. EPA-832-F-99-065.
- [2] <http://www.wastewater.com/pdf/142.pdf>
- [3] <http://www.stamfordscientific.com/ptfemembranes.html>

7 Text and image sources, contributors, and licenses

7.1 Text

- **Diffuser (sewage)** *Source:* [http://en.wikipedia.org/wiki/Diffuser_\(sewage\)?oldid=551303689](http://en.wikipedia.org/wiki/Diffuser_(sewage)?oldid=551303689) *Contributors:* Bkell, Jwanders, Wavelength, SmackBot, PaddyM, Nick Number, TomFrankel, Kktor, ImageRemovalBot, Sfan00 IMG, Moreau1, Addbot, MrOllie, AnomieBOT, FrescoBot, Peter in s, Bogelund, Diannaa, EnvironmentalDynamics, Boilerup12 and Anonymous: 7

7.2 Images

- **File:Question_book-new.svg** *Source:* http://upload.wikimedia.org/wikipedia/en/9/99/Question_book-new.svg *License:* ? *Contributors:* ? *Original artist:* ?
- **File:Windmills_D1-D4_-_Thornton_Bank.jpg** *Source:* http://upload.wikimedia.org/wikipedia/commons/f/f9/Windmills_D1-D4_-_Thornton_Bank.jpg *License:* CC-BY-SA-4.0 *Contributors:* Own work *Original artist:* Hans Hillewaert

7.3 Content license

- Creative Commons Attribution-Share Alike 3.0