

Oxygen measurement test – Aquaculture

Successful test of Aanderaa Oxygen Sensor for the Linde Group

Aanderaa's Aqua Optode has been tested in Norway by [AGA AS](#), a member of the Linde Group. For more than 30 years, AGA has been a leading developer and supplier of oxygen solutions for the fish farming industry. Over the last few years, there has been a large focus on oxygenation in sea cages with the new product Solvox DropIn, a compact and energy effective oxygen control system developed for on-growing and waiting pens as well as precision oxygenation during crowding. At use the Solvox DropIn system needs precise feed-back on the prevailing oxygen levels. This triggered a series of inter-comparative tests to find the most suitable sensor.



SOLVOX® Dropln and Twin Kit.

The oxygen sensor test

Five optical oxygen sensors from different manufacturers were selected for the test. In addition, one optical and two galvanic oxygen sensors were included as references. The test itself was carried out in a tank with controlled water environment. All sensors were placed in a sensor rack, that was tilted at an angle of 45° and kept 30 cm from the bottom of the tank. The tank was equipped with diffuser hoses for adding oxygen and nitrogen. The oxygen saturation during the test was ranging from 45% to 250% air saturation. In order to get a realistic algae growth, only seawater was used. Also, a circulation pump was running to keep the water in motion and homogenous. The test lasted for approximately six months.



Test criteria

The following aspects were taken into account:

- Mechanics and electronics (design, perceived quality, signal exchange, condition after test, growth on sensor during test)
- Use (ease of use, ease of integration)
- Process performance (accuracy, response time, short-term stability, long-term stability)
- Service (supplier/dealer, perception of service level and knowledge)
- Economy (price of sensor, sensing foil and accessories)



SOLVOX® Dropln and Twin Kit in test tank, as well as display of data logged during the oxygen measurement test

Results of the test

The Aanderaa [Aqua Optode](#) had the highest score overall in the evaluation, compared with the reference sensors and the other sensors tested. The stability, the fast response time and the robust moulded plastic casing with the rugged fish bite protected cable and solid cable connection on the sensor, as well as the expected low lifetime cost are some of the positive things mentioned in the test for identifying sensors matching the Linde Group's requirements.

As of today the Linde Group recommends the use of Aanderaa 4531 Aqua sensor when operating their Solvox Dropln systems and for cage measurements of oxygen. The sensor will ensure optimal oxygenation and performance of the system.

The Aanderaa Aqua Optode

In 2002 Aanderaa revolutionized the measurement of oceanographic oxygen with the release of optical-based oxygen sensors. Thousands of our optodes are in use around the world. More than 150 scientific papers have so far been published using these sensors. ([Read more here](#)). The 4531 Aqua Optode is one member in the Aanderaa oxygen optode family that was developed specifically for the fish farming industry taking into consideration the mechanical design, quality of oxygen measurement and cost of sensor.

For more information and questions please contact us at aanderaa@xyleminc.com.

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