

## **Air Diffusers - The best fine bubble aeration system**

### **What are Air Diffusers?**

The Dryden diffusers are the most robust and versatile fine bubble diffusers commercially available. We have been manufacturing the diffusers for 20 years and are one of the leading air diffuser manufacturers in Europe.

Fine bubble diffusion is more effective than coarse bubble diffusion in providing a greater mixing action and aeration efficiency (up to 5 times more efficient). We are not aware of any other fine bubble diffuser that can compare with the performance of the Dryden Aqua diffuser.



The diffusers are of semi-flexible construction 32 mm in diameter and of variable length up to 3 metres depending on the air, oxygen or carbon dioxide through-put required. The diffusers have their own ballast and will stay on the bottom of the aeration tank without the need to add additional ballast or to secure them to the base. This makes our diffusers really easy and quick to install. The diffusers are perfect for tanks, plastic lined lagoons or even clay or earth lined lagoons.

### **Maintenance Advantages**

Solid diffusers have problems with carbonate and iron deposition which blocks the diffusers. Solid diffusers are therefore very difficult to clean and maintain. Flexible membrane diffusers stay largely free of fouling, however they need a heavy frame or are anchored to the base of the aeration tank, this makes the diffusers much more expensive and difficult to handle, it also makes them difficult to use in lagoons, or in retrofitting systems.

The Dryden Aqua diffuser is a hybrid unit, because it is semi flexible, carbonates and metal oxides simply crack off the unit. Also because our diffuser has its own internal ballast it does not need to be anchored to the base of the tank. If any cleaning or maintenance is required, the diffuser is simply pulled out of the tank using the 1/2" air delivery hose. The tank can be full of water and the air blowers running when the diffuser is removed. Normal operating life is from 5 to 10 years.

### **Installation Advantages**

The diffusers require an air blower or compressor, to drive the system. The air pressure required depends upon the depth of the water, in most situations the blower should be sized to give up to 1 bar air pressure with water depths up to 5 m. Positive displacement 100 % oil free blowers are best, such as a diaphragm or linear compressors, rotary vanes, or rotary lobe compressors. If the water is over 5m depth, claw compressors should be used, and for the highest pressure screw compressors are appropriate.

The compressor should be located adjacent to the air diffusers. However you could locate the compressor many 1000's of meters from the diffusers if the pipe work is sized



accordingly. The pipe work should be in metal, if plastic pipe is used, then the first 6 meters of pipe work should be metal in order to bring the air temperature down to at least 90 °C in the plastic pipe. In lakes and lagoons, make an air ring main and come off the ring main with ½” flexible hose, fit a diffuser on the end of the hose, and then simply drop the diffuser into the tank. Installation is therefore simple and very quick.

## Destratification Performance

In order to prevent thermal stratification, algae blooms and anoxic conditions, our air diffusers are used to mix lakes or reservoirs.

Water depth in meters	Amount of water lifted by 1 cubm/hr of air passed through a diffuser
3	10 m <sup>3</sup> /hr
4	15 m <sup>3</sup> /hr
6	20 m <sup>3</sup> /hr
10	40 m <sup>3</sup> /hr
20	80 m <sup>3</sup> /hr
30	120 m <sup>3</sup> /hr
40	150 m <sup>3</sup> /hr
60	200 m <sup>3</sup> /hr

As water depth increases the amount of water moved will increase exponentially. As a guide you should aim to have sufficient air to mix all the water in the lake once every one to two weeks. We have installation for lakes measuring up over 10 km<sup>2</sup> our system will stabilize the chemistry and greatly improve water quality, making the water much easier to filter when used for drinking water supplies. The system will reduce the risk of blue green algae and algae blooms without the use of chemicals.

## Oxygen Transfer Performance

Oxygen solubility is a function of temperature; the above table is at 20 °C. At an oxygen tension less than 1 mg/l, at a depth of 5 m, water temperature of 10 °C, in an activated sludge system we recorded an oxygen transfer coefficient of 7 kg of oxygen per kW of energy expended. In most situations the transfer will be between 2 kg and 5 kg of per kW of energy.

Surface aerators waste a huge amount of kinetic energy throwing the water into the air, transfer coefficient is 1 kg to 2 kg of oxygen per kW. Membrane diffusers are more efficient at 2 kg to 3 kg of oxygen per kW. The Dryden Aqua diffuser at over 5 Kg is therefore the most efficient fine bubble diffuser available and is ideal for retrofit applications as a simple drop in product, for lakes, tanks, lagoons and aeration channels for clean water and waste water treatment.