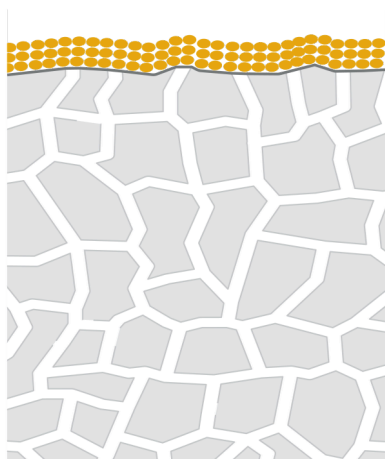


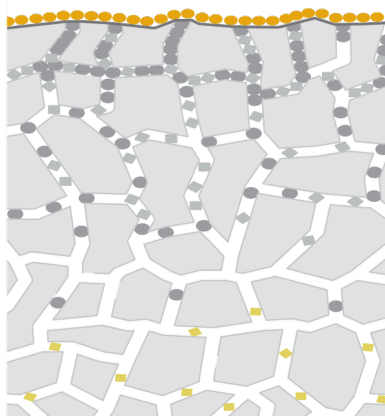


FILTRODISC™ depth filter module DISCSTAR™ housing

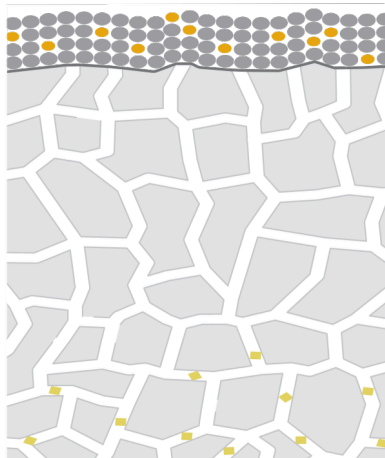
Principles of depth filtration



Surface filtration



Depth filtration



Pre-coat filtration

- = Particles > 5 µm
- = Filter aid > 10 µm
- ◆ = Particles < 5 µm
- ◆ = Particles < 1 µm

Depth filters are used to remove particles from a liquid. This means that liquids can be clear-, fine- or sterilization filtered.

“Thick” filter media (2.5–4.5 mm) are used with depth filtration. The particles are retained using two filtration principles: 1. surface filtration and 2. depth filtration. The liquid flows through a three-dimensional, asymmetrical fiber network in the depth filter. The solid components are retained using mechanical and electrokinetic effects. This significantly increases the intake and adsorbing capacity.

The purpose of a filtration process is either to purify a liquid (filtrate) or to retain solids (retentate). Depth filtration is mainly concentrated on the production of liquid filtrate.

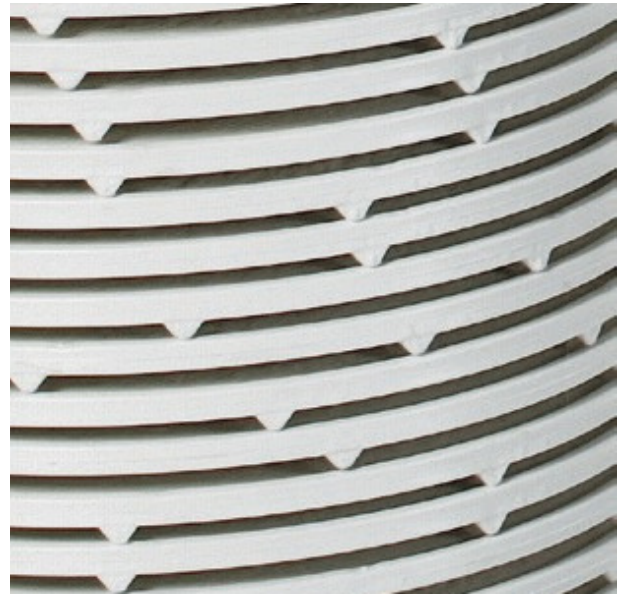
Filter sheets consist of a combination of especially receptive fibers (e.g. cellulose) and powdery, anorganic filter aids such as kieselguhr and/or perlite. The retention rate can be specified by the grinding method and the volume and type of base material used as the filter aid. Small quantities of polymer resin are added as a wet-strength agent. Depending on the type of polymer resin, a lesser or greater positive charge – also called the “zeta potential” – is produced when passing through the filter sheet. The positive charge improves the adsorption of small, negatively-charged particles or micro-organisms. The interior absorption volume of a typical depth filter sheet is approximately 4 kg/m² of filter surface. During the filtration process, multiple depth filter sheets are used one after the other in a sheet filter (NOVOX®). This enables a large filter area to be created in a relatively small space. Another method of using depth filter sheets in a less time-consuming and more effortless way is to use depth filter modules (FILTRODISC™).

With this method, a pre-loaded filter pack is installed in a filter housing (DISCSTAR™). Depth filters are exhausted when the inner matrix is filled with slurry particles. One indication of this is the increasing difference in pressure between the inflow (unfiltrate) and the outflow (filtrate) and a lower flow rate for the liquid. After a certain point, the capacity of the depth filter is exhausted (1.5 bar for sterilization; 2.5–3 bar for clarifying the liquid). Under certain circumstances it is possible for the filter to be regenerated.

Under high particle loads (approx. 1.5%), standard depth filters can blind fast.

By using a filter aid such as Kieselgur (pre-coat filtration process), the flow rate can be increased. With pre-coat filtration, filter aids are suspended in a liquid and then floated onto a supporting sheet in a plate & frame filter to form a filter cake. When doing this, the FILTODUR® supporting sheets themselves function not as filters, but merely as a support for the filter cakes, which is where the actual slurry removal takes place. The separation of particles in this process uses a mechanism similar to that with filter sheets. As with sheet filtration, an increase in the differential pressure indicates when the filter configuration is exhausted. As the filter cake is usually thicker than the filter sheets, pre-coat filters have a longer lifetime due to their greater slurry absorption capacity. The filter cake used is flushed out and disposed of depending on the nature of the slurry.

Functional principle



FILTRODISC™ depth filter modules are used in a sealed housing (DISCSTAR™). The inner rigid core is connected to the filtrate side of the housing. The space between the housing and the module is filled with unfiltrate. During filtration, a differential pressure is produced between the unfiltrate and filtrate sides; this causes the solution to be forced through the depth filter sheets installed in the modules at a constant flow rate. The module has to be replaced or regenerated when the capacity of the filter sheet is exhausted and the differential pressure reaches 2–2.5 bar.

FILTROX FILTRODISC™ modules are constantly being re-developed to keep up with industry requirements. The design of the modules combines the advantages of conventional depth filtration with the positive properties of enclosed filtration in DISCSTAR™ housings.

FILTRODISC™ modules



Depth filter modules enable large filter areas to be handled easily. The filtration takes place in an enclosed system (DISCSTAR™). The installed depth filter sheets have a high particle absorption capacity of up to 4 kg/m². In the filtration process itself, the particles are decelerated in the filter sheet and ultimately retained by their size or the electrokinetic forces. Because of the many different applications

and industries, FILTROX offers a correspondingly wide range of products. This means that the best possible product can be offered in each case as a result of testing on the customer's premises or in our laboratory.

All materials used are FDA approved. Any filter sheet in the FILTROX portfolio can be installed in the modules.



FILTRODISC™ TS Modules with technical sheets that have an open filter matrix and are ideally suited to viscous solutions, for example.

FILTRODISC™ AF

Standard FIBRAFIX® depth filter sheets for a large number of applications.

FILTRODISC™ CH P

Manufactured with our PURAFIX® sheets, with low ion and pyrogen values, for use in critical applications.

FILTRODISC™ SY

Modules with layers reinforced with synthetic components such as HDPE.



FILTRODISC™ CARBOFIL™ Filter modules with immobilized activated carbon in the filter sheet.



FILTRODISC™ HT High temperature modules for use at up to 110 °C.

FILTRODISC™ UHT

Ultra-high temperature modules for use at up to 180 °C.

Available module types

	10"	12"	16"
Diameter (mm)	255	287	398
Max. filter area/module (m2)	1.3	1.8	3.6
Height (DOR adapter)	330	330	330
Height (DOE adapter)	272	272	272

DOE = flat adapter; DOR = bayonet adapter
Standard is 16 lenses/module; fewer lenses are possible on request.

Operating conditions

Max. operating temperature	82 °C 110 °C
Max. high temperature (HT) operation	180 °C
Max. ultra-high temperature (UHT) operation	2.4 bar
Max. differential pressure (modules)	50 l/m2
Recommended flush volume	Hot water, chemical or steam (HT / UHT)
Recommended sterilization	

Note: With chemical sterilization using oxidizing reagents, do not exceed the recommended contact time. Inline steam sterilization requires careful handling to prevent counter-

pressure. More information can be found in the specific brochures and validation guidelines.

Applications

FILTRODISC™ TS –Paints, ink and adhesives – Process water – Biodiesel –Highly viscous solutions – ...

FILTRODISC™ AF –Beverages (beer, wine, juice, liquor etc.) –Fine chemicals – Cosmetics –Plant and natural extracts –Paints, inks and adhesives –Process water – Solvents – ...

FILTRODISC™ CH P –APIs (active pharmaceutical ingredients) – Biotech – Enzymes –Plant and natural extracts –Distilled products (alcohol, spirits) –Pharmaceutical intermediates –Active agents –Blood fractionation – ...

FILTRODISC™ SY
–Enzyme solutions (cellulase)
–Chemical solutions

FILTRODISC™ HT
–Synthetic products
–Heat transfer liquids
–Process/operation liquids
– Solvents
– ...

FILTRODISC™ UHT
–Synthetic products
–Heat transfer liquids
–Process/operation liquids
– Solvents
– ...

FILTRODISC™ HT/UHT modules are available for all sheets in the FILTROX portfolio.

FILTRODISC™ CARBOFIL™ – Decoloration
–Odor removal –For more applications, see the CARBOFIL™ special brochure

DISCSTAR™ housing

The DISCSTAR™ is a highly precise stainless steel filter housing for filter modules, developed and manufactured for everyday use. The enclosed system enables depth filtration to be carried out without drip loss. The large number of variants makes it possible to find the ideal solution for the relevant filtration application.

The DISCSTAR™ is available with two attachment options for the modules: flat gasket (DOE) and double O-ring gasket (DOR). The DOR gasket with bayonet adapter guarantees the highest level of safety. The pharma version of the DISCSTAR™ has an inclined internal base plate for maximum possible emptying.



DISCSTAR™ PTC (only 12" version and with DOR adapter)

Cost-effective solution for chemical applications

- Bulk chemicals
- Abrasives
- Lacquers / paints / inks
- ...



DISCSTAR™ G DISCSTAR™ for food and beverage applications

- Wine
- Tea
- Juice
- Distilled products
- Beer
- Sugars
- ...



DISCSTAR™ I DISCSTAR™ for industrial applications

- Cosmetics (hair lotion, perfumes, aftershave etc.)
- Chemicals (hazardous liquids, filtrations that require EX protection)
- F&B applications in EX protection zones –Process solutions (coolants)
- ...



DISCSTAR™ P DISCSTAR™ for pharmaceutical applications

- Biotech applications (biomass removal)
- APIs
- Injection solutions
- ...

DISCSTAR™ Special

Besides the standard housing, special housings are required for special applications. Over the years FILTROX has worked with its customers to develop a diverse range of variants. If a version is not available, it can be developed in collaboration with our design department if necessary. Examples of special housing types:

- Hastelloy Coated housing
- Split cover
- Base plate with higher edge (prevents hazardous process solutions leaking out)
- Housing on wheels
- Customer-specific adaptations possible



Double-jacketed housing for tempering filtration solutions during filtration



Housing mounted on a skid, combined with other housings (e.g. SECUROX™) and appropriate controls



DISCSTAR™ Jumbo: housing with up to 16 x 16" modules under one cover



FILTROX. MICROFILTRATION FOR VALUABLE LIQUIDS.

As a global market leader in microfiltration, FILTROX offers complete solutions for filtration of high value liquids.

We are experts in development, manufacturing and supply of Swiss top quality products for a wide range of applications in pharmaceuticals, biotechnology, chemicals and cosmetics as well as in food and beverage. Since 1938 we develop

and manufacture filter media and filtration equipment in-house. Based on this experience, we can offer our customers a complete range of products.

FILTROX's worldwide distribution network and comprehensive technical support will help you optimize your filtration process.

Visit us on the web at www.filtrox.com for more information.

Van Borselen Filters reserves the right to change specifications without prior notice as part of their continuous product development program.



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