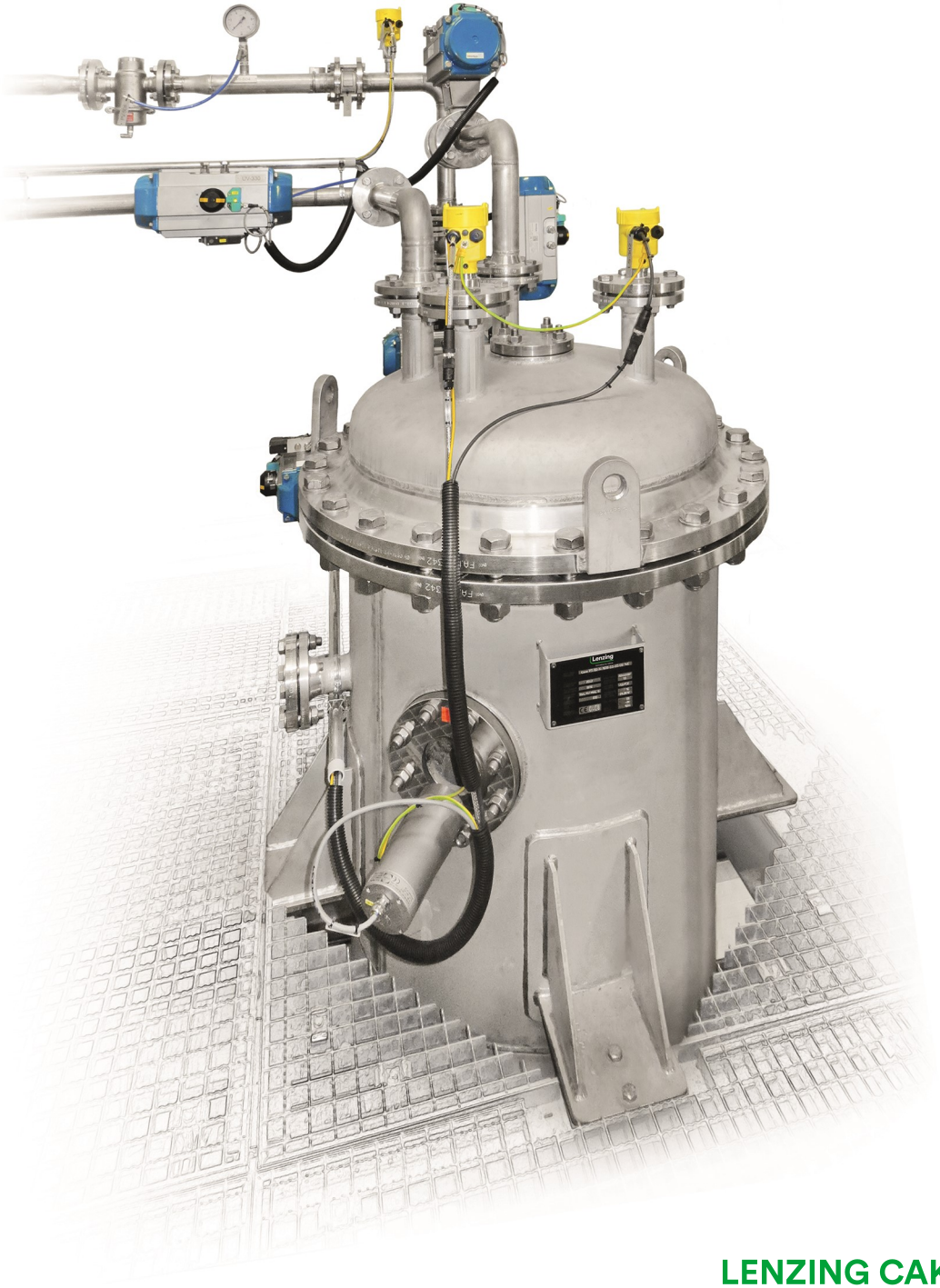
Lenzing | Filtration

CAKE FILTRATION

PRECOAT FILTRATION



LENZING CAKEFIL

Lenzing | Filtration

www.lenzing-filtration.com

Reliable filtration solutions for various industries

FILM | FIBER

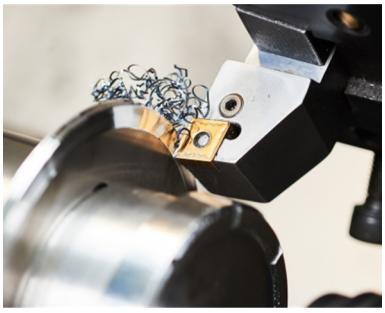
CHEMICAL | PHARMACEUTICAL

WATER | WASTEWATER

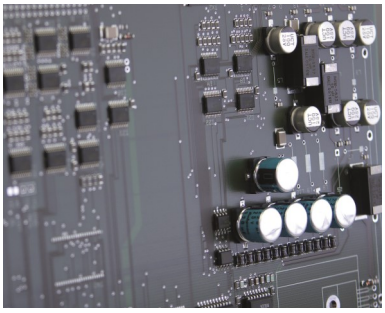
PETROCHEMICAL

FOOD | SUGAR

PULP | PAPER



METAL WORKING



ELECTRONICS | PHOTOVOLTAICS

ELECTROPLATING | SURFACE TECHN.

ABOUT US

The Lenzing Filtration division of the LENZING GROUP is a leading global supplier of filtration and separation technologies. Lenzing Filtration specializes in the development and fabrication of high value-add automatic backwashing filters.

With in-house engineering, design know-how as well as our own laboratory, Lenzing Filtration can offer detailed customer-specific analyses, at-site pilot trials and customer-tailored filtration solutions.

EXAMPLARY INSTALLATIONS

LENZING CAKEFIL

cake and precoat filtration solutions

The **LENZING CAKEFIL** filter is a fully automatic self-cleaning tubular pressure filtration system, also known as candle filter. This sophisticated filtration technology is centered on cake building. A cake of solid contaminants in the liquid stream forms and builds on each of the porous support cloths that cover the full length of the candle elements. The result is that the cakes themselves become the filter media through which the clean liquid (filtrate) passes.

Very fine filtration (as fine as 1 micron particle removal) is possible without the use of filter aid. Submicron particle removal is achievable when filter aid is used for precoating and/or body-feeding. Captured dry-to-the-touch solids (desirable or waste) or alternatively a pumpable wet slurry can be discharged following the filtration step of the process. An automatic cake-washing step (prior to the cake discharge step) is also possible.

Lenzing Filtration division's patent-pending candle design ensures a uniform cake over the full length of all candles, efficient cake discharge and extended service life of filter cloths.

ADVANTAGES OF PRECOAT FILTRATION

- Filtration down to 0.5 microns with filter aid
- Suitable for corrosive fluids
- Dry-to-the-touch solids cake or alternatively slurry discharge

ADVANTAGES OF CAKE FILTRATION

- Filter fineness down to 1 µm without filter aid
- Can accommodate a solid content in the liquid feed of up to 10% if operating conditions are amenable
- Efficient cake discharge

FILTER CAKE

EXAMPLES OF FLUIDS FILTERED

Petrochemical products

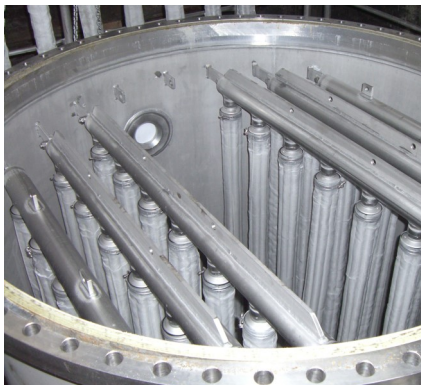
Acids, lyes, solvents, brine, pigments, lube oil, additives, other specialty and agrichemicals

Sugar solutions

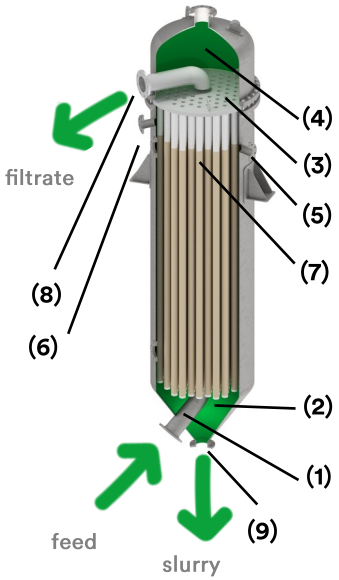
Catalyst recovery

Water and wastewater

FILTER INSIDE



LENZING CAKEFIL
slurry discharge



FILTRATION

Unfiltered fluid enters the filter via feed standpipe (1) and is distributed throughout the feed chamber (2). It further passes the filter cloth and the filter candles (7) from outside to inside and exits the candles via the head plate (3) into the filtrate chamber (4) before leaving the filter through the filtrate nozzle (8). Solids form a permeable “filter cake” on the cloth.

BACKWASH

Filtrate chamber is drained through the filtrate nozzle (8) and upper part of the feed chamber is drained through the feed drain nozzle (5) to its level. Complete filter is pressurized with air or nitrogen. A sudden release of pressure through the pressure relief nozzle (6) forces a rapid reverse flow of filtrate through the filter cloth from inside to outside. This results in an effective removal of the filter cake, which is re-suspended in the fluid inside the feed chamber (2). It also removes solids from inside the pores of the filter cloth. The homogenous slurry is discharged through the bottom drain nozzle (9).

(1) feed standpipe (2) feed chamber (3) head plate (4) filtrate chamber (5) feed drain nozzle (6) pressure relief nozzle (7) filter candles (8) filtrate nozzle (9) bottom drain nozzle

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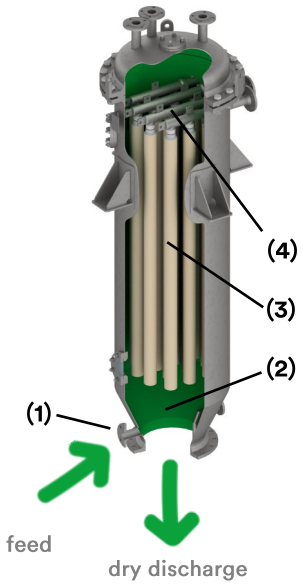
dry discharge



(1) feed nozzle

(2) feed chamber

(3) filter candle

(4) filtrate headers

FILTRATION

Unfiltered fluid enters the filter via the feed nozzle (1) and is distributed throughout the feed chamber (2). It further passes the filter cloth and the filter candles (3) from outside to inside and exits the candles and the filter via the filtrate headers (4). Solids form a permeable “filter cake” on the cloth.

CAKE DRYING

After draining the feed chamber (2), air or process gas is applied in filtration direction to remove the majority of capillary fluid from the filter cake.

OPTIONAL CAKE WASHING

A washing fluid can be applied for cake washing followed by another cake drying step.

CAKE DISCHARGE

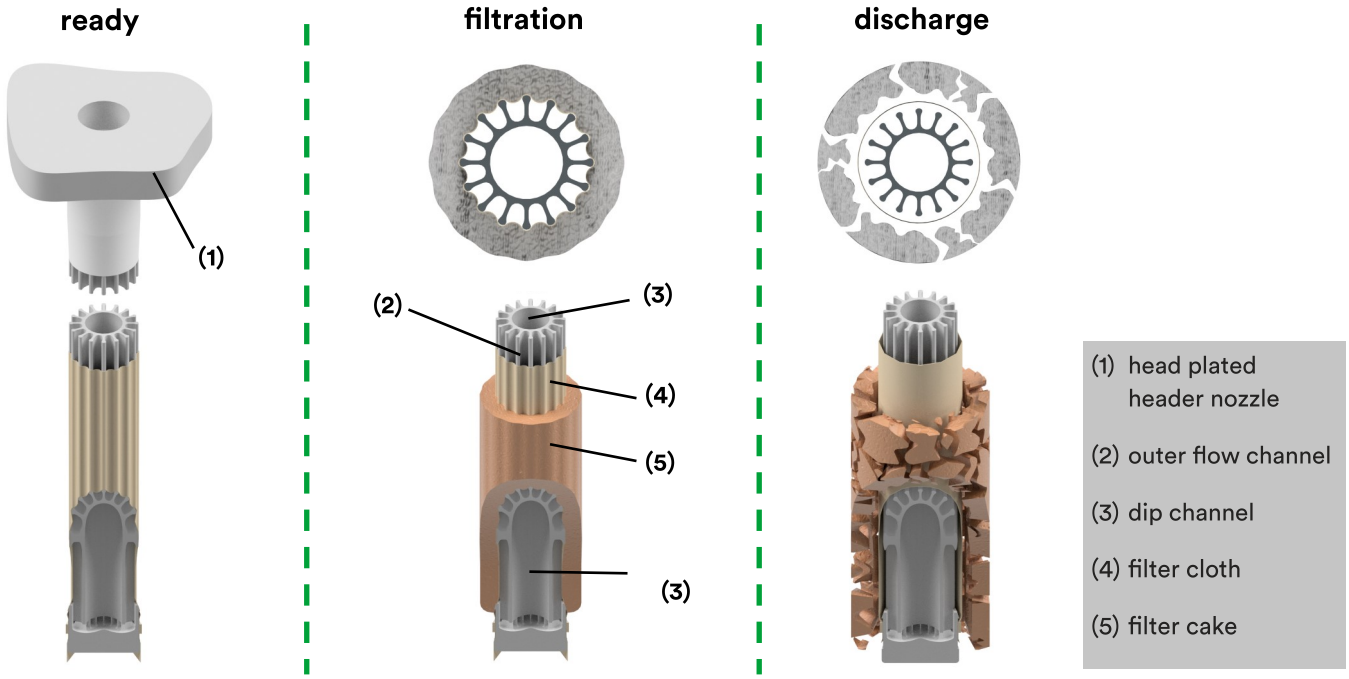
Air is applied from the filtrate side that rapidly blows up the filter hose and thereby removes the filter cake, which falls down through the bottom valve in pieces typically “dry to the touch”. This is done for each filtrate header individually one after another (in large systems two by two).

FILTER FILLING / CLOTH CLEANING

The filter is filled via feed nozzle (1). To remove solids trapped inside the pores of the filter cloth prior to starting filtration, another backwash is carried out by introducing air or gas via the filtrate nozzles to force fluid to pass through the cloth in the opposite direction of the fluid flow. This effectively releases trapped particles.

LENZING CAKEFIL

candle design



The filter candle is equipped with outer flow channels (2) for the filtrate, which are connected at the bottom end of the candle to a central dip channel (3).

During filtration, the filtrate flow is downwards via the outer flow channels and leaves the candle upwards via the central dip channel. This allows for complete emptying of the candle from liquid when flowed through by air.

During backwash, the flow direction is reversed and air or gas is being brought to the very bottom of the candle. An essential factor for an efficient, differential pressure driven backwash.

"THE CAKEFIL EFFECT"

PRIOR STATE-OF-THE-ART CANDLE

Remaining solids in pores
after 85 regenerations

96 g/m²

LENZING CAKEFIL CANDLE

Remaining solids in pores
after 85 regenerations

22 g/m²

=

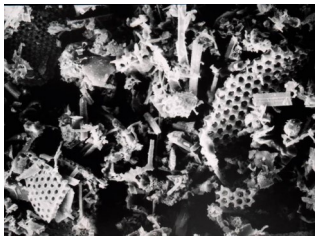
"THE CAKEFIL EFFECT"

The patent pending design of LENZING´s filter candle leads to a very efficient removal of particles from the pores of the filter cloth. A test with different filter candles has shown that the remaining (not backwashable) particle weight in the pores of the cloth can be reduced by 80% compared to prior state-of-the-art filter candles.

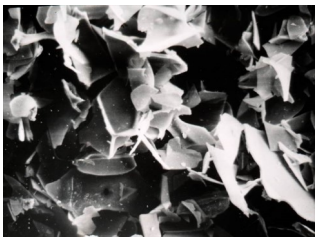
LENZING CAKEFIL
filter aids

For soft and slimy solids or if adsorption of components in the fluid is needed, various kinds of filter aids can be applied as precoat and/or dosed to the fluid as a so called “body feed”.

Cellulose
Available as natural wood fibers, extract free fibers and highly pure fibers for food and pharma applications



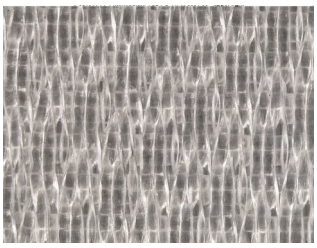
Diatomite
Agglomerated fossilized residues of diatoms



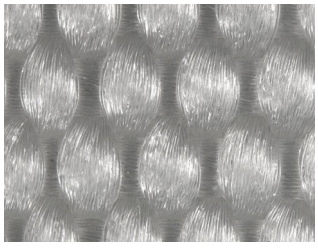
Perlite
Volcanic material used in chemical and food industry

Activated carbon
For removal of hydrocarbons, chlorine or other unwanted dissolved components by adsorption

LENZING CAKEFIL
filter cloth



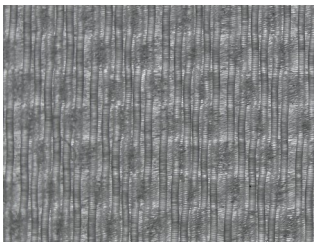
PP
Mono | Monofilament



PP
Multi | Multifilament

PVDF | PTFE
Mono | Monofilament

Various filter materials are available for each individual application with pore sizes down to 1 micron for temperatures up to 180°C.



PP
Mono | Multifilament

PPS
Multi | Multifilament

PVDF
Mono | Multifilament

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