

New benchmark in sustainable fish farming

SOLVOX[®] OxyStream boosts energy efficiency and fish health at Matorka



Matorka success story



Customer

Headquartered in Kopavogur in Iceland, Matorka specializes in land-based aquaculture, pioneering the production of environmentally friendly and sustainable seafood. The company runs its own hatchery, quarantine, grow-out, processing and export operations. Every day, thousands of customers worldwide enjoy environmentally friendly and healthy products from Matorka.

Utilizing the latest technologies, Matorka feeds a uniquely sustainable diet to its fish, also running its entire operation on clean geothermal energy. In fact, the company's grow-out facility is one of the newest in the world and has proven revolutionary in terms of environmental performance and sustainability.

Challenge

To round out its hatchery and quarantine operations, Matorka decided to build a greenfield grow-out facility. Initially focusing on Arctic char,

this multi-species development will gradually be expanded to include rainbow trout and salmon. In keeping with Matorka's strong commitment to sustainability, the number one priority was to maximize efficiency at the new facility – not only by reusing water to the greatest possible extent, but also by minimizing power consumption. To achieve this, the company needed an oxygenation solution capable of reducing energy and operational costs, while still supporting Matorka's unique configuration. Specifically, the company wanted to cascade water from one tank to the next, using only gravity to keep the water flowing through the farm. The other key success factor in the search for a new oxygenation solution was tank hydraulics. The company wanted a system that would enhance fish welfare and promote growth by optimizing tank hydraulics and ensuring even dissolution of oxygen throughout the tank.

Solution

Matorka turned to its long-standing and trusted oxygen supply partner AGA, member of Linde, for advice. AGA invited Matorka to visit its



Innovation Centre for Aquaculture in Ålesund in Norway to explore the various options and technologies first-hand. Following extensive live demos, consultations and customizing advice, Matorka realized that Linde's SOLVOX® OxyStream system was an ideal match for its needs. SOLVOX oxygen dissolution and distribution systems were developed specifically to meet the requirements of the aquaculture industry.

Matorka decided to install two SOLVOX OxyStream systems – one of which is the high-performance OxyStream A1100 model – in each of its six 1500 m³ production tanks. The company then worked closely with Linde to configure the precise technical details, spanning parameters such as energy consumption, oxygen volume requirements, carbon dioxide levels, carbon dioxide and nitrogen degassing needs, etc. This also involved adapting the SOLVOX OxyStream units so they would integrate seamlessly into Matorka's degassing system. As Sveinbjörn Oddsson, COO at Matorka explained: "We quickly realized that SOLVOX OxyStream was the perfect fit for our needs. It is a low-overhead, energy-

efficient solution that requires nothing other than the pressure in the water system to dissolve the oxygen. Plus, it works well in deep tanks."

Once Matorka finalized the configuration details in consultation with AGA, the Ålesund experts supported on-site deployment with installation, commissioning and optimization services. "It was very reassuring to know that the AGA team really knew what they were doing. Calculating key factors such as the mass balance calls for expert insights – and the obvious expertise of the AGA application engineers really built trust and confidence in the capabilities of SOLVOX OxyStream," continues Oddsson.

Benefits

The SOLVOX oxygenation system has brought a number of compelling benefits to the Matorka facility. First and foremost, it meets Matorka's energy efficiency requirements. It does not require a separate energy supply or pump to dissolve the oxygen or pump the water through



the farm. This makes it extremely cost-efficient to operate.

In addition, SOLVOX OxyStream creates uniform water quality parameters throughout the tanks. In other words, the oxygen is readily available to all fish – regardless of where they are located in the tank. In fact, an expert from the US Freshwater Institute visiting Matorka claimed he had never before seen such consistent results. Highly effective hydraulics has also more than halved the volume of water that needs to be withdrawn and subsequently replaced for filtering purposes (relative to the industry-standard value for partial recirculation systems). This is attributable to the powerful centrifuge effect that draws waste to the center drain. Reduced cleaning effort, coupled with the zero-maintenance design of SOLVOX OxyStream, further lowers operating costs. All of which has combined to enable benchmark energy efficiency at Matorka (in other words, the lowest kW/h rating per fish produced).

The even current within the tanks also has a positive impact on fish health which, in turn, boosts the food conversion rate (FCR). The

company is looking forward to stabilizing the growth gains it has achieved relative to the industry standard. Allowing for batch-to-batch variations and peak gains of as much as 40%, the overall trend is positive and Matorka is aiming to maintain a stable increase of 20% over time. “We are very happy with the results we have achieved thus far with SOLVOX OxyStream and plan to build on the outstanding professional services we have received from AGA as we move forward,” summarizes Árni Páll Einarsson, Chief Executive Officer of Matorka.

Future Plans

In 2019, Matorka plans to double its current annual capacity, which is in excess of 1500 metric tonnes. The plant extension will accommodate additional species such as rainbow trout and salmon. Looking to the medium term, the company plans to expand the farm even further as it meets rising demand for sustainable salmon production. “We certainly will be looking towards AGA and Linde to support these expansion plans,” adds Einarsson.



“We quickly realized that SOLVOX® OxyStream was the perfect fit for our needs. It is a low-overhead, energy-efficient solution that requires nothing other than the pressure in the water system to dissolve the oxygen. Plus, it works well in deep tanks.”

Árni Páll Einarsson, Chief Executive Officer of Matorka

Getting ahead through innovation.

With its innovative concepts, Linde is playing a pioneering role in the global market. As a technology leader, it is our task to constantly raise the bar. Traditionally driven by entrepreneurship, we are working steadily on new high-quality products and innovative processes.

Linde offers more. We create added value, clearly discernible competitive advantages, and greater profitability. Each concept is tailored specifically to meet our customers' requirements – offering standardized as well as customized solutions. This applies to all industries and all companies regardless of their size.

If you want to keep pace with tomorrow's competition, you need a partner by your side for whom top quality, process optimization, and enhanced productivity are part of daily business. However, we define partnership not merely as being there for you but being with you. After all, joint activities form the core of commercial success.

Linde – ideas become solutions.

Linde plc

Gases Division, Carl-von-Linde-Strasse 25, 85716 Unterschleissheim
Phone +49 89 31001-0, www.linde-gas.com/aquaculture