salsnes filter™

Industrial Applications

Eco-efficient **solids separation**

ABOUT SALSNES FILTER

Over 25 years ago, we designed the first rotating belt filter to provide customers with a highly efficient and reliable technology that could maximize solids separation and decrease costs. Today, we continue to lead the development of this technology from our office and manufacturing facilities in Namsos, Norway. We are a brand in the Trojan Technologies group of businesses, located in Ontario, Canada.

The Salsnes Filter system provides an alternative to conventional primary treatment and can offer:

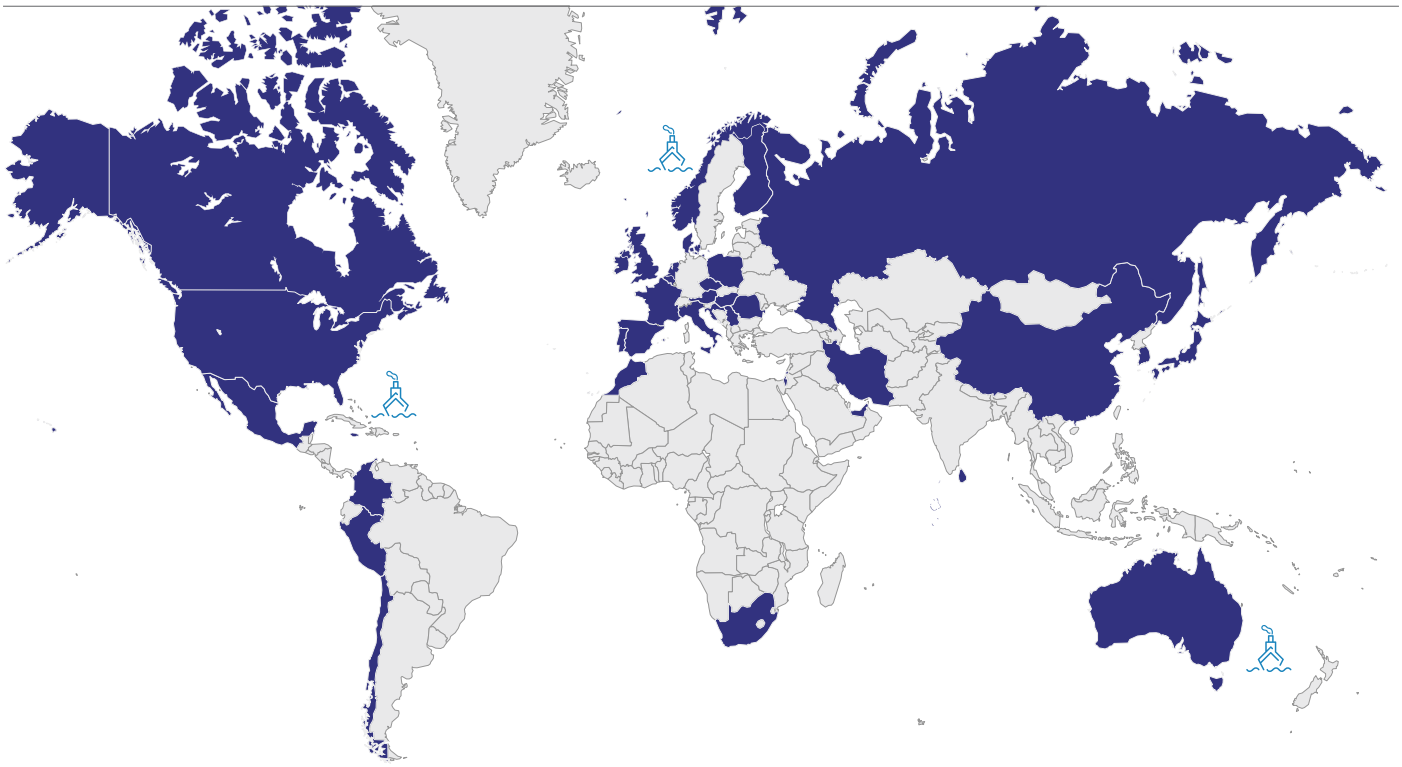
- 30-60% lower investment costs
- 1/10th the land requirements
- Integrated thickening and optional dewatering
- Significantly lower lifecycle costs
- Smaller volume of drier sludge that reduces disposal costs
- Less civil works
- Fully automated equipment
- Optimal removal of TSS to ease demand on downstream biological treatment
  - 30-60% removal in a typical municipal installation
  - up to 80% removal when a polymer is used
- Higher Volatile Solids content in primary sludge for biogas production
- Fast and easy maintenance
- Lower operating costs

Product Overview

	Enclosed Models		Channel Model
			
	SF1000	SF2000 SF4000 SF6000	SFK200 SFK400 SFK600
Maximum Hydraulic Flow	Up to 54 m^3/h (0.3 MGD)	54 - 576 m^3/h (0.3 - 3.7 MGD)	Up to 576 m^3/h (3.7 MGD)
Average Treated Flow	35 m^3/h (0.2 MGD)	90 - 325 m^3/h (0.6 - 2 MGD)	90 - 325 m^3/h (0.6 - 2 MGD)

SALSNES FILTER SYSTEMS AROUND THE WORLD

We have installed over 900 filters around the world, giving us a global footprint in municipal and industrial markets. Our customers use the Salsnes Filter system in municipal wastewater treatment plants, and for a host of industrial applications such as tanneries, cruise ships, aquaculture, biofuel production, pulp & paper and food & beverage.



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INDUSTRIAL APPLICATIONS | Aquaculture

AquaOptima AS
Lensvik, Norway

Since 1993, AquaOptima AS has designed and supplied recirculation aquaculture systems (RAS) for both salt and fresh water species (1 - 500 grams typical) to a global market of hatcheries and growout land-based farms.

The Challenge

The Lensvik Hatchery needed to remove suspended solids from recirculation water prior to their existing biological treatment. This can be especially challenging in aquaculture applications as the particles that need to be removed (excrements and feed waste) are weak by nature, making them prone to breakage. When particles are broken during separation, removal efficiencies can be greatly reduced as you are left with smaller, harder–to–filter particles.

The Solution

Two SFK400 Salsnes Filters with 131 micron filtermesh were installed for solids separation prior to the biological treatment step. The system has a hydraulic capacity of 125 L/S (2.9 MGD) and removes 40 - 90% TSS. The system's gentle filtration process allows for the high TSS removal rates, as particles are separated in such a way that they are not crushed or broken.

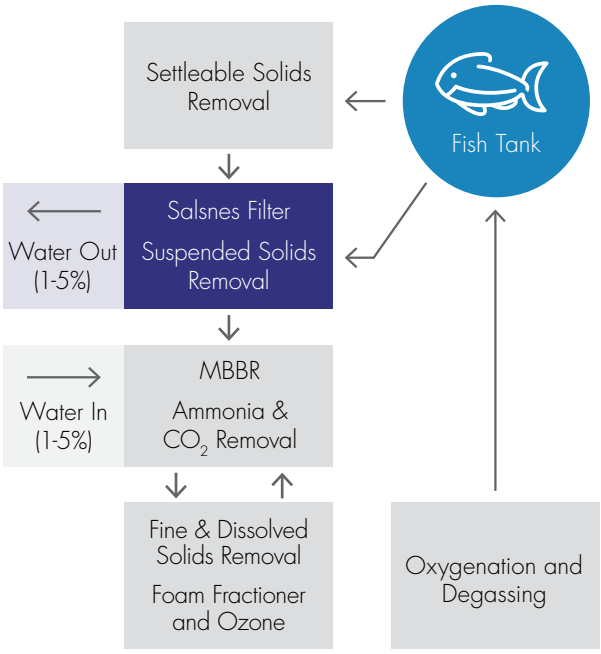
Advantages of Salsnes Filter in Recirculation Aquaculture Systems

- Gentle filtration will not crush or break solids into smaller particles
- Cleaner water for fish
  - provides a better living environment, reducing gill disease and improving growth and survival rates
  - easier for operators to observe fish
- Improved process control - particles and the condition of the filtermesh can be inspected by operators via video camera
- Filtermesh can be cleaned with a high pressure cleaning device to restore it to almost brand new condition. This allows for stable removal efficiencies for longer periods of time.

System Parameters

Salsnes Filter: SFK400
Type of Treatment: Hatchery Recirculation Water

TSS Removal: 40 - 90% TSS
Hydraulic Capacity: 125 L/s (2.9 MGD)



The process stream at Lensvik Hatchery

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INDUSTRIAL APPLICATIONS | Microalgae Harvesting

Aqualia
Chiclana de la Frontera, Spain

Spain's Aqualia, owned by FCC (a global company servicing the environmental, water and infrastructure sectors) was awarded a project under the European Union's Seventh Framework Programme to help build the largest biofuel facility in Europe. The facility, located in Chiclana de la Frontera, Spain, investigates how nutrients from wastewater can grow microalgae to be harvested into biofuel.

The Challenge

Wastewater from the Chiclana Wastewater Treatment Plant was put into 6 (six) raceway-style ponds where the sun accelerated the growth of microalgae. Aqualia needed to find a harvesting technology that could recover microalgae from the wastewater to be further processed into biofuel.

The harvesting technology needed to be able to recover > 95% of algae from the wastewater using less than 0.08 kWh/m^3 of algae.

The Solution

We built a new SF500 pilot-scale Salsnes Filter system that was connected to a flocculator (designed by Asio) and a database system (designed by Inwatec) to create a microalgae harvesting technology named SWAT (Salsnes Water to Algae Treatment).

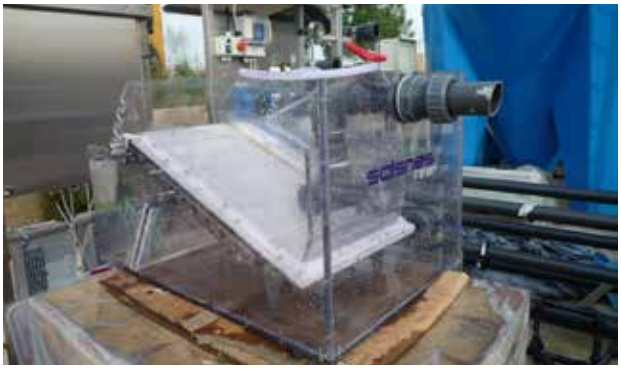
A range of on-site tests were conducted on SWAT, including particle size analysis, direct filtration and speed optimization. Different types of polymer and their dosages were also trailed, all to determine the optimal operating conditions for the system.

When final testing was through, results showed that SWAT could remove > 95% of algae from the wastewater while surpassing the goal for power consumption, using only 0.03 kWh/m^3 algae.

System Parameters

Salsnes Filter: SF500
Type of Treatment: Microalgae Harvesting

Filtermesh Size (Microns)	250	350
Influent Flow (m^3/h)	0.54	0.54
Power Consumed (kWh/m^3)	0.03	0.03
Influent TSS (mg/L)	282	266
TSS Removal (%)	96.7	93.4
Total Solids (g/kg)	50.5	54.9



Pilot-scale SF500 Salsnes Filter system

The Salsnes Filter system separates microalgae from the wastewater

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INDUSTRIAL APPLICATIONS | Chemical Wastewater

Glass Fibre Manufacturer
Netherlands

The Challenge

During the manufacturing of glass fibre cloth, a wastewater stream is produced that contains a large variation in the amount of glass fibre particles, as well as polyvinyl alcohol. Since 2013, this customer has been required to reduce the amount of glass fiber in their wastewater to <300 mg/l before discharging to the Municipality.

The Solution

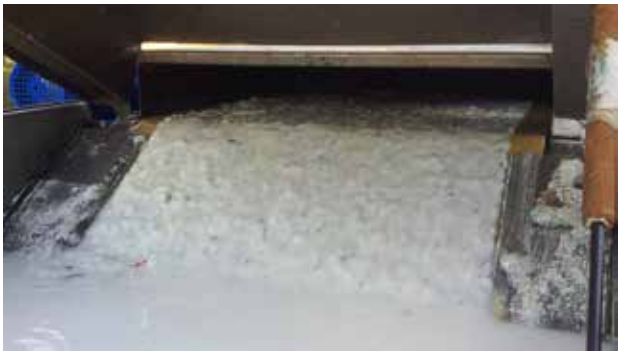
After a laboratory test, the customer decided to install a pilot-scale Salsnes Filter system for futher testing. This testing was carried out over a couple of weeks under varying conditions. The customer was very pleased with the system's performance and decided to permanently install two SF2000 Salsnes Filters with 158 micron filtermesh at their facility.

One of the two Salsnes Filter units handles all the incoming wastewater, removing the required amout of glass fibers before discharge to the Municipality. The second unit stands by to guarantee a 100% availability.

System Parameters

Salsnes Filter: SF2000
Type of Treatment: Chemical Wastewater

Treated Flow: 20 - 40 m^3/h (88 - 175 gpm)
TSS Removal: 30 - 80%
TSS Influent Average: 1600 mg/l



Incoming wastewater meets the filtermesh and glass fiber particles are separated.

Two SF2000 Salsnes Filters

Separated glass fiber particles drop into a collection area.

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INDUSTRIAL APPLICATIONS | Food Processing

Potato Processing Plant
Netherlands

The Challenge

This potato processing plant has a production capacity of approximately 300, 000 tons of potato products per day. This produces an average of 100 m^3/h (0.6 MGD) of wastewater.

Until recently, the plant used mechanical separation equipment (non-Salsnes Filter) and anaerobic digestion for treating their wastewater. They found that after the separation stage, the wastewater still contained a significant concentration of suspended solids. The solids interfered with downstream anaerobic digestion, causing inefficiencies and high disposal costs.

The Solution

Installation of one SF6000 Salsnes Filter with 1000 micron filtermesh has helped to properly remove suspended solids from the wastewater. This has improved the performance of the entire wastewater treatment process and has reduced the discharge load.

System Parameters

Salsnes Filter: SF6000
Type of Treatment: Food Processing

Treated Flow: 100 m^3/h (0.6 MGD)
TSS Removal: 15 - 30%
TSS Influent Average: 4500 mg/l

The thickened and dewatered sludge exiting the Salsnes Filter system.

One SF6000 Salsnes Filter

Wastewater enters the inlet and meets the filtermesh where solids separation takes place.

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INDUSTRIAL APPLICATIONS | Tannery

Tannery
Netherlands

The Challenge

This tannery pre-treats wastewater from production before it is pumped to a wastewater treatment plant managed and operated by an external party. Previously, an in-channel coarse screen was installed to filter the wastewater, but this did not remove enough suspended solids for the treatment plant, so the tannery looked for alternative equipment.

The Solution

Four SFK600 (1000 micron filtermesh) and one SF2000 (350 micron filtermesh) Salsnes Filters were installed to remove suspended solids from the wastewater. In addition to its performance, the system was chosen because of its small footprint and its ability to operate with high levels of chromium in the wastewater.

The SF2000 Salsnes Filter installed at the tannery.

System Parameters

Salsnes Filter: SFK600 and SF2000
Type of Treatment: Tannery Wastewater

Treated Flow: 10 - 60 m^3/h (44 - 260 gpm)
TSS Removal: 30 - 80%
TSS Influent Average: 4000 mg/l

One of four SFK Salsnes Filters installed in a concrete channel.

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INDUSTRIAL APPLICATIONS | Food Processing

Fruit & Vegetable Processing
Netherlands

The Challenge

Many companies in the food processing industry face similar challenges in removing fine particles from their wastewater as they have the potential to clog wastewater treatment equipment. This fruit and vegetable processing facility faced just that.

The facility processes fruits and vegetables throughout the year, and for three months of the year it processes beans as well. During bean processing, a lot of sand is fed into the wastewater and their drain screw did not adequatley remove the sand and other fine particles. This material would flow into the filtrate drain and then into downstream treatment equipment.

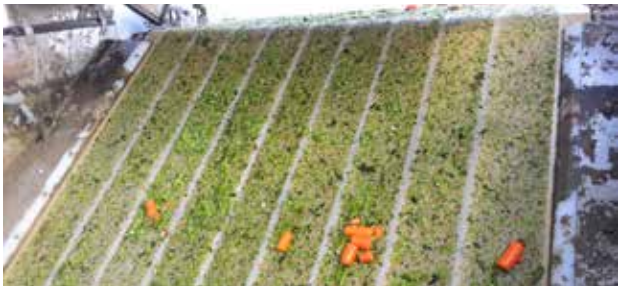
The Solution

One SF4000 Salsnes Filter was installed to operate during the 3 month bean processing season. The system effectively removes sand and fine particles which reduces the organic load for downstream treatment equipment and prevents clogging.

System Parameters

Salsnes Filter: SF4000
Type of Treatment: Food Processing

Flow Rate: 140 m³/h (0.9 MGD)
TSS Removal: 60 – 80%
COD Removal: 15 - 40%
TSS Influent Average: 2000 mg/L
COD Influent Average: 3500 mg/l



Particles are separated from the wastewater on the rotating filtermesh.

The SF4000 Salsnes Filter installed at the facility.

The integrated dewatering system produces a dry sludge.

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INDUSTRIAL APPLICATIONS | Food Processing

Vegetable Processing
Netherlands

The Challenge

At this vegetable processing facility approximately 300 m³/h (1.9 MGD) of water is pumped into gutters, where all vegetable waste is deposited. Larger pieces of vegetable waste are separated from the water by sieve conveyors. The fine particles in the wastewater clogged the sieve conveyors, so this wastewater had to be diverted and treated with a sieve bend.

In the next stage, separated vegetable waste material was poured into tanks in containers. Wastewater is pumped to a concrete reservoir, where some is discharged into the sewer. The discharged wastewater, even after treatment from the sieve bend, still contained significant amounts of suspended solids, requiring the facility to pay high discharge fees.

The Solution

The facility decided to install one SF4000 Salsnes Filter with a 210 micron filtermesh to treat 100 m³/h (0.6 MGD) of wastewater. The system successfully removes 60 - 80% TSS which resulted into considerable cost savings in discharge fees as these solids are no longer discharged into the sewer.

One SF4000 Salsnes Filter is installed to treat 100 m³/h (0.6 MGD) of wastewater.

System Parameters

Salsnes Filter: SF4000
Type of Treatment: Food Processing

Treated Flow: 100 m³/h (0.6 MGD)
TSS Removal: 60 – 80%
TSS Influent Average: 2100 mg/L

Separated particles build up on the filtermesh creating a "filter mat" to enhance separation performance.

The integrated dewatering unit in the Salsnes Filter system produces a dry sludge.

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INDUSTRIAL APPLICATIONS | Food Processing

Shrimp Processing

Morocco

The Challenge

This customer processes shrimp, which involves peeling, cleaning and rinsing processes. The resulting wastewater was discharged into a sewer system that led directly to the sea without any further treatment at a wastewater treatment plant. Therefore, the wastewater discharged was not treated according to the requirements.

The Solution

One SF1000 Salsnes Filter with a 350 micron filtermesh was installed to remove 30 – 80% TSS and 15 – 40% COD from the wastewater to meet discharge requirements.

The SF1000 Salsnes Filter installed at the shrimp processing facility

The Salsnes Filter system contains an integrated sludge dewatering unit.

System Parameters

Salsnes Filter: SF1000
Type of Treatment: Food Processing

Flow Rate: 20 m^3/h (88 gpm)
TSS Removal: 30 – 80%
COD Removal: 15 - 40%
TSS Influent Average: 1400 mg/l
COD Influent Average: 2000 mg/l

Separated solids build up on the filtermesh and then move onto the sludge thickening and dewatering processes integrated within the system.

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