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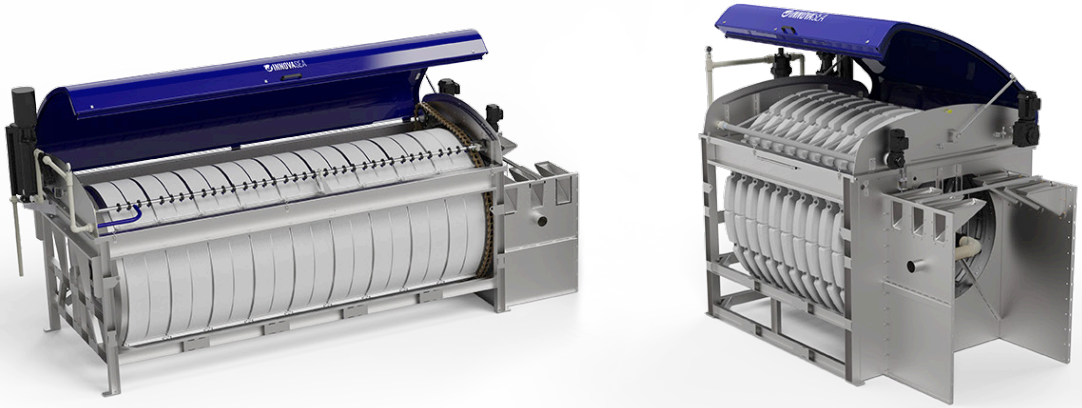

THE ULTIMATE STARTER GUIDE TO DRUM AND DISC FILTERS

Everything you need to know for selecting the ideal filtration setup for your facility

BUYER'S GUIDE

2024

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An Intro to Drum and Disc Filters

Water filtration is vital to all aquaculture systems, especially recirculating aquaculture systems (RAS). By swiftly and effectively removing solid particles from the water – before they degrade into smaller fragments – operators can keep their fish healthy and limit disease by preventing the buildup of harmful nitrogen by-products.

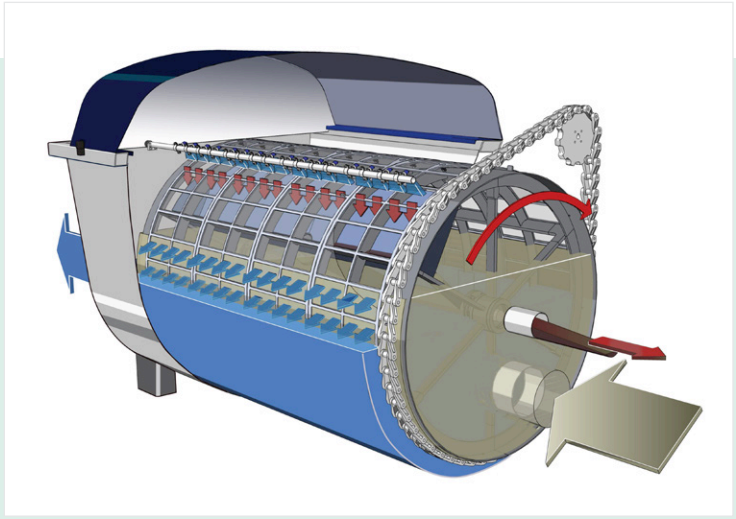
Historically, **drum filters** have been the filtration workhorse for fish farms, but over the last decade, operators have had another effective tool at their disposal: **the disc filter**.

In this buyer's guide, we'll explore the main differences between the two and help you navigate the essential factors to consider, such as sizing and model selection. While this guide provides a solid starting point for understanding your options, choosing the right filter requires carefully considering many factors. For personalized guidance and expert recommendations, contact the Innovasea team.

At Innovasea, we've partnered with **NP Innovation**, the leaders in aquaculture water treatment and **inventors of the aquaculture disc filter**, to deliver state-of-the-art drum and disc filters. When comparing the capabilities of different models, we'll be referencing Innovasea's current offering.

How Drum and Disc Filters Work

While both drum and disc filters leverage micro screen filters to catch and remove particles, there are several important differences.

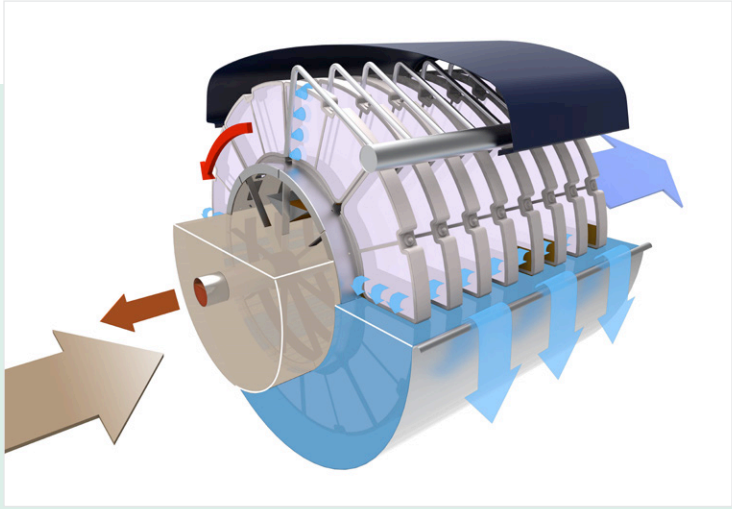


DRUM FILTERS

Water enters the drum filter by gravity and flows through a unified set of filter screens. The suspended solids collect inside the filter panels. As the water level rises, the drum filter rotates, automatically activating the backwash system.

The nozzles spray the outside of the filter panels, removing build-up from the panels, which is collected in a trough to be discarded. Cleaned water can now move to the rest of the system.

With the Innovasea drum filter, operators gain an efficient, powerful and customizable water filtration solution that works well for a wide variety of aquaculture systems and sizes.



DISC FILTERS

Disc filters are well-suited to manage the filtration requirements and higher flow rates seen in very large RAS facilities. The major innovation comes from introducing three-dimensional "cassettes" with filter mesh on both sides. These cassettes are arranged in a side-by-side configuration to create a circle or disc, with each filter containing multiple discs.

This innovative, multi-layer design allows for a filter area three times larger than a drum filter on the same footprint. It enables the machine to handle higher flows, filter smaller particles, and process more water.

In a disc filter, untreated water similarly enters through a central location, moving through rows of disc segments in the middle of the drum. From here, particles are trapped on both sides of the cassettes Like drum filters, disc filters also use a series of backwash spray nozzles to clean the mesh and send the sludge out of the system.

The cleaned water flows out to the rest of the RAS.

Drum vs. Disc: Which is Right for Me?

Drum and disc filters each offer unique benefits, and it's important to understand these when choosing between them.

BENEFITS OF A DRUM FILTER

From hatcheries to grow-out facilities and influent and effluent treatment systems, drum filters can be ordered in various sizes, making them ideal for a wide range of land-based aquaculture applications. They excel in facilities with lower flow rates and can effectively handle everything from large items to particles as fine as 20 microns and below.

Benefits of a drum filter include:

- **Diverse selection:** Drum filters come in a broad range of sizes, allowing you to get the perfect fit for your needs.
- **Lower upfront costs:** The initial cost of a drum filter is typically cheaper than that of a disc filter, making it a more cost-effective initial investment.

BENEFITS OF A DISC FILTER

Disc filters are best for medium- to large-scale applications with high flow rates, where rapid particle removal is essential and physical space is limited.

Benefits of a disc filter include:

- **Greater efficiency:** The filter area of a disc filter is 3x larger than a drum filter on the same footprint, allowing operators to use a finer mesh and capitalize on its efficiency for higher flow rates.
- **Smaller physical footprint:** For higher flow rate applications, disc filters are smaller and produce less waste than a drum filter. This reduces the space required for your filtration setup.
- **Operational savings:** Because of their two-sided filter design, disc filters require less electricity and create less discharge water while extracting the same amount of material.

Which Drum or Disc Filter is Right for Me?

Once you have selected between a drum or disc filter, choosing the right filter material composition, model, and size for your facility requires the expert assessment of several critical factors. The following section outlines some key considerations Innovasea's team will evaluate when helping you select the ideal filter for your system.

MATERIAL COMPOSITION FOR DRUM AND DISC FILTERS IN AQUACULTURE

Material composition is crucial, as it directly impacts the filter's durability and performance in different water environments.

Fiberglass tank 500 mm

Fiberglass tank 800 mm

Fiberglass reinforced plastic (FRP) is used exclusively for the smallest drum filters, making it ideal for facilities with low flow rates, such as small hatcheries and nurseries. It offers significant advantages, including lightweight construction for easy handling, exceptional resistance to corrosion, and stability across various temperatures and chemicals. Additionally, FRP is a cost-effective alternative to metal filters, providing durability and reliability in compact, low-flow aquaculture systems.

Stainless steel is the most common material used for drum and disc filters due to its robustness and corrosion resistance. However, the specific type of stainless steel selected depends on the salinity and temperature of the water in the facility where the filters will operate.

Freestanding steel tank

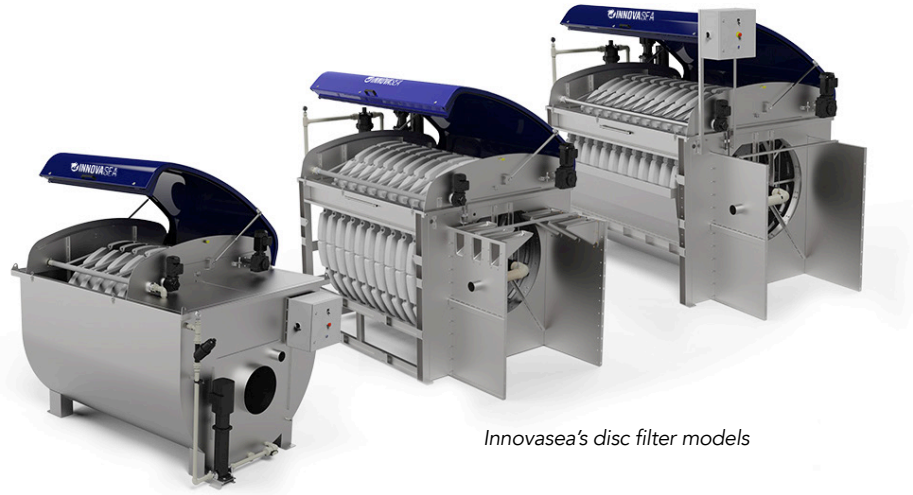
Stainless steel frame

- **304 Stainless Steel (304SS):** This is the standard choice for freshwater environments. 304SS provides excellent corrosion resistance in non-saline water, making it a reliable and cost-effective option for aquaculture facilities that operate solely in freshwater.
- **316 Stainless Steel (316SS):** For aquaculture systems in brackish water—where salinity levels are higher than freshwater but lower than seawater—316SS is the preferred material. It contains molybdenum, which enhances its resistance to pitting and corrosion in more challenging environments.
- **Duplex Stainless Steel:** In seawater environments, where the risk of corrosion is highest due to high salinity and humidity, duplex stainless steel is the optimal choice. Duplex combines the benefits of austenitic and ferritic stainless steel, offering superior strength and resistance to stress corrosion cracking. This makes it ideal for marine aquaculture or any facility exposed to harsh coastal conditions.

By selecting the appropriate material for your specific environment, you can ensure that your drum and disc filters will provide long-lasting performance and reliability, safeguarding the health of your aquaculture operation.

Model Type Selection for Drum and Disc Filters in Aquaculture

Drum and disc filters are available in various model types, each suited to different operational needs.



Innovasea's disc filter models

TANK VERSION

Offers a self-contained unit with an integrated tank. This compact, all-in-one solution is ideal for smaller operations, like hatcheries, where space is limited, and easy maintenance is essential.

FRAME VERSION

Designed to be installed within existing tanks or ponds, this model can be easily integrated into various aquaculture setups, making it ideal for larger or custom-built systems.

FRAME VERSION WITH LEVEL TANK

Combines the frame version with a level tank to maintain consistent water levels for optimal performance when a weir is not included in the system.

> *Choosing the right model ensures effective and efficient water filtration tailored to the specific facility design. Stainless steel drum and disc filters come in all three versions, while the FRP drum filter is only available in the tank version.*

Selecting the Right Drum or Disc Filter Size

Below are some factors an Innovasea technician will require to help determine the appropriate filter size.

FLOW RATE

The flow rate directly impacts the size of the drum or disc filter. Higher flow rates require larger filters to process the increased volume of water without sacrificing filtration efficiency or creating frequent clogging.

MICRON SCREEN SIZE

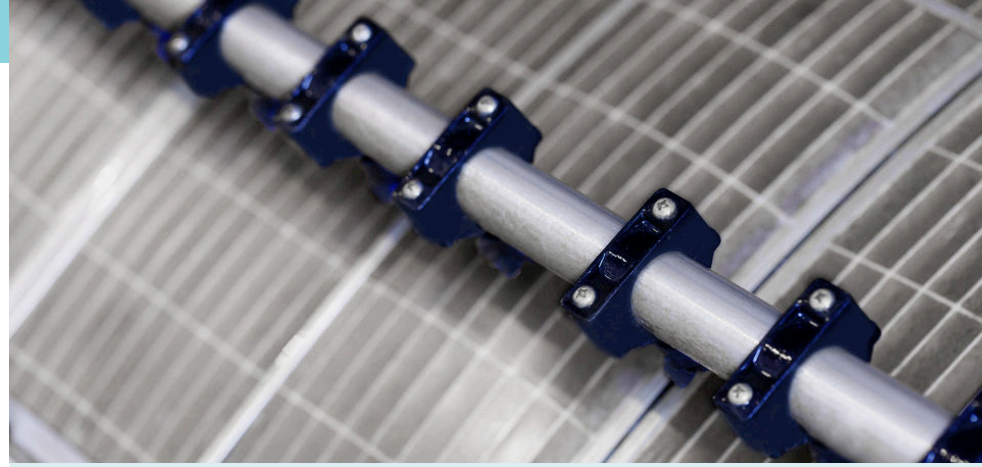
The micron screen size refers to the size of the particles that the filter will capture. Different aquaculture systems may require different levels of filtration based on the species and water quality standards. Selecting the appropriate micron screen size will help determine the overall filter size needed to achieve the desired water clarity.

TOTAL SUSPENDED SOLIDS

TSS levels indicate the concentration of particulate matter in the water. A higher TSS requires a larger filter to manage solids effectively without clogging.

AVAILABLE PHYSICAL SPACE

Another important factor is the available space in your facility. Before making a decision, it is crucial to measure where you plan to put your drum or disc filter to ensure it will fit. When taking measurements, consider your other equipment, installation, and maintenance needs.



Moving spray bar automatically cleans panels

Secondary characteristics to consider:

TEMPERATURE OF THE WATER

Water temperature can affect the biological load in the water, as higher temperatures often increase biological activity and waste production. With warmer water, you may require a more robust filtration system or a larger size to handle increased bio-waste efficiently.

WATER TYPE (INCOMING, RAS, OR EFFLUENT)

The water source can dictate the type of filtration needed. Incoming water might require less stringent filtration than a RAS system, while effluent water might need specialized filters to handle higher levels of waste before discharge. The filter needs to be able to withstand all potential chemical and biological contaminants without degrading.

SALINITY

Salinity can affect the type of biological and particulate load in the water. Higher salinity environments can require larger filters to remove salt-tolerant debris and organisms effectively.

Drum or Disc Filter: Real-Life Examples

Taking everything we've covered thus far, let's explore two real farms that Innovasea worked with to identify and install the right filtration system for them.

CASE 1

Fish species	Lumpfish
Size of farm	300,000 juveniles
Water Type	RAS
Water Temp	42–45°F
Salinity	Saltwater

Drum or Disc Filter: **Drum**

The reasons why: After reviewing the farm's operations and layout, the Innovasea team recommended five tank stainless steel drum filters. This particular version and size were ideal because it allowed them to effectively filter 1800 gpm of water down to 30 microns. In addition, the tank was easily integrated into the system's low head design, while the stainless steel provided excellent corrosion resistance in the system's cold saltwater environment.

CASE 2

Fish species	Atlantic Salmon
Size of farm	10,000 MT
Water Type	RAS
Water Temp	54–57°F
Salinity	Freshwater

Drum or Disc Filter: **Disc**

The reasons why: After a comprehensive evaluation of this large production facility, the Innovasea team recommended 56 stainless steel disc filters of different model types. This setup could handle the RAS facility's large flow rates, while providing a cost-effective solution. The size and efficiency of the disc screens allow the farm to use fewer filters than if they had chosen drum filters for the facility. This decision also allowed them to save on space, construction costs, and energy usage.

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WHY INNOVASEA

At Innovasea, we have the expertise, experience, and technology to create the ideal conditions for raising fish in any environment. As world leaders in land-based aquaculture and RAS solutions, we understand the importance of reliable, high-performance systems. Whether you choose an Innovasea disc or drum filter, you can trust in the highest quality standards and innovative solutions that fit your needs.

To start designing your water filtration system, or to learn how we can help with all aspects of your aquaculture project, speak with a member of the Innovasea team today.

Click here to talk to an Innovasea team member >