Oxygen Solutions for Aquaculture
Bringing Oxygen Generators to Your Aquaculture Business

Oxymat at a Glance

Oxymat is a Denmark based company specialized in designing and manufacturing on-site Oxygen and Nitrogen solutions, using Pressure Swing Adsorption (PSA) Technology. We have been designing, engineering and manufacturing Oxygen generator systems since 1978 and nitrogen systems since 2001. We possess first hand knowledge of the market, development, demands and possibilities the PSA technology holds. It is our mission to be your preferred innovative, dynamic and environmentally responsible supplier of on-site oxygen and nitrogen solutions worldwide.

Our team of more than 80 skilled and dedicated employees is based in 3 different locations:
• Denmark: Administration, Sales and Service
• Slovakia: Administration, R&D, Production, Project management, Sales and Service
• China: Administration, Sales and Service

With more than 20 engineers (project managers, 3D CAD designers, automation engineers and experienced sales engineers) making sure we offer the right solution for any demand.

Through an ever ongoing process we are always focused on developing Oxymat to be cost-effective and ahead of the competition in terms of quality, performance and price. This strategy has made it possible to grow to the size and position Oxymat has in the market today. Our 2015 turnover was 20,1 mil. € and our product range is the most energy efficient in the market and even at a competitive price.

Our team of specialists will always be able to serve any demand. From our extensive standard industrial or marine programme to highly specialized turnkey projects, Oxymat will provide the quality solution. We offer a wide range of standardized control systems, and remote access and offer to tailor make automation solutions according to your requirement.

It is our priority to always deliver high quality products and services. Oxymat holds all relevant approvals for serving the numerous applications we supply.
• ISO 9001
• ISO 13485
• ISO 14001
• ISO 18001 (OHSAS)
• PED 97/23/EC Module B+D
• MDD 93/42/EEC (Medical Device Directive)

Marine Class societies - we can deliver according to the rules of:
• American Bureau of shipping
• Bureau Veritas
• Det Norske Veritas
• Germanischer Lloyd
• Lloyd's Register
• Nippon Kaiji Kyokai
• RINA

Adding oxygen increases your business

In recent years, fish farming has turned into a high density farming practice using ponds, large scale tanks etc. Fish needs oxygen to live and grow, when fish grow the density of fish in the ponds increases, while the oxygen saturation level in the water decreases and the loss of fish will be high.

Adding oxygen into the water will not only prevent the loss of fish, but it will also gain the growing process for the fish and so does your business.

Oxymat Oxygen Generator saves energy and cost spent on transporting Oxygen cylinders. After the installation, customers can operate easily and start uninterrupted Oxygen supply on-site immediately.

Why Oxymat PSA generators are the wise choice?

Oxymat has many years of experience delivering Oxygen generators to the fish farming industry. Our Oxygen generators are known as: reliable, easy to use and low operational cost.

In Oxymat’s dictionary, there is nothing called a problem, we only see challenges. No matter what your need, we can provide state-of-the-art technology and customized design to meet different requirements. In close cooperation with our increasing number of aquaculture customers, we have designed and developed a product line specifically for this application.

Product range includes models supplying from 0.9 to 634 kg/h, up to 95% purity.

Special design features include:
• Low energy consumption (1.0 kW/m³)
• Low CO₂ emission
• Heavy duty construction designed for rough conditions
• High quality & durable components
• Container installed systems - Optional
• Frame build design - Optional
• Plug and play installation
• High quality Touch Screen Control Unit
• Remote Control Access
• Specialist support from planning , installation and operation of your project
Technology/ Process description

The essence of PSA

PSA process is an extremely clean process and the only ‘raw material’ is air.

On-site Oxygen generators allow an uninterrupted supply of gas with a high purity output. This means that you can produce gas where and when you need it, and in the exact quantity and quality you need, which means gas selfsufficience and independence from external gas suppliers. Oxymat generators are easy to operate and require minimum amount of maintenance and service. Oxymat uses only high quality components and all systems are designed for 24 hours, 365 days a year’s operation. An Oxygen generator combined with cylinder gives the highest level of backup In comparison with cylinders it gives overall a cost reduction up to 80%. The average oxygen production cost is 1.1kWh per cubic meter of oxygen.

“We have had Oxymat Oxygen Generator on wellboats transporting live Salmons for more than 8 years now. Oxymat has through the years earned the reputation and trusts of 95% of our wellboats owners. Oxymat Oxygen Generator needs the minimum of maintenance, uses less/ lower energy and provides uninterrupted oxygen directly to the fish hold through oxygen injection system. Our wellboats sail up to 32 hours in South Chile where the average water temperature is 12-16 degrees, and Oxymat Oxygen Generators is perfect without any problems.”

Mauro Aguayo
Manager
Cflow Chile
Several studies have shown adding dissolved oxygen into water on fish farms has a very positive effect on growth rates, feed conversion ratio and mortality—all factors that will affect your profitability significantly.

In other words, the right amount of oxygen dissolved into water may turn your business into a very profitable success. A minimum oxygen saturation level in the water of 70-80 % will obtain a desirable production, here are some facts for Tilapia as example:

**Feed Conversion Rates (FCR)**

<table>
<thead>
<tr>
<th>Saturation Level of Oxygen</th>
<th>FCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 %</td>
<td>&gt; 2.0</td>
</tr>
<tr>
<td>70 %</td>
<td>1.8</td>
</tr>
<tr>
<td>80 %</td>
<td>1.4</td>
</tr>
<tr>
<td>90 %</td>
<td>1.0</td>
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</tbody>
</table>

**Growth Rates**

<table>
<thead>
<tr>
<th>Saturation Level of Oxygen</th>
<th>Relative Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 %</td>
<td>40</td>
</tr>
<tr>
<td>70 %</td>
<td>60</td>
</tr>
<tr>
<td>80 %</td>
<td>90</td>
</tr>
<tr>
<td>90 %</td>
<td>99</td>
</tr>
</tbody>
</table>

**Mortality Rates**

<table>
<thead>
<tr>
<th>Saturation Level of Oxygen</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 %</td>
<td>5 %</td>
</tr>
<tr>
<td>70 %</td>
<td>2 %</td>
</tr>
<tr>
<td>80 %</td>
<td>1 %</td>
</tr>
<tr>
<td>90 %</td>
<td>&lt; 1 %</td>
</tr>
</tbody>
</table>

Oxymat can assist designing the proper sized oxygen generators, oxygen cones and diffusors to ensure profitability of your business.

Oxygen can also be used for your waste water treatment and as feed gas for your ozone system. Adding oxygen directly into the waste water increases the effectiveness of removing pollutants.

“Inter Aqua Advance A/S has purchased and supplied Oxymat oxygen generators to customers in the fish farm industry in Norway and Canada. The Oxymat oxygen generators were supplied as part of a turn-key delivery of fish farm systems designed to produce Salmon smolts. Oxygen is a significant part of the production price on Salmon smolt. It is therefore important for the fishfarmer that oxygen is produced to a competitive price. By choosing Oxymat oxygen generators, oxygen is secured to a competitive price, without letting go of the reliability and steady operation of the system. After the supply of a fishfarm system, we are in close contact with our customers for several years, and none of the Oxymat Oxygen generators we have supplied, have led to serious claims or warranty repairs.”

Henrik Elgaard
Head of Technology Department B.Sc.
Inter Aqua Advance A/S  Denmark
**Oxymat Cones**

Oxygen Cones are widely used in the aquaculture industry because of their high saturation efficiency. If you are currently pumping water back to your pond, then you can use Oxygen Cone to saturate pure oxygen into water without even using a diffuser. And, you can run the dissolved oxygen up to 25 mg/l with as little water pressure as 1,0 bar. The Oxymat Oxygen Cone is easy to install and simple to operate. There are no moving parts.

Water and oxygen enter at the top of the cone. Due to the larger volume of the cone at the bottom the velocity of the down coming water stream gradually decreases. The buoyancy of the oxygen bubbles counteracts the velocity of the water. Bubbles remain in the cone, where they sub-sequentlly totally dissolve. You can use cones with high water pressure, where a portion of the total water flow is highly supersaturated with oxygen and then mixed with the main water flow to reduce the supersaturation, or with low water pressure where the total water flow is only slightly supersaturated. The choice of water pressure depends on how great extent the plumbing is arranged and whether the water to be oxygenated is seawater or fresh water. Professional system design is suggested to achieve maximum system efficiency. Nom matter what the situation, Oxymat has a suitable cone. The Oxymat Oxygen Cones are made aout of non corrosive fiberglass with flanges n and out, and rated from 1.5 to 4.0 bar(g). See specifications and prices on related catalogue product list.

**With our optional SMS warning system** you are able to receive messages like: “Purity alarm”, “PSA stopped operation” etc.

“We were looking for a supplier of Oxygen to our new fish farm in Latvia, looking through different ways of supplying the Oxygen to our fish farm, and we decided to choose Oxymat solution, thinking ‘why buy it when we can make it on-site’?

Adding Oxygen into the fish tank and enclosures by diffusers keeps the fish healthy and allows them to grow bigger, which help for a fast return of the investment. We also use Oxymat Oxygen Generator to our Ozone production for water recirculating and water treatment program.”

Damas Zivju Audzetava
Latvia
The sky is the limit when it comes to the type of industries Oxymat PSA generators serve. While the bulk of our generators are used in marine and offshore, medical and aquaculture, we also serve many other interesting sectors. Oxygen generators, for instance, are used in areas ranging from glass work, mining and ozone production to steel and metal cutting and waste water treatment. The range of use for nitrogen generators is just as wide ranging from petro-chemical and oil industry to electronics and food and beverage. Oxymat products can be found in all corners of the world, from Asia, Africa and Australia to South America and Europe.

We embrace new challenges and out-of-the-box solutions are designed and developed to serve any need. Through the years this approach has resulted in state-of-the-art solutions ranging from field hospital filling stations for NATO and Swedish Nuclear power stations to gold mines in Sahara and hospitals in Greenland.
We know that service plays a key role to PSA generator systems, from project start-up to evaluation, and throughout the life-span of the generator system. Once installed our customers rightly expect the generator operate flawlessly and we know that any unforeseen problems can have an immediate and major impact to running any business, whether it is fish farm, an oil tanker or a medical facility. Our highly educated specialist can travel worldwide at short notice. At headquarters in Denmark and branches in Slovakia and China they have a call centre with technically trained staff on duty 24 hours a day. In addition to our call centre, we have a global network of skilled partners and distributors, who are always at your service, whether your demand is finding an answer to a simple question or helping you, solve a complex issue. Our customers are always our top priority. Our extensive spare part program ensures day-to-day delivery of high quality original spare parts throughout the lifetime of your plant.

Service agreements
Oxymat Service Agreements are the easiest and best way to ensure you keep the system in perfect working condition. This way, you make sure you will always have the unique performance and reliability that comes with every Oxymat system.
Highest level of international approval

Oxymat has long experience in design, engineering and delivery of hundreds of Oxygen systems all over the world, in accordance with international and national authorities.

Oxymat operates a QA system in accordance with EN ISO 9001:2000 and is certified by Apragaz.