

Filtration and Separation Technology

Overview

Automatic Backwash Filters • Cake and Precoat Filters • Automatic Self-Cleaning Filters • High Surface Area Filters • Bags and Cartridges and Housings

Lenzing Technik

Filtration and Separation Technology

Lenzing Technik's filtration and separation division specializes in the development and fabrication of high value added solid/liquid separation systems. Originally created over forty years ago to identify filtration solutions for its parent company's own high viscose fiber spinning solutions filtration applications, Lenzing Technik's filtration division has evolved into a leading supplier of high-performance liquid filtration systems used in a multitude of industries and applications.

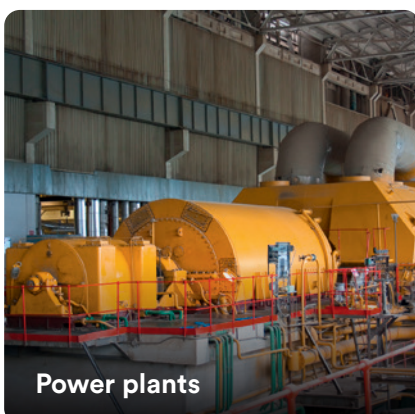
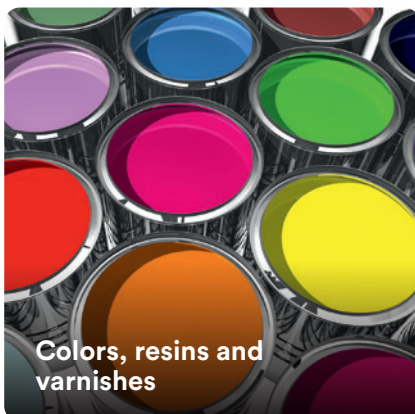
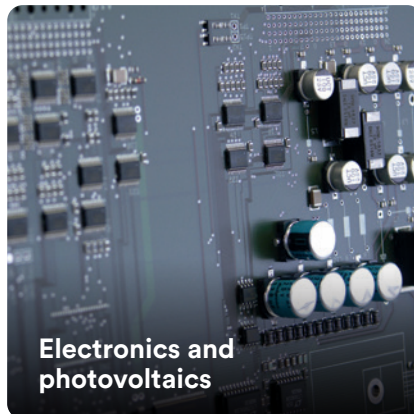
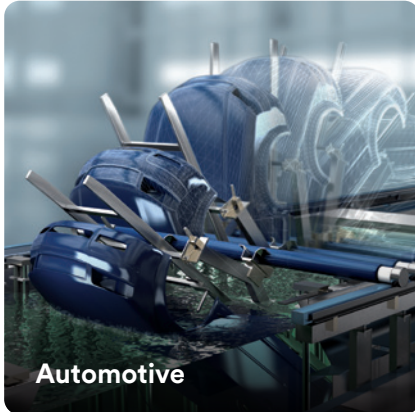
Lenzing Technik's broad filtration system portfolio ranges from bag and cartridge type filter housings on one end of the filtration spectrum, to patented sophisticated automatic backwash filter systems on the other. Today Lenzing Technik's product development focus is on automatic backwash filter systems used to purify a vast range of low to high viscosity process fluids.

Our competencies

- In-house engineering and design
- In-house manufacturing includes state-of-the-art machining capabilities
- Complementary equipment manufacturing
- Lab scale filter trials and trial result analyses conducted in our own laboratory
- On-site pilot trials and detailed customer-specific analyses and reporting
- Turnkey systems



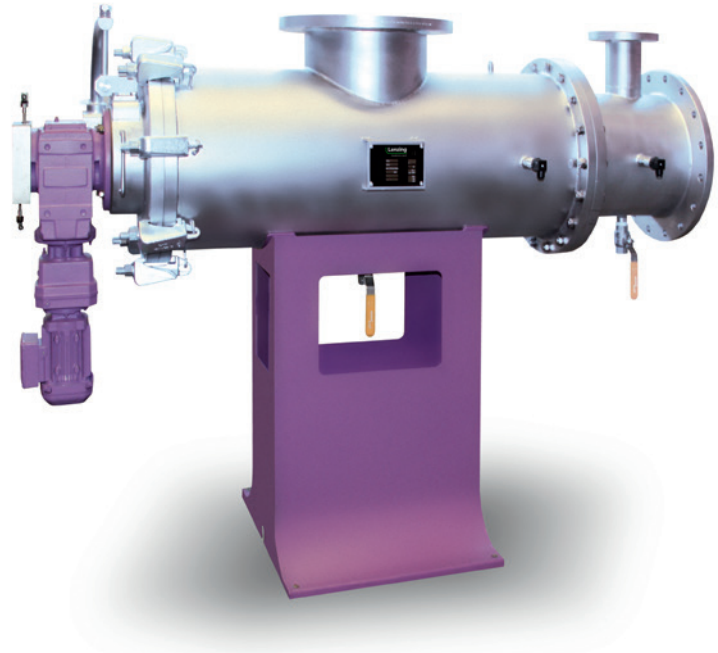
Processing Applications



Automatic backwash systems for fine filtration

Lenzing OptiFil® Filter

The OptiFil® Filter is a fully automatic, continuous backwash filtration system capable of capturing solids as fine as 1 micron. It can achieve this fine filtration level as a result of a patented backwash mechanism design that prevents solids bypass. In the center of the OptiFil® multi-layer cylindrical screen lies one single filter media layer. That layer is available in metal fiber fabric, sintered stainless steel fleece or woven synthetic media, all in a multitude of micron ratings. Solid contaminants are either retained inside depth media or on top of surface media. After the preset pressure drop across the OptiFil® has been reached, the backwash mechanism is triggered and the screen is cleaned methodically in a matter of seconds via backwash. An extremely small percentage of the process flow is used at any given moment for backwashing purposes, therefore the reject volume is extremely low. The filtration process continues throughout the backwash sequence.

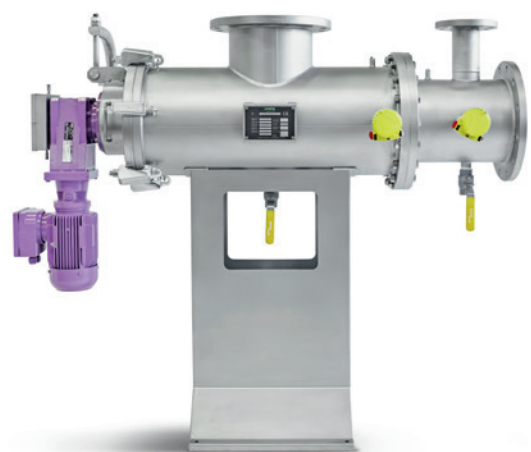


Advantages

- High backwash efficiency
- Filter fineness down to 1 µm
- Patented backwash mechanism

Fluids Filtered

- Acids, lye, solvents, resins, paint
- Process water, river water, sea water, potable water, well water, cooling water, waste water, formation water
- Sugar solutions, molasses, starch
- Oil, oil additives, cooling lubricants, cleaning bath solutions, surfactants



Lenzing OptiFil® Filter

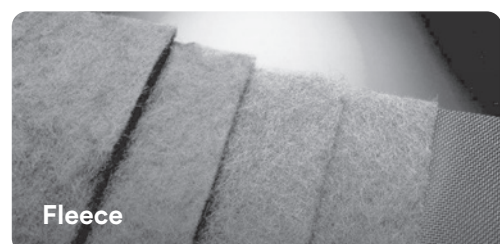
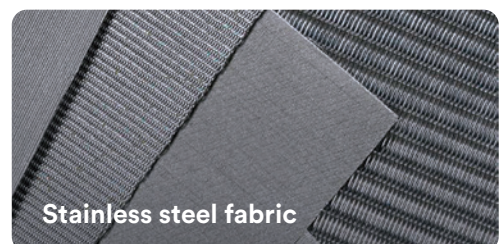
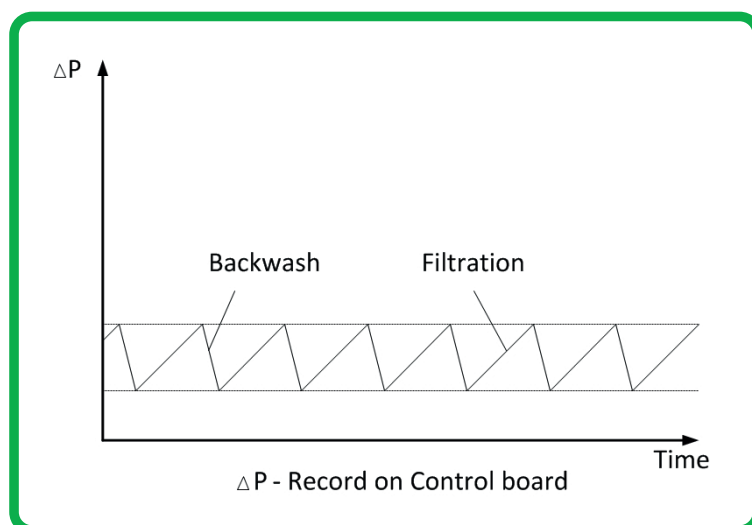
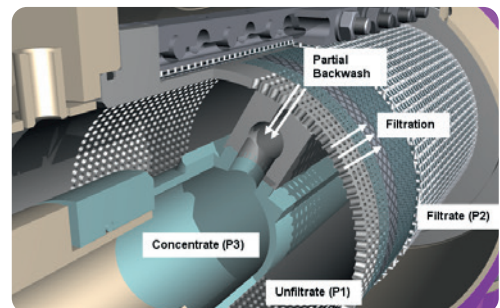
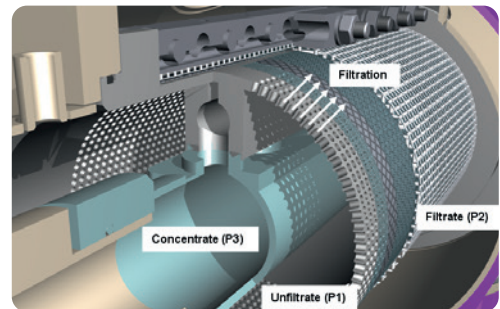
Filtration

Unfiltered fluid is fed to the P1 chamber through the inlet by means of the feed pump. Separation of particles from the liquid occurs when the unfiltered fluid flows from the P1 (unfiltered fluid) chamber into the P2 (filtrate) chamber. Solid contaminants are captured by a perforated screen positioned between these chambers. Blockage of the filter media by captured solids causes the differential pressure (P) between chambers P1 and P2 to increase continually. The increase in differential pressure is managed by a control system. After reaching a preset differential pressure level, the backwash step is triggered.

Backwashing

After the maximum volume of solid contaminants has been captured, the entire surface of the filter media is cleaned via a backwash process. Only one single full rotation of the mechanical backwash mechanism around the inside wall of the cylindrical screen is required. That full rotation is performed in just seconds. The channel shaped opening in the special plastic compound backwash strip completely seals the inside surface of the perforated cylindrical screen that supports the filter media layer. The screen is backwashed, that is to say, embedded solid contaminants are completely removed, using just a very small volume of process fluid (filtrate). After having cleaned the entire screen, the backwash mechanism returns to a waiting position until such time as the differential pressure reaches the preset level once again.

Operating principle



Automatic backwash filters for medium to high viscosity fluids



Lenzing AKF/KKF/ViscoFil® Filters

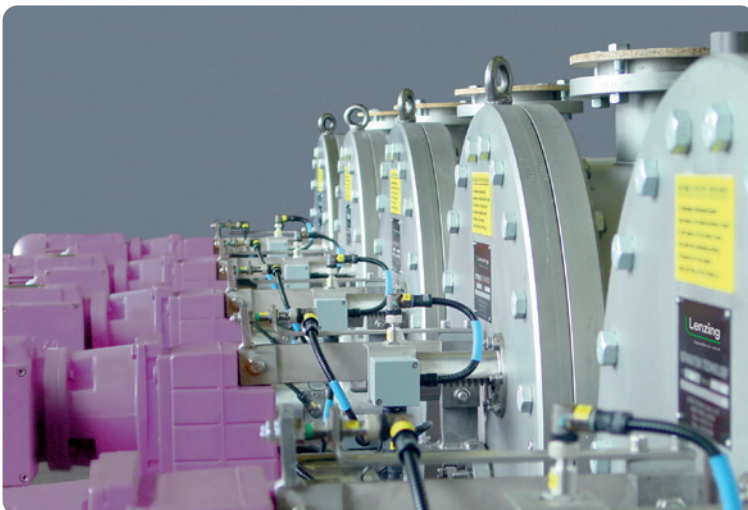
Lenzing AKF, KKF and ViscoFil® filters are fully automatic, continuous depth filtration systems. A sintered metal fleece is used as the filtration layer of the multi-layer cylindrical screen. This depth filter fleece layer captures various sized and shaped solid particles. After the predetermined degree of solids contamination has been reached, the screen is cleaned via a systematic backwashing of small sections in a circular rotation pattern. Filtration continues during the backwash process.

Advantages

- Applicable for very highly viscous fluids
- Filter fineness down to 3 µm
- Gel removal capability

Fluids Filtered

- Spinning solutions including viscose, polyacrylics, polyimides, cellulose acetate, spandex and aramid
- Resin, varnish, petrochemical products, hot-melt adhesives

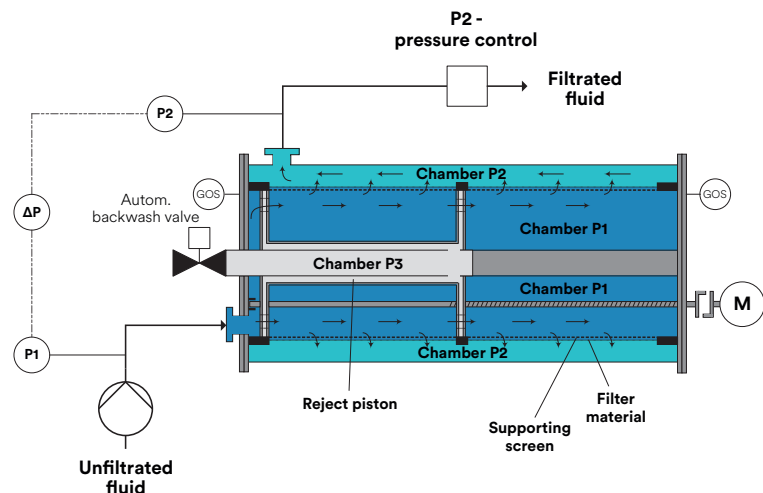


Lenzing AKF/KKF/ViscoFil® Filters

Filtration

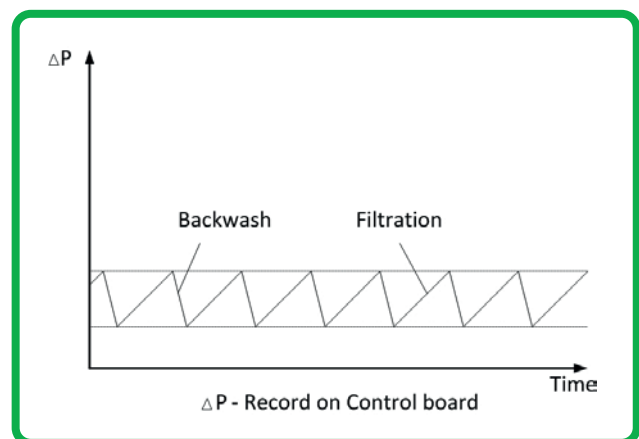
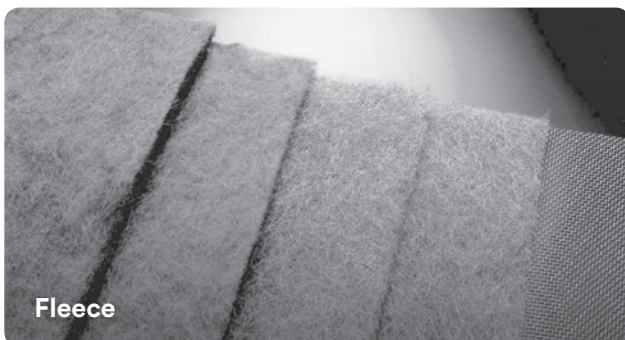
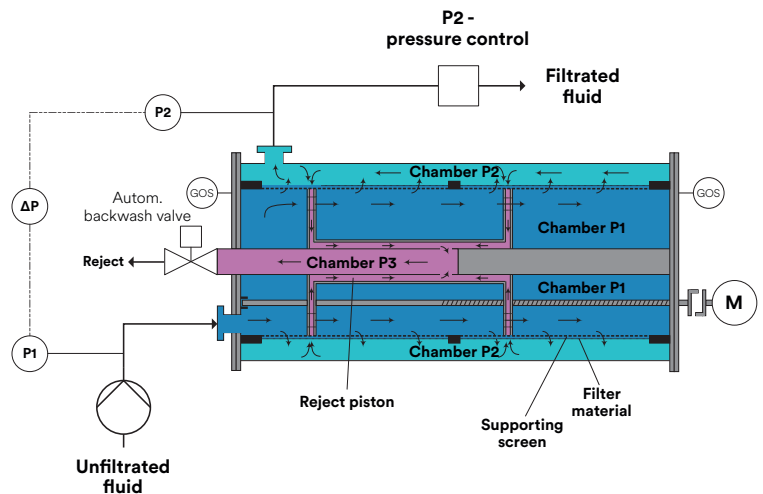
Unfiltered fluid is pumped to the inlet of the P1 chamber. Separation of the solid particles occurs as the fluid flows from the P1 (unfiltered fluid) chamber into the P2 (filtrate) chamber. The fluid is fed into a perforated cylindrical screen positioned between these two chambers. The filtered fluid is discharged through the outlet and then flows to a P2 pressure control valve or a P2 tank. Blockage of the filter media by captured solids results in a steady increase in differential pressure (ΔP) between chambers P1 and P2. The increase in differential pressure is managed by the control system.

Operating principle



Backwashing

After reaching the preset differential pressure level, the backwash process begins and the filter media is cleaned automatically. This cleaning process is effectuated by the movement of the reject piston from lid to bottom or in reverse direction. The piston rings seal to the inside surface of the perforated cylindrical screen that supports the filter media. During the backwash cycle, the differential pressure between the P2 (filtrate) chamber and P3 (reject) chamber forces a small volume of the filtrate backwards through the filter media. After having cleaned the entire filter media surface, the backwash device returns to a waiting position until such time as the differential pressure again reaches the preset level.



Cake and precoat filtration

Lenzing CakeFil Filter

The Lenzing CakeFil Filter is a fully automatic self-cleaning tubular pressure filtration system, otherwise known as a candle filter. This sophisticated filtration technology is centered around cake building, that is, a cake of the solid contaminants in the liquid stream builds on each of the porous cake support cloths that cover the full length of the candle elements. This results in the cakes themselves becoming the filter media through which the clean liquid (filtrate) passes.

Since the cake's solids are size graduated, that is, the largest particles are in contact with the cloth and smaller ones are further away, very fine filtration is possible.

Specifically, 1 micron filtration is achievable without filter aid and 0.5 microns is possible with filter aid. Captured solids can either be retained or discarded as waste. The waste discharge can either be "dry to the touch" (around 40-50% moisture content) following the automatic blowdown step or in pumpable wet slurry form. An automatic cake washing step (prior to the cake blowdown step) is also possible in the case of the dry cake discharge design. The sophisticated design of the filter candles used by Lenzing ensures uniform cake structure, thus fine filtration, as well as efficient cake discharge.



Precoat filtration – Advantages

- Filtration down to 0.5 microns with filter aid
- Suitable for corrosive fluids
- Dry-to-the-touch as well as slurry discharge

Fluids Filtered

- Petrochemical products
- Acids, lyes, solvents, chemicals
- Sugar solutions
- Catalyst recovery

Cake filtration – Advantages

- Filter fineness down to 1 μm without filter aid
- Solid contents in the liquid feed of up to 10% in specific cases and operating conditions
- Efficient cake discharge

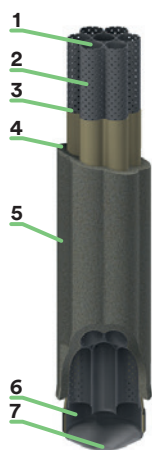
Filter cake



Lenzing CakeFil Filter

Operating principle

Formation and drying of filter cake



Functional description

1 Central tube

Filtrate collector with solid wall for total displacement of filtrate from the filter element

2 Filter tubes

Support for filter medium

3 Filter tube apertures

4 Filter medium

Pressed against the bundled filter tubes during filtration

5 Filter cake

6 Collection chamber

Connection central tube (1) with filter tubes (2)

7 Filtrate

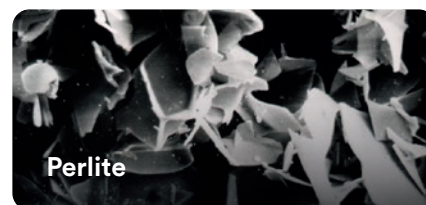
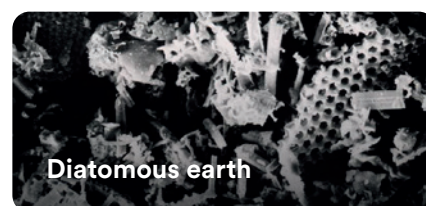
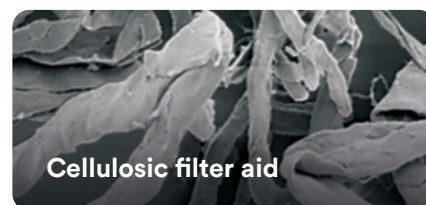
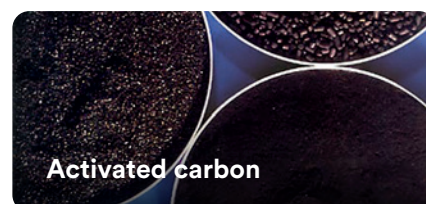
Exits filter element through central tube

8 Blow-Back-Gas

Discharge of filter cake



Filter aid



Cake building on candle elements

During the filtration process, the liquid to be filtered is pumped into the pressure vessel and then through the vertically suspended candles in an outside to inside flow direction. Solids collect on the surface of the support cloth that adheres to the flower shape of the six exterior small diameter tubes which are welded together with one interior tube to form one single candle. The candle design ensures a uniform cake structure over the full length of the candle, resulting in fine particle removal and a very gradual differential pressure build-up over the course of the batch process.

Cake discharge

After the filtered fluid is emptied from the filter vessel, the cake can be optionally washed. Following the washing step, the cake is then dried via an injection of air or gas through the candles in the same direction as the previous liquid flow (outside to inside). Once the moisture from the cake has been removed as much as possible, compressed air or gas is again injected through the candles but in the reverse direction, that is, from the inside to the outside. This has the effect of blowing open the filter cloth on each candle. At that point the cloth no longer adheres to the flower shape contour of the candle but rather becomes fully cylindrical. This has the effect of breaking the cake into slivers. The cake then drops to the bottom (conical) section of the filter vessel and is discharged through an open valve into a receiving bin.

Filtrate

During the filtration process, the cake filtered filtrate flows downward through the six concentric perforated filter tubes into a sump section of a candle and then rises inside a seventh non-perforated central tube. The filtrate exits the filter vessel through horizontal pipes called "registers" that are mounted in the upper section of the pressure vessel.

Cake drying

Following the draining of the fluid from the bottom (sump) section of the filter vessel, compressed air or gas is injected through the filter cake (in the same direction as the liquid flow), that is, from the outside of the candle towards the inside towards the inside. Much of the residual moisture in the cake is forced into the non-perforated central tube of the candle.

Automatic backwash filter for cooling and processing water

Lenzing CanFil Filter

The CanFil Filter is a fully automatic backwash system that operates continuously. Small diameter wedgewire or metal fiber fabric candles are used to capture solid particles on their inside surface. After a preset pressure differential has been reached as a result of solids build-up on the surface of the candles, one or alternatively two candles are isolated and cleaned at a time. During this step, a small volume of unfiltered fluid is used for backwashing while filtration continues during this sequence.

Advantages

- Filter fineness down to 50 µm
- Throughput as high as 10.000 m³ / h (44,000 gpm)
- Simple and robust

Fluids Filtered

- River water, process water, cooling water, waste water, well water



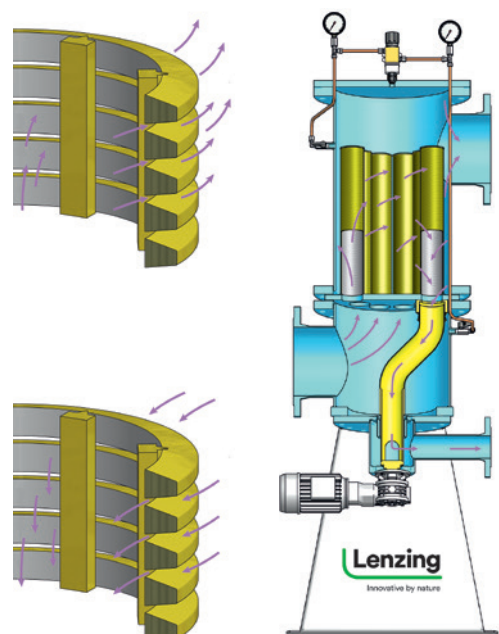
Filtration

The fluid to be filtered is pumped through the inlet piping located in the bottom of the pressure vessel and is directed to the inside of the filter candles which are fastened to the perforated disc. The filtrate exits through the outlet pipe. An automatic vent removes any gas or air bubbles. Solid contaminants are retained on the inside surface of the candles and flow resistance gradually increases.

Backwashing

As soon as the preset pressure differential is reached or a preselected time interval elapses, a backwashing sequence is triggered. The backwash rotor at the bottom of the inside of the vessel isolates one or alternatively two candles at a time, while the other candles continue to filter. Candles that are isolated for backwash by the rotor received outside-in (reverse) flow from the backwash valve. Following a full rotation of the backwash rotor, the backwash process is complete and the backwash valve is closed.

Operating principle



Automatic self-cleaning filters

Lenzing ScrapeFil Filter

The Lenzing ScrapeFil Filter uses a cylindrical wedge wire screen to remove solid contaminants. The solids are captured on the outside surface of the screen as a result of an outside-to-inside flow of fluid. The wedge wire screen continuously rotates and is in contact with one single spring actuated scraper blade which serves to scrape off captured from the outside surface of the screen, such that they fall into the conical sump of the housing. The geometric profile of the wedge wire strips that are welded together to form the screen dictate the micron rating of the screen as well as its cleaning efficiency. A valve located at the bottom of the housing is actuated on a regular interval (timed) basis to discharge solids that have been removed by the scraper blade.

Advantages

- Filter fineness down to 50 μm
- Excellent for viscous fluids
- Can filter fluids having a high solids content

Fluids Filtered

- Juices, honey, chocolate, syrup
- Glue, varnish, resin
- Cooling lubricant, water



High Surface Area Filters

Lenzing DoubleFil Bag Filter and Filter Bag

Lenzing's DoubleFil bag filter is a high surface area bag filter housing. The surface area of a DoubleFil filter bag that is installed in a DoubleFil bag filter housing is 80 % greater than a standard Size 2 filter bag. DoubleFil filter bags have a dirt holding capacity that is up to four times greater than standard filter bags, resulting in reduced bag replacement frequency. Standard Size 2 bag housings can use DoubleFil high surface area filter bags simply via the installation of a special DoubleFil bag frame which can be purchased from Lenzing.



Advantages

- Up to 4 times more dirt holding capacity than standard Size 2 filter bags
- Standard Size 2 bag filter housings can be retrofitted with a DoubleFil bag frame
- Low investment cost for new installations



High Surface Area Filters

Lenzing HisoFil Filter Cartridge

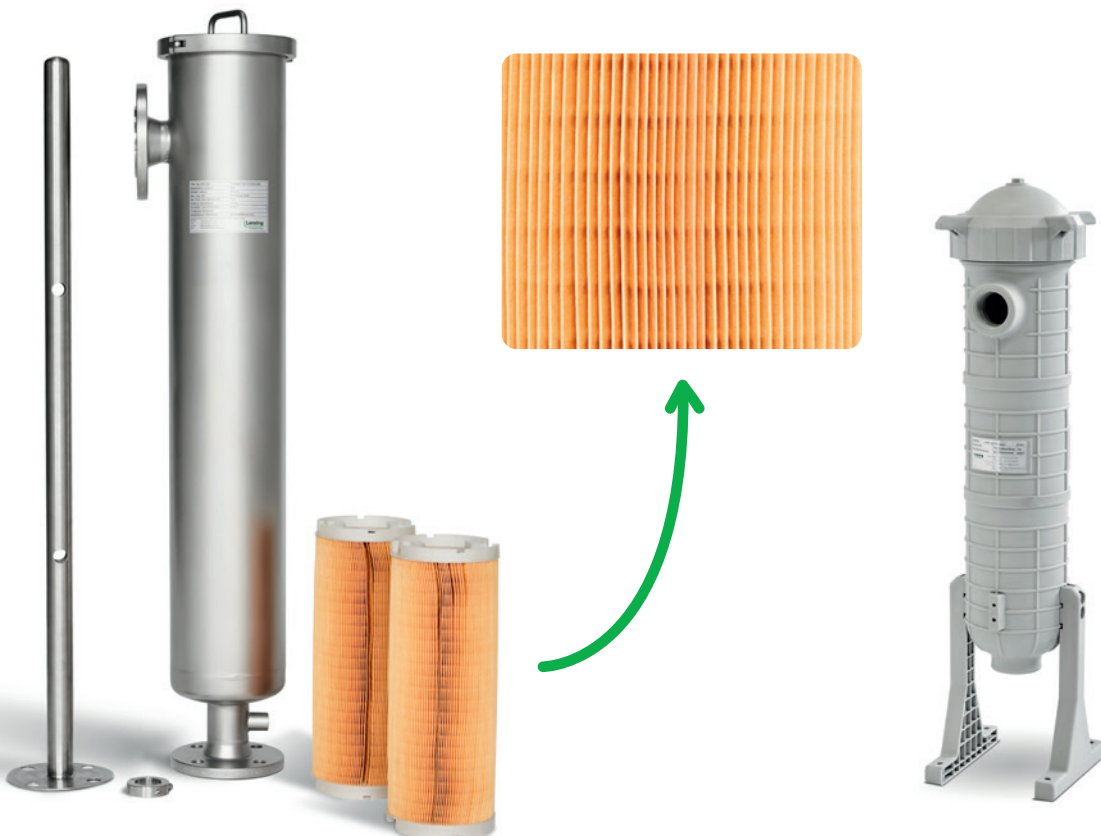
The Lenzing HisoFil filter cartridge is a unique pleated cartridge that was developed to filter liquids containing high solid loads. The HisoFil cartridge was designed with the benefits of flow velocity reduction in mind. At these low flow velocities, even small or soft solid particles can form a filter cake on the high surface area pleated media, contributing to high dirt holding capacity. The HisoFil cartridge design results in reduced cartridge replacement intervals as well as lower filtration costs. The best HisoFil cartridge applications include those in which the labor costs associated with cartridge changeout are significant and operator safety is deemed to be critical.

Advantages

- High dirt holding capacity
- Low filtration cost
- Very long service life

Fluids Filtered

- Chemicals
- Water
- Oil



Bags and Cartridges and Housings

Bags and Cartridges and Housings

Lenzing Technik offers a wide range of bag and cartridge housings for customers that prefer OPEX as opposed to CAPEX filtration solutions. Lenzing housings are available in a variety of materials of construction and designs. Flexibility in these areas allows us to offer valued clients with the most fluid compatible and resistant housings for a given application. Lenzing Technik filtration experts pride themselves on providing customers with the highest possible level of support, as well as filtration solutions that will meet or exceed expectations.

Advantages

- Large variety of filter housings
- Technical guidance for individual applications
- Filtration solutions at a reasonable cost

Housings



Bag filter housings (Sideliner & Topliner)

Low cost filtration for high flow rates and low solid loads



Multi cartridge housings

Low cost filtration for low flow rates and high solid loads



Multi bag filter housings

Low cost filtration for high flow rates and low solid loads



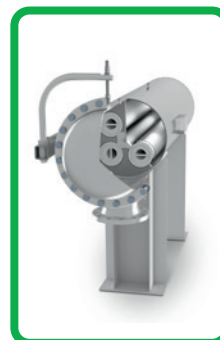
Plastic housings

Compact filtration systems for very high flow rates



Single cartridge housings

Low cost filtration for low flow rates and high solid loads



High flow housings

Compact filtration systems for very high flow rates

Special designs, materials and variable connections are available upon request.

Bags and Cartridges and Housings

Filter cartridges



Meltblown filter cartridges

Heat bonded filter cartridges for difficult to filter particles in a wide particle size range



Stainless steel filter cartridges

Cartridges used to filter high viscosity and temperature fluids



String wound cartridges

Nominally rated, affordable cartridge having a relatively low dirt holding capacity



Activated carbon filter cartridges

Cartridge that is capable of absorbing chemical and organic components



Pleated filter cartridges

High dirt holding capacity cartridge having a long operation life



High flow filter cartridges

Very high flow rate and dirt holding capacity cartridge

Special designs are available upon request

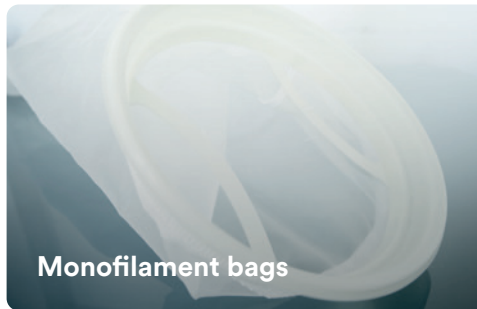
Bags and Cartridges and Housings

Filter bags



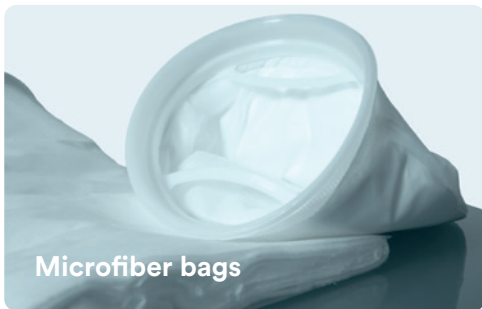
Needle felt bags

Nominally rated single and multi-layer needle felt bags



Monofilament bags

Absolute rated single layer fabric bags



Microfiber bags

Protective needle felt and compressed non-woven filter bags having a multi-layer composite matrix



Active carbon bags

Used in applications in which the absorption of chemical and organic components is required



Absolute rated bags

High quality microfiber and meltblown filter bags having a multi-layer composite matrix

Special designs are available upon request

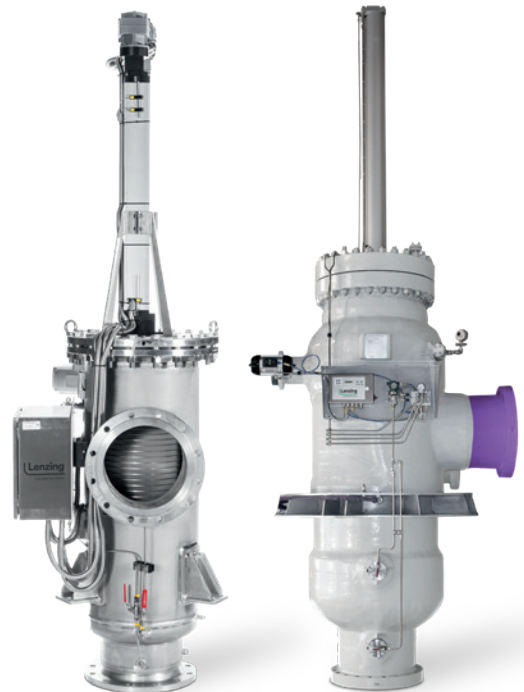
Other Automatic Filters

Lenzing VeloFil Filter

Lenzing Technik's automatic self-cleaning and continuous functioning VeloFil Filter is a multi-purpose, nearly maintenance-free filter that is used in a multitude of water filtration applications. Water types filtered by the VeloFil Filter include cooling, process, sea, river, ground and rain waters. This unit operates at pressure of 0,6 bar (8.4 psi) and produces a very low pressure drop. Superior performance from this compact filter is reflected by its high flow capacity design.

Advantages

- Low pressure levels
- Filter fineness from 150 to 3000 microns (3 mm)
- Efficient cleaning by means of the Bernoulli effect



Lenzing StrainFil Strainer

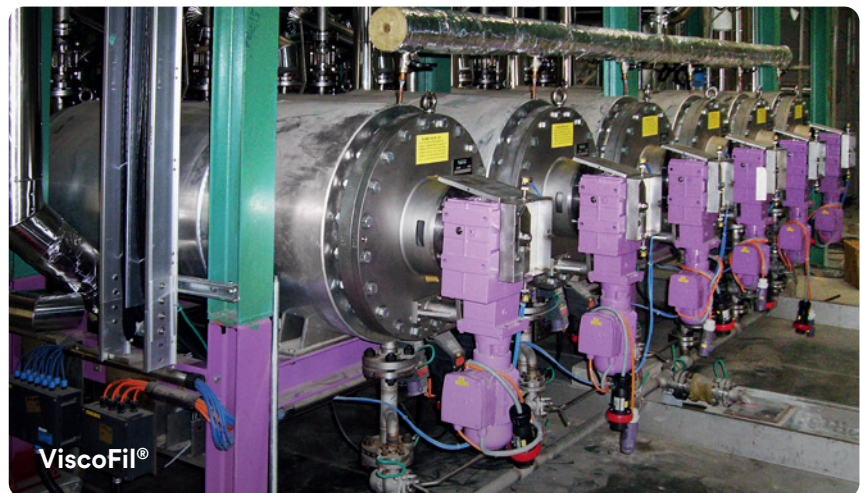
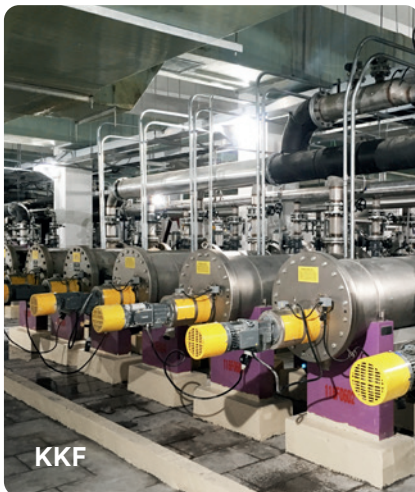
Lenzing Technik's fully automatic strainer StrainFil Strainer uses one or more slotted filter elements inside to outside liquid flow. After a preset differential pressure has been reached an automatic valve opens, enhancing the flow encountered by the elements and resulting in their cleaning. Due to its simple design and a wide range of component materials, the StrainFil Strainer is the perfect choice for protecting contaminant sensitive components like spray nozzles and heat exchangers.

Advantages

- No moving parts therefore no wear and tear
- Filter fineness from 200 to 5000 microns (5 mm)
- Best possible design for retrofit



Installations



Subject to alteration, misprints and errors excepted.
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