Technical Bulletin 116

Aquaculture Aeration Systems

by:

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BULLETIN BRIEF

Advanced technology flexible membrane aeration systems designed by Environmental Dynamics International (EDI) offer significant benefits to the aquaculture industry.

When properly engineered and designed, these systems can increase profitability and minimize risk for disastrous loss caused by oxygen depletion and stratification within the aquaculture basin.

A high-efficiency diffuser system can also significantly reduce the labor costs required to install, monitor, and operate an effective aeration system.

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TECHNICAL BULLETIN 116 – AQUACULTURE AERATION SYSTEMS

EDI high-efficiency diffuser systems offer major process and economic benefits for aquaculture applications, effectively improving product quality and production. How?

- High-efficiency diffuser systems distribute energy throughout the basin with little or no directional velocity. This allows fish and shellfish to maintain their proper positions in the basin with no extra effort and stress on their part, contributing to demonstrably faster growth rates and higher product quality.
- These diffuser systems incorporate no moving parts within the basin, eliminating all risk of damage to fish, shellfish, and equipment from mechanical contact. Contrast this against competing diffuser systems that rely on high-speed rotating devices to function properly.
- Diffused aeration systems are connected to a centrally located primary blower or air source. Benefits of this arrangement include:
    - Ease of access to electrical and mechanical components, reducing expensive labor and downtime to execute operation and maintenance routines.
    - An ability to activate standby aeration capacity at any time to accommodate maintenance requirements or respond to peak loading requirements.
    - Significant total system and operational safety improvements by eliminating the need to install distributed electrical service to the aquaculture basin or vessel.
    - Effective air distribution control throughout the basin by simply adjusting the system's air control valve, either manually or automatically, in response to product demands during their life cycle.
    - Systems available with retrievable units to allow full access or maintenance without shut-down or disruption of the plant.
- Diffused aeration systems create uniform dissolved oxygen (DO) concentrations and circulation in all zones of the basin by using low-intensity aeration distributed side-to-side and at full depth in the basin. This arrangement optimizes a healthy growing environment for aquaculture species. Compare this against mechanical aeration systems creating high oxygen levels at the point of entry and non-uniform, significantly reduced DO levels at the outer reaches of the basin.
- EDI diffused-air low-intensity aeration systems eliminate short-circuiting within the basin. Systems using directional and mechanical aerators are prone to short-circuiting as they take inlet water and send it immediately to the outlet of the pond. Such short-circuiting can be detrimental in flow-through systems.

In addition to improving product quality and production, high efficiency diffuser systems consistently deliver 50% - 100% more oxygen to the water per unit of power compared with similarly rated mechanical aeration systems, resulting in substantial ongoing energy savings for aquaculture installations.

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