

FRAMO INNOVATION

Pumping systems for fish farming



We develop new solutions for fish farming

Fish farming is Norway's future as far as sea is concerned. Experts anticipate that production will grow by five times within the next 30 years.

To support that rapid growth, we need to develop new technologies and solutions. Among the many challenges that we need to handle are salmon lice, a variety of diseases, algae problems and sludge.

The future of farm fishing will likely include both closed and semi-closed farms at sea as well as closed farms on land. All these solutions require pumping large volumes of water. This is where we at Framo want to support you.



Framo pumping systems for farm fishing have been developed in close cooperation with leading fish farms. The solution is suitable to semi-closed, closed and land-based installations.



**We know pumping,
fish farmers know farming**

Framo is a world-leading supplier of pumping solutions for cargo tankers and the offshore oil and gas industry. These industries require extreme performance, reliability and safety. Now, we can support the same requirements in fish farming.

All Framo products and solutions are developed in close collaboration with our customers. We work with you to better understand your unique business challenges, preferences and needs, and meet them with innovative technology and decades of industry expertise.



The best solutions are those that copy nature

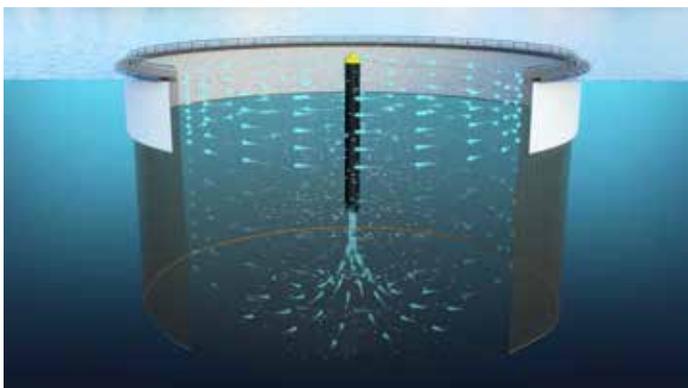
The central idea behind Framo's pumping system was to create solutions able to pump up large amounts of fresh water in order to recreate the stream conditions in the wild. The pump maintains the proper flow, oxygen levels and temperature in the water, which remains free from lice and algae.

Recreating the salmon's optimal environment within the fish farm makes the fish more active. They will naturally use their muscles and senses in the same way as wild salmon. This improves their health and appetite and leads to increased growth and higher fish quality.

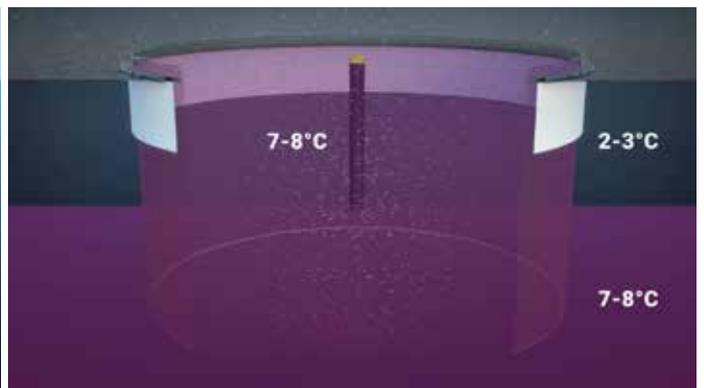
Always in full control

Framo delivers complete systems with pumps as well as control systems, emergency systems and digital monitoring. Additionally, we have a dedicated team of experienced service technicians who are on-call to support your operation when you need them. We are talking about big investments. That is why everything has to function in the best possible way – always.

Every system is tailored according to the needs of the specific fish farm. We employ hydrodynamic analyses and models to determine the correct capacity and pumping requirements. For example, the conditions required to create the right currents in a square tank will be vastly different than those needed in a round one.



Framo's is a solution for fish farms using lice skirts. Using a Framo SR2000 flow generator, we pump large volumes of fresh water up into the lice skirt, distributing the water in a manner that ensures the most efficient water exchange possible.



The pumped water comes from lower depths and therefore provides warmer water during the winter (III.) and colder water during the summer. This ensures the best possible conditions for salmon growth all year long.

Innovative products based on proven technologies

Framo has a long history of developing pumping systems that can be used for water circulation, feed water, sludge treatment and much more.

Framo's SR2000 is a permanent magnetic motor, rim-driven flow generator specifically developed for pumping large volumes of water in systems with low back pressure. The efficient pump features water-lubricated bearings. There is no oil in the system and the motor has neither gears nor shafts. Typical capacities range from 2.8 to 5.6 m³ per second.



SR2000



SEA315



Framo SEA315 is a complete pumping system for fish farms with lice skirts. The integrated system comes with the SR2000 flow generator, cloth tunnel with nozzle tower, strainers and floats.

As a system provider, Framo also delivers a control system with the pumps. We have limitless capacity control with local frequency converters, central steering units that can be connected to other steering systems, as well as remote control.

Framo's SEA315 is a submersible caisson pump used in a wide range of applications such as circulation pump, feed pump or slam pump. The SEA315 is the latest development in Framo's SEA series, which we first delivered to the fish farming industry in the 1980s. Typical capacities range between 500 m³/h to 5000 m³/h.



Framo Innovation: where the future is born

Framo Innovation is based at our headquarters in Askøy outside of Bergen, Norway. We established the Innovation division to discover new areas and markets where our technology and knowledge can be used. Here we have gathered a mix of pump technology experts and talented professionals from other industries who bring new thoughts and ideas.

As part of our fish farming efforts, Framo Innovation has established facilities for prototype testing, simulation systems, modelling tools, 3D printing and VR simulations, as well as an electro lab and a mechanical lab. For Framo, it is critically important that all of our products undergo full-scale testing, and this is equally true for our fish farming pumping systems. This means you can be confident that your installation will deliver reliable performance from day one.



All Framo solutions undergo full-scale testing in our own testing facility.

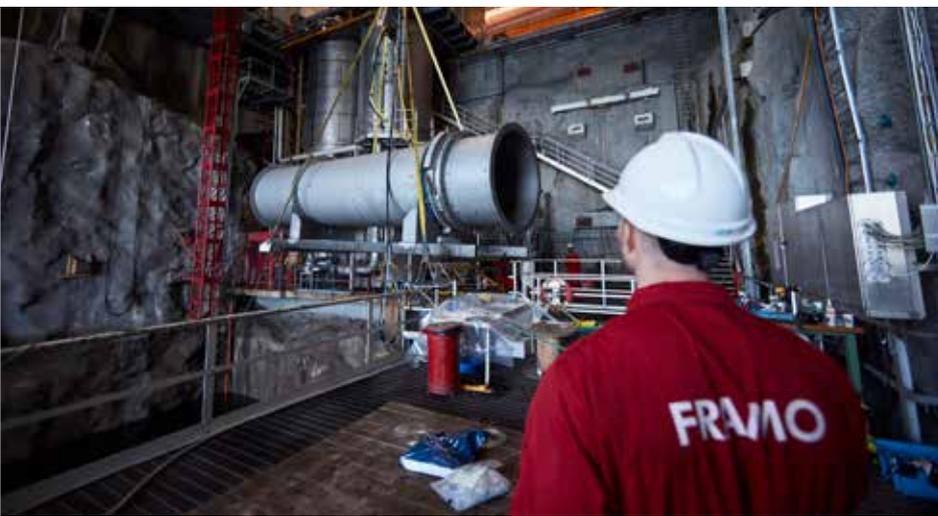


Framo means quality and support

For more than 80 years, ships and offshore platforms around the world have trusted Framo pumping technology to meet their extreme demands for performance, reliability and safety. Framo has now brought this same dependable technology to the fish farming industry.

Throughout the decades, Framo has developed, installed, operated and maintained pumping systems on thousands of tankers as well as oil and gas installations. Our world-class service organization provides dependable support from knowledgeable and experienced technicians who can be there to assist you as soon as you need them. In our own training facilities, we also offer training for your crew to ensure optimal use of the pumping systems.

Additionally, Framo has developed comprehensive systems and routines for digital control and remote monitoring. This can help you ensure maximum uptime and security to safeguard your investment.



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