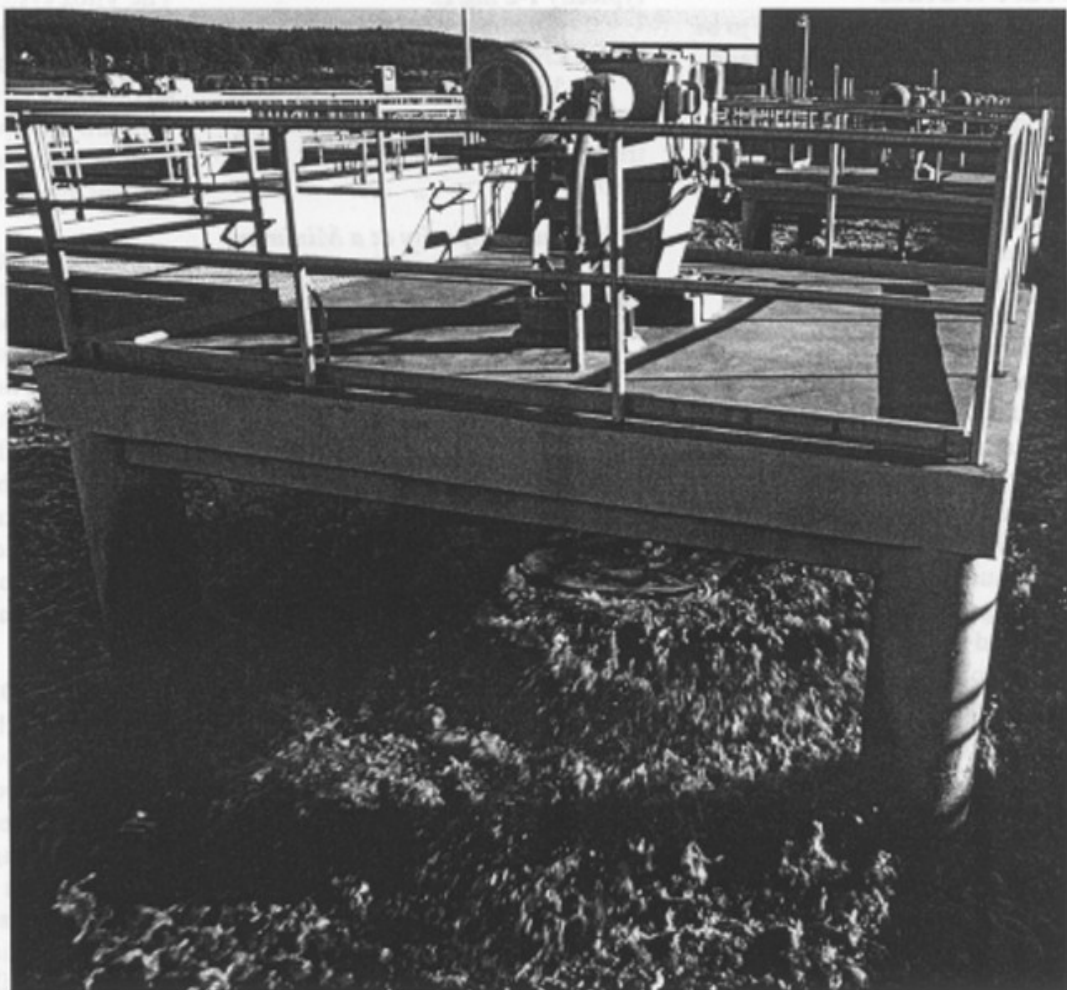


TECH TOPICS

DEVELOPMENTS IN GAS APPLICATION TECHNOLOGY

*The Vitox®
sidestream system
offers wastewater
treatment plants
a highly efficient,
flexible and cost-
effective means of
improving their
effluent quality.*



PURE OXYGEN INCREASES WASTEWATER TREATMENT CAPACITY

Growing demands on industrial and municipal wastewater treatment facilities and stricter environmental discharge regulations are requiring these plants to increase treatment capacity. Rather than adding more treatment basins and aeration systems that raise both capital and electrical costs, many companies are solving the capacity problem simply by adding pure oxygen to their wastewater.

Pure oxygen is the most effective way to satisfy both the biochemical oxygen demand (BOD) and chemical oxygen demand (COD)

of the wastewater and the endogenous respiration of sludge organisms. Yet, only 21% of the air dissolved by aeration systems is used by the microorganisms. Nitrogen, which comprises 78% of air, is of no benefit whatsoever.

The Vitox® sidestream system is a highly efficient, flexible and cost-effective means by which to dissolve pure oxygen in activated sludge basins. The system was developed and patented by The BOC Group, of which Airco, BOC's U.S. gases business, is an integral member.

HOW THE VITOX® SYSTEM WORKS

The Vitox system is designed to be easily installed and operated. A land-based or submersible pump draws a mixed liquor sidestream from an activated sludge tank or lagoon. Gaseous oxygen is injected into the sidestream through a venturi, which disperses the gas bubbles throughout the sidestream. The highly oxygenated mixture is returned to the bottom of the tank or lagoon through high velocity mixing nozzles that break up the oxygen into fine bubbles. Jet action creates turbulence, which mixes the tank contents thoroughly, achieving up to 95% overall dissolution efficiency.

A dissolved oxygen (DO) analyzer is used to automatically control the flow of oxygen. A probe, located in the activated sludge basin, continuously monitors the DO level. Oxygen flow is automatically switched on or

off, based on preset control limits, typically 1-2 mg/L.

SYSTEM BENEFITS

The Vitox system provides an array of benefits for overloaded wastewater treatment plants. For example, the system

- **Increases Capacity at a Minimum Cost.** The low-capital Vitox system is ideal for upgrading existing facilities to handle higher flows and higher oxygen demands at minimum costs. Plant capacity can be boosted significantly by supplementing an existing air-based system with the Vitox system. This generally eliminates the large capital expense of building new tanks or lagoons, and of installing additional aeration equipment.

- **Accommodates Peak Loads.** The system was developed to meet fluctuations in both daily and seasonal demand by matching

oxygen supply to BOD. It was first used to augment treatment for the seasonal high loadings of effluent at a vegetable processing plant during peak production. When oxygen demand drops off, the Vitox system is automatically shut down.

- **Maintains Positive DO Levels.**

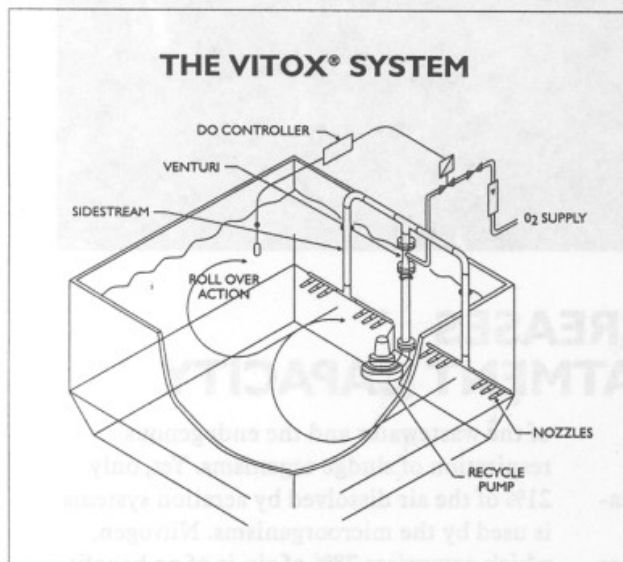
The Vitox system automatically regulates the flow of oxygen to maintain positive DO. This can eliminate filamentous bacteria, often associated with low DO levels, which, in turn, improves sludge settleability and effluent quality.

- **Supports Higher MLSS.** The Vitox system provides high-rate oxygen dissolution and complete mixing of tank contents, which can support higher mixed-liquor suspended solids (MLSS). This, in turn, allows treatment of compounds that are often difficult to break down biologically and minimizes the effects of toxic discharges into the activated sludge plant. Decreased sludge production is another benefit of operating at high MLSS.

APPLICATIONS EXPERTISE

Airco and other members of The BOC Group have installed over 300 Vitox systems worldwide. Airco's application engineers will assess your plant's operating needs and design the best oxygen system for you. In addition, as a leading, full-service supplier of gases and gas handling technology, Airco will provide: liquid oxygen and associated storage equipment; installation and start-up support; and operations and safety training.

To find out more about the Vitox sidestream system and begin integrating it into your operations, contact the Airco Gases regional sales office nearest you, or Airco's Commercial Development department, Water Treatment or Pulp & Paper group, in Murray Hill, NJ; telephone (908) 771-1744.



Simple to install and operate, the Vitox® sidestream system automatically controls dissolved oxygen in activated sludge basins.

AIRCO

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