Air Liquide
creative oxygen

Oxygenation in Aquaculture

Oxygen a Key Element

The high fish densities normally used in intensive fish farming induce two limiting factors:

1) The concentration of dissolved oxygen available for the fish (risk of hypoxia)
2) The concentration of dissolved ammonia excreted by the fish (risk of toxicity)

Continuous management of the concentration of dissolved oxygen, a life-critical gas for fish respiration, is the first limiting factor.

In intensive fish farming, the amount of oxygen naturally supplied by the inlet water does not satisfy the needs of the fish. That's why additional aeration or oxygenation is required.

A sufficient level of dissolved oxygen at all times promotes healthy and fast-growing fish.

Oxygen Dissolution in Water

Three main factors are involved in the dissolution of oxygen:

1) The pressure of water and oxygen
2) The exchange surface
3) The contact time

Water pressure can be provided by gravity, when the water falls into an oxygenation equipment (free energy) or by mechanical devices when the water is agitated or pumped (electric energy).

The exchange surface is increased either by creating a high amount of small oxygen bubbles in the water or by creating a large number of small water droplets in a volume of oxygen.

The contact time is optimised by designing the equipment size in closed reactors.

Why oxygen injection?

Availability of dissolved oxygen has a direct impact on fish farm performance.

Thoughtfully designed oxygen injection systems optimize and balance operating and capital costs in aquaculture, while ensuring an uninterruptible oxygen supply. The type of application equipment should be tailored depending on the specific conditions of each farm.

Efficient oxygen control is also key for the success of any fish farm.

What are the benefits?

- A more efficient use of feed improving the conversion ratio
- Increased fish growth
- Increased resistance to diseases
- Reduced stress and mortality
- Optimized facility efficiency by achieving high densities

Control & Monitoring Systems

Air Liquide provides oxygen monitoring for land based and offshore fish farms as well as for fish transportation, allowing oxygen and energy savings.

Efficient regulation is essential to maintain constant oxygen saturation when feeding or transporting the fish.

Integrated monitoring systems are available to support control and efficient troubleshooting.

Oxygen Network Supply

Our company operates a global oxygen network, encompassing every supply mode. From design to operation, we are your partner. How can we help?

Type	Capacity in m^3
On-Site Production	**10 up to 3200 Nm^3/h**
Cryogenic Tanks	**>5000**
Skid Tanks	**>5000**
Cryogenic Vessels	**142**
Bundles	**90**
Cylinders (ALTOP)	**10**

Oxygen Injection Systems

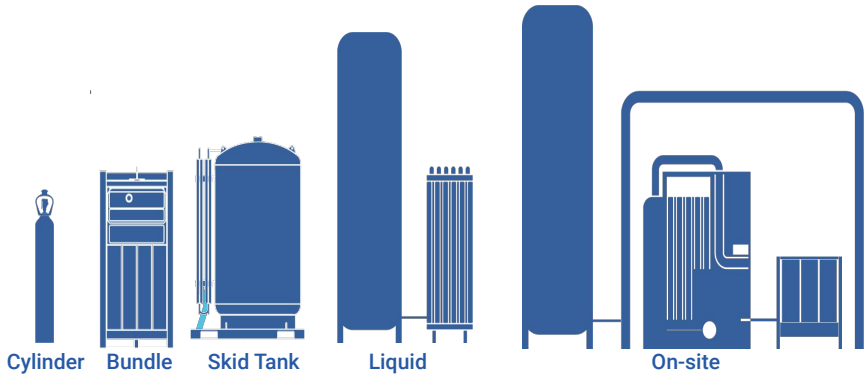
Air Liquide has a wide range of contemporary oxygen injection solutions. Our equipment is adapted to each fish farming technology with the least energy cost.

Product Supply & Services

Oxygen injection must be optimized according to individual fish farm needs, and the application equipment must be carefully chosen and designed in order to achieve maximum efficiency.

Our specialized experts will always recommend the best-suited supply system and equipment to drive profitability in your fish farming operations.

Supply Modes



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