



Technical Bulletin 122

Fixed Grid Aeration System

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BULLETIN BRIEF



When properly applied fixed grid systems offer significant improvements in performance. Grid configurations for fine bubble systems can be employed with a wide range of products. Application of the fixed grid system is generally limited to concrete floor basins with either concrete or steel tank construction. When necessary special installation procedures allow installation of EDI advanced technology membrane diffuser components and systems into earthen basins or lined earthen basins.

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Aeration mixing systems (both coarse bubble and fine bubble) can be applied to an aeration basin in many configurations. The USEPA and Los Angeles County Sanitation District demonstrated in their test data that proper distribution of aeration into a biological reactor can result in significant improvements in performance. Side-by-side tests of various methods for distributing coarse bubble and fine bubble diffusers (including single roll from one side, center roll down the middle, swing diffuser type systems, etc.) were compared vs. full floor coverage or grid-type. A summary of those results suggest the following:

1. Aeration devices, whether fine bubble or coarse bubble, can be applied in any of the above configurations involving roll or full floor coverage grid-type systems.
2. Full floor grid configurations consistently deliver energy savings of 20-25% vs. the exact same diffuser system applied in a less effective mounting configuration. As an example, fine bubble diffusers mounted along one wall of the tank are substantially less efficient compared to the same fine bubble diffusers properly distributed in a grid configuration over the floor of the basin.
 - a. The full floor cover grid configuration will consistently deliver 20-30% improved oxygen transfer efficiency using the same type and the same number of diffusers.
 - b. It is of interest to note that coarse bubble diffusers mounted at one side of the tank also lose efficiency compared to a grid or more uniform distribution.
 - c. A grid configuration of coarse bubble diffusers offers the same gain in efficiency of 20-30% vs. the side or roll configuration.
3. Fixed grid installations typically must be installed within 6 inches to 2.5 ft of the floor (0.15 to 0.76 meters of the floor) in order to deliver proper mixing in addition to the improved oxygen transfer efficiency. Please note that the desire to install the units as close as possible to the floor for best oxygen transfer and best mixing with the design must be considered in conjunction with the existing or new blower system capabilities.
4. Fixed grid applications are suitable for most types of diffuser installations. For coarse bubble applications, please refer to EDI product literature on the following products:
 - a. MaxAir™ wide band diffuser assemblies with Spectrum™ Saddle Mount
 - b. EDI PermaCap 5™ coarse bubble unit
 - c. EDI 9 inch Disc coarse bubble diffuser unit.

- Each of the above coarse bubble diffuser systems have slightly different mounting arrangements or proper piping considerations. The EDI can supply proper design criteria for application and design of coarse bubble diffuser systems using either the wide band or the disc configuration as manufactured by EDI.
5. Grid configurations for fine bubble systems can be employed with a wide range of products. Request information on EDI FlexAir® diffuser units of the following types for specific applications:
- a. 2 inch or 3 inch (62 mm or 91 mm) diameter tube diffuser units with threaded 3/4-inch male connection. EDI FlexAir® "T" series is available in multiple lengths and diameters to meet the specific piping objectives.
 - b. EDI 9 inch (230 mm diameter) disc diffuser unit. The EDI FlexAir disc can be employed using direct piping mounts or using special saddle mount assemblies for the diffuser units.
 - c. EDI Model 84P tubular diffuser units with integral Spectrum saddle factory assembled. This unit has the largest capacity and the lowest installed cost of flexible membrane diffuser units.
 - d. EDI FlexAir® MiniPanel™ designs. These units also employ the saddle mounted tube diffuser concept; however, the MiniPanel tube diffusers are perforated top only in order to produce the effectiveness of a rectangular disc diffuser unit.
 - e. FlexAir® MicroPore™ MiniPanel design – similar to the MiniPanel described above; however, much smaller openings in the membrane are employed to produce different oxygen transfer and operating pressure characteristics for specific high efficiency applications.
 - f. EDI REEF® aeration unit. This unit is designed with rigid porous polyethylene media and has been a favorite in many applications over the last 20 years. EDI technical support group can offer sizing and performance information on REEF applications.

Application of fixed grid systems is generally limited to concrete floor basins with either concrete or steel tank construction. Special installation procedures can be employed to allow installation of EDI advanced technology membrane diffuser components and systems into earthen basins or lined earthen basins when necessary. These earthen basin fixed grid applications require special techniques for protection of the liner or protection of the earthen basin itself. Please contact EDI for those specialized applications where fixed grid would be preferred in earthen and/or lined basins.

Specification of grid type diffuser systems is a key function in the selection and installation of the most efficient and durable system. EDI suggests you request technical specification details on these various components and diffuser assemblies in order to allow engineering judgments be properly made. Please contact EDI direct in order to obtain those specification techniques and features and complete the project Data Sheet.

