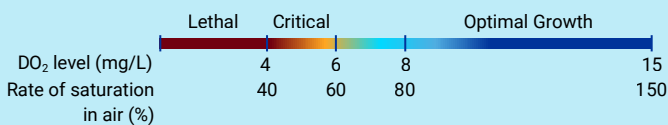


Boost fish growth and farm profitability with enhanced oxygen management

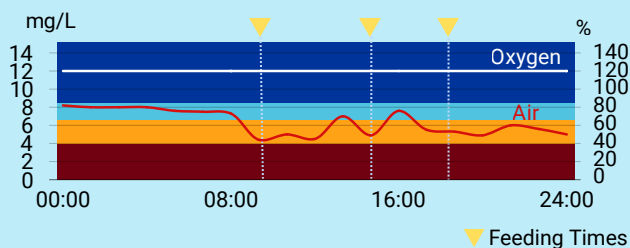


Optimal dissolved oxygen (DO₂) levels in water are crucial to enhance feed conversion and fish growth.

Fresh Water Trout Oxygen Needs at 15°C



Oxygen Saturation using Air vs. Oxygen Injection



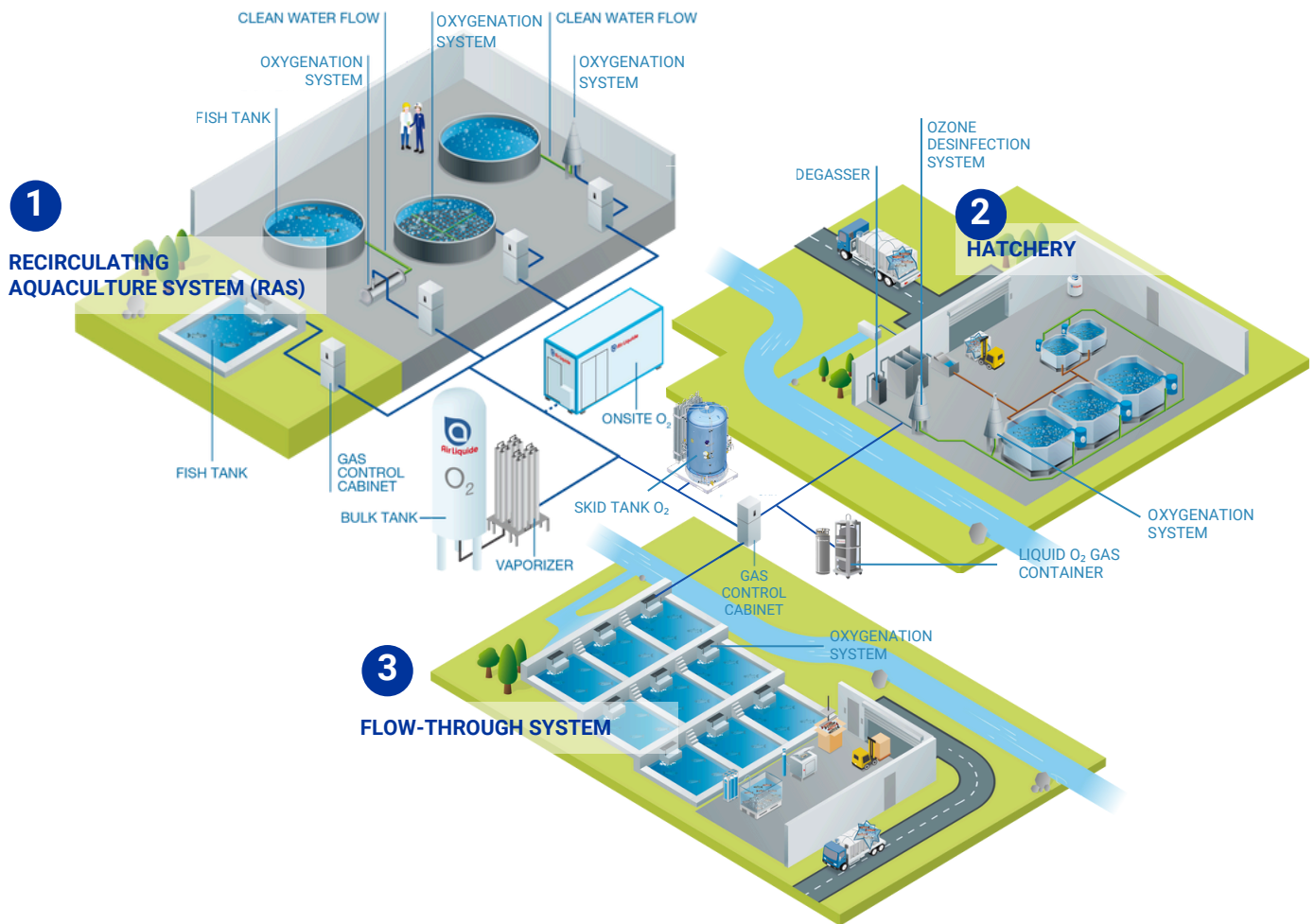
Relying on air injection in fish farms increases the risk of oxygen levels dropping to lethal levels. This is especially true after feeding, as a fish's oxygen consumption can rise by up to 250% in just two hours. Using oxygen injection via automatic control maintains **optimal fish growth throughout the day.**

In intensive fish farming, high fish densities can lead to low dissolved oxygen levels (hypoxia) and toxic ammonia buildup. Because the natural oxygen supply is often insufficient, additional oxygenation is crucial for fish respiration. Maintaining stable, sufficient oxygen levels promotes healthy, fast-growing fish.

Oxygen dissolves in water based on three factors: pressure, exchange surface, and contact time. Pressure can be created by gravity or mechanical pumps. The exchange surface is increased by creating many small bubbles or droplets. Finally, contact time is optimized by designing the equipment size.

Oxygen injection systems ensure an uninterrupted supply, optimise costs, **sufficient oxygen supply for high fish density** and are essential for a successful, productive fish farm.

Air Liquide provides innovative and flexible gas technologies adapted to your operations



benefits

Whatever the type and size of your operations, our custom-designed oxygen injection systems and flexible supply modes are engineered to boost the performance of your farm, by optimising both operational and capital costs.

With an uninterrupted supply of dissolved pure oxygen, you can ensure the health and growth of your fish. We tailor our application equipment to the specific needs of your farm, because we know that efficient oxygen control is the key to maximising your success and profitability.

- ✓ Enhance the health, growth and well-being of farmed fish
- ✓ Reduce production cycle time
- ✓ Increase feed conversion ratio
- ✓ Minimise waste and pollution
- ✓ Improve stocking densities
- ✓ Facilitates transport of living fish

Air Liquide's state-of-the-art aquaculture technologies achieve optimal cost & efficiency for your fish density

OXYFLOW®

Best for Recirculating Aquaculture Systems (RAS)



OXYFLOW® is an oxygen dissolution device that achieves **up to 560% oxygen saturation (1.5 bar)**. In RAS, OXYFLOW® is installed on the main pipe. It does not require any piping nor pumps, and allows **huge energy savings**.

- Supported water flow rate
 - Freshwater: 20- 375 L/s
 - Seawater: 10 - 215 L/s
- Dimensions
 - Height: 1,900 - 3,000 mm
 - Outer diameter: 530 - 2,210 mm

OXYFOX® SC

For ponds or entire fish farms
Best for flow through set ups



OXYFOX® is an oxygen dissolver that uses hydrostatic pressure and little energy to achieve **up to 300% DO₂ saturation** in the mixed water downstream. It can be installed either on an existing pump, or on a water fall. A water fall of 0.8 m to 1.5 m high is enough to maximise efficiency.

- Supported water flow rate:
 - Freshwater flow rate: up to 360 L/s
 - Seawater flow rate: up to 220 L/s
- Dimensions
 - Height: 3,000 - 5,000 mm
 - Outer diameter: 600 - 2200 mm

HappAL FISH-1

A submersible distributor with O₂ water flow
Best for small / middle size basins up to 300m³

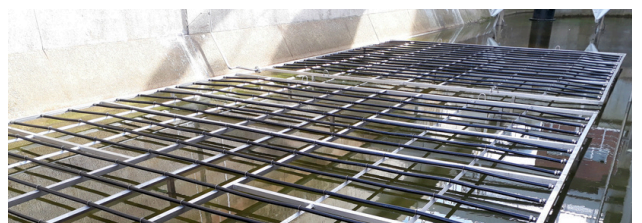


The HappAL FISH-1 is both a **highly efficient oxygen dissolution device with fine bubbles** and creates movement by mixing water. The installation can directly utilise customers' water pump which can **save energy**, or installed with a submersible pump.

- Suitable basin size : ~300 m³
- Oxygen capacity : up to 20 kg/h
- Suitable for freshwater and seawater

INJECTOR-POROXAL

Zero power gas injection



The **electricity-free** INJECTOR-POROXAL uses gas pressure to inflate pipes, which opens up their orifices and injects gas into the water. It's a reliable solution that protects you from the risk of introducing electricity shocks to your set up. It can be fitted with an electricity-free automatic switch system.

- Oxygen capacity: up to 105 kg/h
- Custom sizes

A consistent and dependable oxygen supply is crucial for any fish farm operation. Air Liquide provides flexible solutions to meet those specific needs



FLOXAL™ oxygen generator

Air Liquide's FLOXAL™ range provides on-site and continuous supply from small (typically <math>< 5\text{m}^3/\text{hr}</math>) to very large user requirements (>1,000m³/hr).



Bulk supply

For large volumes requirements, liquid gas is delivered by Air Liquide road tankers to vacuum insulated vessels installed on your premises.



Skid tank

For moderate gas volumes, liquid gas can be stored in smaller vacuum insulated vessels installed on your premises.



Packaged Gases

For smaller gas consumption needs, packaged gases like cylinders and bundles or pallets are available.

Supply security with telemetry

Our telemetry solutions guarantee a continuous supply and reduce operational constraints. By automatically monitoring tank levels in real time, the system triggers supply deliveries without manual intervention.

You gain full operational visibility with live data on flow rates and network pressure, and can access all technical and safety documentation.

Accreditations



ISO 9001:2015
Quality



ISO 45001:2018
Safety



FSSC 22000 v6
Food Safety

"We don't just sell gas,

we collaborate closely with the industry as a partner to provide customised solutions that address specific customer needs."

Tianyan CHEN,
Air Liquide International Expert



Passion & expertise

Air Liquide is more than just a gas supplier. Whatever the size of your operations, our global experts and dedicated local teams provide project management and on-site support to ensure your oxygen is both safe and efficient.

Oxygen injection must be optimised for the individual needs and application of each fish farm. The equipment should be carefully selected and designed to achieve maximum efficiency. Air Liquide's experts will recommend the most suitable supply system and equipment to increase profitability for fish farming operations. Whatever the size of your operations, we can support you with:

- ✓ Evaluation of your oxygen needs
- ✓ Oxygen-compatible equipment
- ✓ Configuration of your gas installation
- ✓ Tailored advice on process innovation
- ✓ Oxygen dosing control and process monitoring
- ✓ Gas efficiency and safety audits

Contact us

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Scan the QR code to locate your nearest regional office



Fueling the future of seafood: Air Liquide powers New Zealand's aquaculture innovation

As the global market for premium seafood products continues to grow, New Zealand's aquaculture industry is developing and adapting quickly. As a key industry partner, Air Liquide contributes to positioning New Zealand at the forefront of land-based aquaculture innovation.

Scan the QR code to read more.



Sustainability

Air Liquide is deeply committed to creating a positive impact on both the environment and society. Our strategy and actions are designed to address crucial challenges the world faces today, where we can make an impact and thus invent a sustainable future.

Air Liquide is a world leader in gases, technologies, and services for Industry and Health. With approximately 67,800 employees in 72 countries, Air Liquide serves more than 4 million customers and patients.

Present in the Pacific since 1957, Air Liquide in the Pacific has been partnering with our customers to help them succeed in their competitive markets by providing innovative, value-added gas solutions.

