

# RETRIEVABLE DIFFUSER AERATION SYSTEMS

## Aeration Systems

### Bulletin Brief

Many aeration mixing systems for water and wastewater treatment are installed in single basins, or have process considerations that prevent the system basins from being dewatered for service and maintenance. As a result, some form of retrievable diffuser system can be very helpful in maintaining optimum performance of the system and allow maintenance or service to be conducted without shutting down the process or dewatering the basins.

### Technical Presentation

To evaluate retrievable diffuser systems there are some primary types of units available as outlined below:

1. A simple drop type assembly with a small diameter pipe and “T” section at the bottom. Diffusers are mounted at this “T” section and are installed near one wall of the aeration basin. This creates a strong roll or roll mix aeration pattern in the basin similar to the fluid schematics shown in drawing number 1 attached. This arrangement of diffuser is simple and easily administered; however, there are some limitations:
  - a. The roll configuration dramatically reduces oxygen transfer as much as 25%.
  - b. Proper mixing may be difficult to maintain unless the basin has a specific geometry conducive to roll mixing.
  - c. Retrieval of the units is simple; however, reinstalling units with air inside the piping can sometimes be a major challenge.
  - d. Typically used for small basins, small activated sludge plants, and channel aeration.
2. Floating aeration systems. Floating aeration systems utilize the characteristics of a floating aeration pipe on the surface of the liquid as an air header. Feeder hoses are then mounted to this air header and used to drop to the diffuser elevation in the biological reactor, lagoon, aeration basin etc. These systems are employed in 2 primary configurations:
  - a. Floating air header with hoses feeding diffuser units sitting on the floor of the aeration basins. Again this is primarily used for low intensity aeration

- systems and each diffuser would have float and rope assembly to the surface of the basin to allow access for inspection or maintenance.
- b. Floating lateral systems with the diffuser suspended off the floor of the basin. This is particularly helpful and economical for large basin and large lagoon installation with low F/M loading rates.

Please see drawings 2A and 2B attached for typical retrievable diffuser units.

3. Retrievable diffuser units in small waste treatment facilities with individual rubber hose feed to each diffuser unit. This rubber hose feed is controlled by a valve at the air header and the diffusers sit on the floor of the basin. Refer to drawing 3 as a typical installation.
4. For large activated sludge systems and high intensity aeration systems the retrievable aeration system similar to the EDI ModuleAir™ unit can be employed. The ModuleAir is a large diameter PVC or stainless steel pipe fed by a large diameter hose from metal air header above the liquid surface. This unit is mounted on legs or feet to level the assembly and maintain the assembly and diffusers at the proper elevation. To employ this device requires a level and stable floor such as a concrete floor. Some of the characteristics of the system are as listed below:
  - a. Slightly reduced aeration efficiency versus complete grid configuration.
  - b. Capital cost installed of 1.5 to 2 times the cost of the most economical grid diffuser system with fixed to the floor diffusers..
  - c. Generally requires access for a crane to lift the assemblies out of the aeration basin for inspection or maintenance.For the ModuleAir concept see the enclosed detail No. 4 for typical description or views.
5. Other special retrievable system are possible. For special needs, contact Environmental Dynamics Inc., in Columbia, Missouri.

Proper use of retrievable aeration mixing systems can greatly expand the ability of diffusers to meet aeration and mixing needs in water and wastewater systems. These systems can be engineered and applied to each application as required. The proper selection or application of these products is beyond the scope of this technical bulletin and details for your specific application should be requested from Environmental Dynamics Inc. Columbia, Missouri at 573-474-9456.

For additional information regarding your specific application contact Environmental Dynamics Inc. at (573) 474-9456