

## Depth Filtration of Beverages and Liquid Food Backwashing Recommendation BECOPAD®



### Premium Mineral-Free Depth Filter Medium

The excellent backwashing characteristics of BECOPAD depth filter medium is a decisive factor for the securing of the profitability of depth filtration. By backwashing and regeneration, the colloids, microorganisms, and compressible particles in the BECOPAD depth filter medium can be loosened and washed back out. The sediment intake capacity is available for further filtration. This significantly improves the total performance depending on the load.

#### Backwashing of BECOPAD Depth Filter Medium – an Advantage for the Customer

The high wet strength of BECOPAD depth filter medium, even after a number of steam and hot water cycles, allows backwashing after the end of filtration or achievement of the maximum difference pressure. This can significantly lower the costs of depth filtration.

The following principles are important for backwashing:

1. Depth filter media consists of an asymmetrical fiber structure. Its inlet side is more open-pored than its outlet side. This funnel-shaped structure benefits the cleaning effect of backwashing. Retained colloids are washed towards the open structure and thus removed more effectively.
2. Deformable particles like yeasts and colloids are more easily washed through close-meshed fiber structures than for example filter aids that are not deformable.
3. Continuous heating of the water improves the cleaning effect, whereas rinsing only with hot water (> 140 °F (> 60 °C)) can also make proteins coagulate to coarser colloids. They are then more difficult to wash out.

The higher the end difference pressure of the filtration is, meaning the more blocked the filter medium is, the more difficult and ineffective the regeneration is.

#### Framework Conditions

##### 1. Relaxation

The filter package is only to be relaxed slightly so that product rests that could promote mold growth are not pressed into the edges.



##### 2. Pressure

Set a counter pressure of at least 50 kPa, 0.5 bar for backwashing. This is the only way the entire filter package can be permeated evenly. Backwashing without counter pressure has little effect. To improve the counter pressure required for the washing effect, throttle the emptying and ventilation valves on the water output side, and close them on the water inlet side shortly after beginning the washing cycle.

##### 3. Speed

Set the filtration speed to 1 – 1.5 times higher for backwashing.

##### 4. Direction

The washing effect is best if the filter package is permeated diagonally, meaning if the water inlet and outlet are facing each other diagonally. The washing water may not be directed in circles.

If a combination filter with baffle plate is being washed, the regeneration is to be performed separately on each package. No water may reach the filtrate side of the other filter package.

##### 5. Water quality

The rinsing water, and also the hot water for sterilization, should be drinking water quality and be free of particles and microorganisms. Contaminated water should be filtered in advance.

## Performance

### a) Emptying

Push the product in filtration direction into a castor tank with cold water.

### b) Backwashing

- First rinse the filter with cold water contrary to the filtration direction for 5 minutes using cold water.
- Continuously heat the rinsing water to at least 122 °F (50 °C) to max. 176 °F (80 °C).
- Rinse the filter until the hot rinsing water comes out clear and without foam at the outflows and valves.

bb) For best possible removal of adsorptive separated substances, like for example coloring agents, the following parameters need to be adhered to by all means:

- Rinsing water temperature: 158 – 176 °F (70 – 80 °C)
- Rinsing direction: diagonal
- Counter pressure at the filter exit: 100 kPa, 1 bar
- Rinsing duration: at least 20 minutes
- Let the filter set hot overnight and rinse again with cold water the next morning.

### c) Hot water sterilization

- Slightly decompress the filter, continue to heat the water to 185 °F (85 °C) and sterilize the filter for at least 25 minutes.
- Have counter pressure of at least 50 kPa 0.5 bar at the exit of the filter during sterilization.
- The hot water can be circulated with constant temperature for energy saving.

### c) Steaming

(strongly recommended for the sterile filtration for the elimination of *Alicyclobacillus acidoterrestris* germs and spores)

- Drain the rinsing water and empty the filter all the way by opening all valves.
- The steam should be free of particles and contaminations.
- Maximum steam temperature: 273.2 °F (134 °C)
- Open the condensate exit valves for the prevention of steam hammers for the duration of the steaming.

After a steam plume has exited the ventilation and outflow valves, slightly close them and continue to the steam the filter for at least another 20 – 30 minutes.

### d) Cooling

- Cool the filter with cold water in filtration direction.
- Ideally push filter empty with CO<sub>2</sub>.
- Close valves and let the filter set with excess pressure (at least 30 kPa, 0.3 bar).

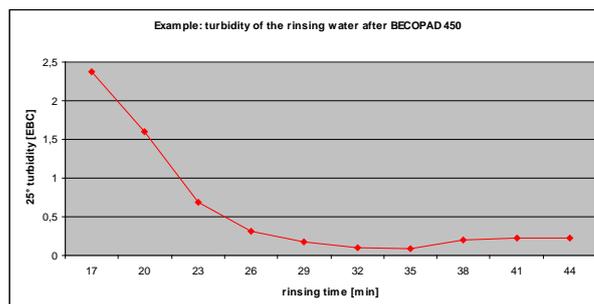
The filter needs to be rinsed again shortly prior to filtration.

**In case of a longer filtration pause (> 24 h) the filter should be sterilized again and rinsed with cold water due to safety reasons.**

## Checking the Rinsing Effect

BECOPAD depth filter medium is characterized by a high strength and a very good rinse ability. In average, the rinsing volume and the rinsing duration can be reduced by 30 – 50% compared to common depth filter sheets. Therefore, it is important to watch when the filter is rinsed and a longer rinsing does not promise further cleaning success. The process of regeneration can be measured with the following methods, which allows the determination of the minimum required rinsing time:

1. Filtration ability of the rinsing water in the filter outflow (measurement of the flow-through time of equal quantities using test membranes)
2. COS\*-value-determination in the rinsing water
3. Turbidity measurement in the filter outflow



\* chemical oxygen demand



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