NP Filters

Water treatment for aquaculture

The success of fish farming is totally dependent on the water quality. Securing good water conditions to allow for good fish health and high production yield, is therefore one of the most vital factors.

State of the art solutions for particle removal

With focus on land-based fish farming, NP Innovation have refined the design of aquaculture filters. The products have been developed with a strong focus on functionality, performance, and robustness – but also on minimizing the investment and running costs, to make the products both technically and commercially attractive.

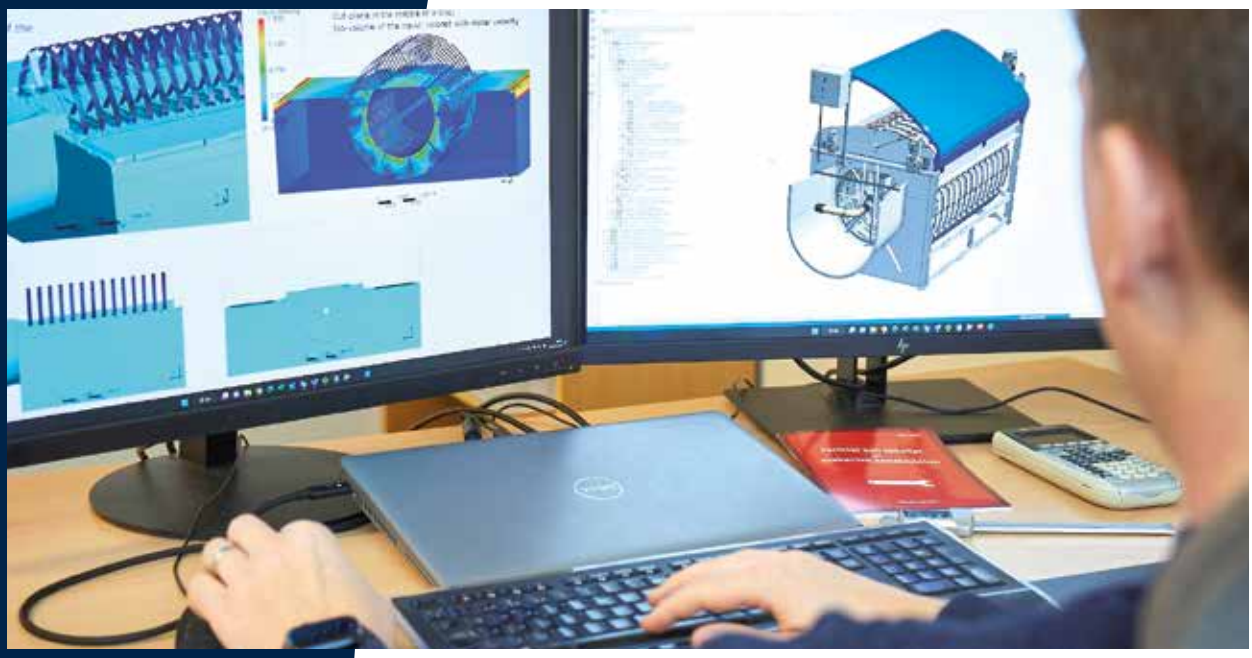
NP Innovations mechanical self-cleaning filters for aquaculture applications are designed for high performance in water-treatment systems, where it is essential to minimize particle break-up.

Microscreens in aquaculture

One of the key treatment steps in recirculating aquaculture system plants is efficient and gentle particle removal. It is important to get the particles out as quickly as possible so that they are not degraded into finer particles or broken down by bacteria in the water.

Microscreens have been used for aquaculture for a long time. The drum filter, especially, is extensively applied both for inlet and effluent treatment in flow-through plants, and for particle removal internally in re-use and RAS plants.

Especially for particle removal in the recirculation loop, the disc filter has shown to be outstanding. This is due to its high filter capacity, the gentle and quick removal of particles and all this



at a very low footprint, ensuring not only favorable capex but also a very low opex over time.

How drum filters and disc filters work

As the name indicates, the drum filter is built around a drum-shaped skeleton enclosed with external filter panels. The untreated water flows into the drum, and gravity drives the water through the filter panels and out of the drum (figure 1a).

In the disc filter, the influent water also enters a central drum. The drum has a number of openings that distributes the water to the filter discs (figure 1b). The disc segments are made up of several filter cassettes with filter cloth on both sides. This increases the filter area considerably.

The water is filtered passively through the filter cloth in a similar manner as for the drum filter. However, the disc filter has a significantly larger filter area which provides a more efficient filtration, or alternatively, a smaller footprint.

As particles accumulate on the filter cloth and the resistance increases, the water level inside the filter will rise with time. Common to both types of filters are that a backwash cycle is automatically initiated when the water level reaches a certain level.

The filter panels are then sprayed from the outside to clean the filter cloth. Reject water containing particles is collected in a long trough located inside the filter, along which it exits, e.g. to a collection tank for further sludge treatment.

Larger filter area in a smaller space

A disc filter has more than three times the filter area of a drum filter with a corresponding footprint. It is therefore possible to use much finer cloth in the disc filter and still ensure favourable overcapacity in relation to the filter area. This prevents the differential pressure from increasing too much over time as a result of fouling of the mesh. For example, it is possible to use 30 to 50-micron cloth instead of 60-micron which is widely used in drum filters.

In general, fewer and smaller units of disc filters will be needed when compared to drum

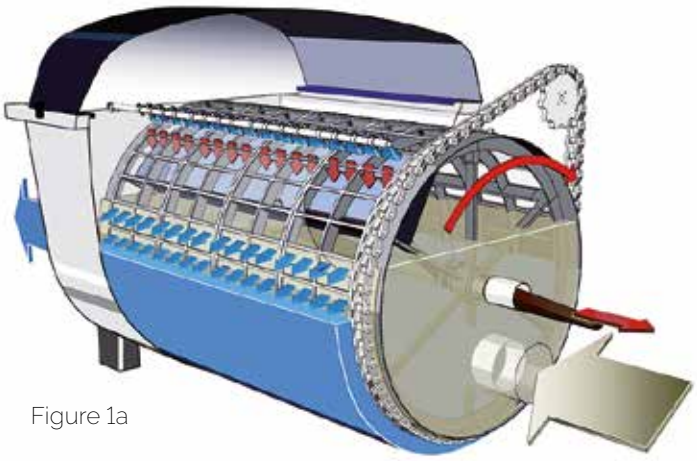


Figure 1a

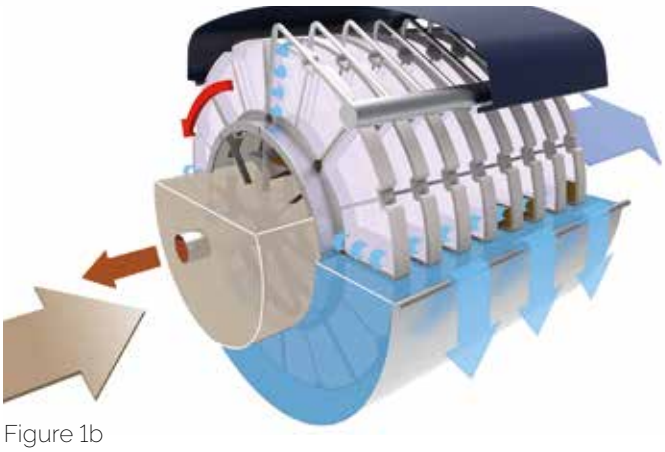


Figure 1b

filters. Being able to take up less space for filter installations can also have other positive economic aspects, for example by reducing the size of the building and the plant site.

Backwash water and energy consumption tests with water from RAS modules have shown that a disc filter produces 45 % less reject water than a drum filter while extracting the same amount of suspended matter.

So, what are the benefits of minimizing the amount of reject water beyond reducing the water consumption?

Firstly, the operating cost is reduced corresponding to the reduction of the backwash water. The energy consumption – which is mainly spent on pumping backwash water and rotating the drum – is therefore lower in a disc filter than in a drum filter.

Secondly, there will be less volume of sludge that must be stored and dewatered. This in turn can reduce the need to invest in sludge storage and dewatering equipment.

NP Innovation's Drumfilter is a mechanical, self-cleaning microscreen filter designed for high performance in water-treatment systems where it is essential to minimize particle break-up.

NP Drumfilter

The NP Drumfilter is ideal for use in aquaculture applications as well as industrial and municipal water and waste-water treatment. The filter design ensures careful handling of solids to achieve the best filtration effect.
The improvements cover both the design and manufacturing stages, enhancing filtration performance whilst lowering the investment, as well as operating and maintenance costs. To ensure the highest standards of quality all design work and manufacturing takes place in Sweden.

Why is it better?

The development work leading up to the new NP Drumfilter covers the basic design principles, as well as many detail refinements. For example:

- Drum design with support shaft and slide centre bearings at each end – improved structural integrity, reduced over-all weight and long-life bearings help reduce investment and operational costs.
- Increased drum length-to-diameter ratio – provides an increase in peak solids loading capacity.
- Drumfilters from model size 1212 and upwards are by default equipped with oscillating backwash spray header ("Moving Backwash"). This function improves the cleaning and life span of the filter cloth and reduces backwash water consumption by 20 %.
- Peripheral drive arrangement with lubricant-free non-metallic chain reduce stress on the drum structure and drive arrangement, leading to reduced maintenance costs.
- Choice of modular filter panel designs: PG panel with polypropylene grid and the PL panel with 8 % larger open filter area. Comparison tests show quicker lifting-out of particles and less lifting-out of water.
- Single GRP access cover with stainless steel gas struts and safety switch – enhanced safety and access in service and maintenance.
- Modular design – increases manufacturing efficiency leading to reduced initial purchase cost and improved delivery periods.
- Emergency bypass – protects the drumfilter from overloading.

Highlights

- High flow capacity.
- Designed for careful handling of solids which in combination with the special PL filter panel, ensures high filtration and no grinding effect.
- Moving backwash reduces water consumption and gives the best possible cleaning of the filter panels.

Model Range

1. Stainless steel tank version
2. Drumfilter with FRP tank (Fiberglass Reinforced Plastic)
3. Freestanding stainless steel tank version
4. Stainless steel frame version

1 2 3 4

NP Innovation have adapted the disc filter technology for aquaculture criteria and made our Discfilter the most optimized disc filter solution on the aquaculture market.

NP Discfilter

The filter has several filter media discs attached to a drum. The filter is rotated by a helical worm gear motor via a lubricant-free chain, running on the peripheral of the centre drum, leading to lower power consumption and reduced maintenance costs.

The optimized way of filtering water

The NP Discfilter is a mechanical self-cleaning filter for removal of suspended solids, specially designed for aquaculture applications. The inflow enters the filter drum and is distributed into the disc segments by gravity. The filter media attached to the discs separates the solids from the inflow and allows the filtrate to pass through. The separated particles are removed with the backwash system and is flushed into the sludge trough.

All NP Discfilters are by default equipped with oscillating backwash spray header ("Moving Backwash"). This function improves the cleaning and life span of the filter cloth and reduces backwash water consumption by 20 %.

The filter cloth is normally made from polyester, or stainless steel if required. The filter opening can be chosen from a wide range, normally from 10 to 100µm.

Material: Stainless steel EN 1.4301, EN 1.4404 or EN 1.4462 (Duplex).

The cover is by default made from GRP.

Highlights

- Large filter area per sqm footprint which gives lower CAPEX on the construction and installation work.
- The filter technology has been adapted for aquaculture criteria.
- Large filter area allows for better filtration and the use of finer filter cloth.
- Excellent for lifting out particles both gently and quickly, resulting in high concentrations of solids in the reject water.
- Moving backwash reduces the water consumption.
- Easy to access filter media for cleaning and maintenance purposes.

Model Range

Frame version

Frame version with level tank

Tank version

The tank version is a free-standing filter, whereas the framed version enables installation in concrete channels.

NP Innovation
– a company dedicated to the development of water treatment solutions for aquaculture applications.

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