Technical Information

Depth Filtration
BECOPAD

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Premium Depth Filtration for the Beverage and Food Industries

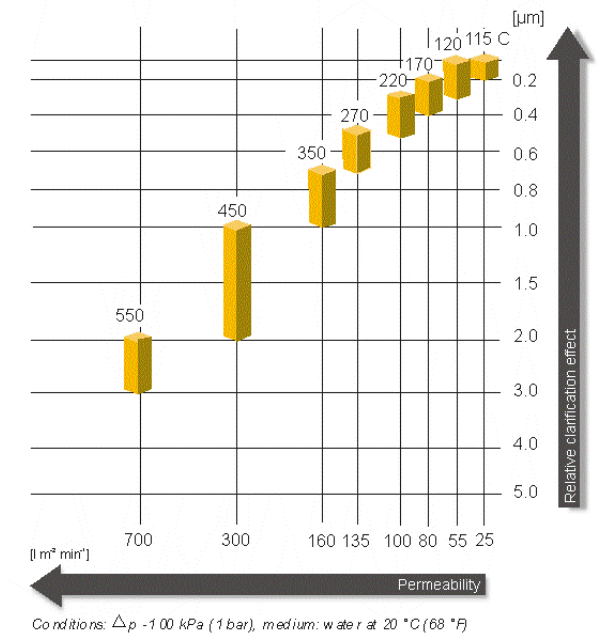
BECOPAD is a new, mineral-free depth filtration system for a wide range of applications, including coarse and sterile filtration.

BEGEROW developed this innovative product in its in-house research facility. In the *bepure* process, different types of high-purity cellulose are cross-linked to form a unique structure that does not require the addition of any inorganic material, even for sterile filtration duties. BECOPAD is characterised by their unparalleled purity when compared with conventional depth filter sheets, giving rise to much lower values for extractable ions and organoleptic quality affecting substances.

The advantages of **BECOPAD**:

- No mineral components
- 20 % higher capacity
- Water required for preflushing and regenerating reduced by up to 50 %
- Drip losses reduced by 99 %
- Maximum filtration hygiene
- Biodegradable

BECOPAD Type Overview



Ingredients

BECOPAD is made only of high-purity cellulose and wet strength materials.

Areas of Application

BECOPAD can be used for filtration of all liquid foodstuffs. Application options range from coarse filtration to sterile filtration.

Guide to Choosing the Right BECOPAD

Like a conventional depth filter sheet, **BECOPAD** can be selected according to the required filtrate quality.

BECOPAD 115 C
Sterile filtration with the highest certainty. This depth filter medium is ideally used as membrane protection when products with difficult or unknown filterability are to be filled via membrane filter cartridges. Microcolloids impairing the filtration impairing are safely retained.

BECOPAD 120
Sterile filtration with increased safety. Filtration for separating bacteria for heavily used or delicate products.

BECOPAD 170
Sterile filtration for filling or storing with high initial burden.

BECOPAD 220
Sterile filtration with average initial burden.

BECOPAD 270
Germ-reducing filtration with low initial burden.

BECOPAD 350
Fine filtration, removal of yeasts and reduction of bacteria.

BECOPAD 450
Clarification filtration, removal of yeasts in applications with low cell count.

BECOPAD 550
Coarse filtration, particle retention, yeast reduction.

Physical Data

This information is intended as a guideline for the selection of **BECOPAD**.

Type	Article No.	Nominal retention rate [µm]	Thickness [mm]	Ash content [%]	Bursting strength wet [kPa]	Water throughput at Δ p = 100 kPa [l m^{-2} min^{-1}]
BECOPAD 115 C	Q2C11	0.1 – 0.2	4.2	< 1	> 150	25
BECOPAD 120	Q2112	0.1 – 0.3	3.9	< 1	> 150	55
BECOPAD 170	Q2117	0.2 – 0.4	3.9	< 1	> 150	80
BECOPAD 220	Q2122	0.3 – 0.5	3.9	< 1	> 150	100
BECOPAD 270	Q2127	0.5 – 0.7	3.9	< 1	> 150	135
BECOPAD 350	Q2135	0.7 – 1.0	3.9	< 1	> 150	160
BECOPAD 450	Q2145	1.0 – 2.0	3.9	< 1	> 150	300
BECOPAD 550	Q2155	2.0 – 3.0	3.9	< 1	> 150	700

* The water flow is a laboratory value characterizing the different **BECOPAD** types. It is not the recommended flow rate.

Instructions for Correct Use

BECOPAD requires careful handling when inserting them into the plate and frame filter. Avoid banging, bending, and rubbing. Do not use damaged **BECOPAD**.

Inserting

Each **BECOPAD** has a rough side and a smooth side. The rough side is the feed side; the smooth side is the filtrate side. When inserting the sheets, always ensure that the filtrate side is in contact with the filtrate plate of the plate and frame filter. Folded **BECOPAD** styles are to be inserted dry. Only soak once inside the slightly closed filter.

Sterilisation prior to start of filtration (optional)

BECOPAD can be sterilised with hot water or saturated steam up to a maximum temperature of 134 °C (273 °F).

Ensure complete sterilisation of the entire filtration system. Open all valves slightly. The compression on the depth filter sheets should be reduced slightly. Allow the depth filter sheet assembly to cool before re-tightening.

Sterilisation with hot water

The specific flow rate should at least equal the flow rate. The hot water should be softened and free from contamination.

The following parameters must be adhered to:

Temperature:	> 85 °C (185 °F)
Duration:	25 minutes after 85 °C (185 °F) is reached at all valves
Pressure:	> 50 kPa at the filter outlet

Sterilisation with steam

The steam must be free from foreign particles and contamination.

The following parameters must be adhered to:

Temperature:	≤ 134 °C (273 °F) (saturated steam)
Duration:	> 20 minutes after steam emerges from all filter valves
Rinsing:	At 1.25 times filtration flow rate after sterilisation, min. water quantity 25 l/m²

Filter Preparation and Filtration

Prior to the first filtration, we recommended pre-rinsing the closed filter with a minimum of 25 l/m² of water at 1.25 times filtration flow rate until the wash water is taste-free and clear, unless this has already been done after sterilisation.

Check the entire filter for leaks at maximum operating pressure.

High-proof alcoholic solutions and products that cannot be rinsed with water should be circulated with the product. Discard the rinsing solution after rinsing.

Differential Pressure

Filtration should normally be stopped once a differential pressure of 300 kPa (3 bar) has been reached.

For safety reasons, a differential pressure of 150 kPa (1.5 bar) should not be exceeded in applications for removing micro-organisms.

Regeneration/Backwashing: Framework Conditions

1. **Relaxation**
   The filter package is only to be relaxed slightly so that product rests that could promote mould growth are not pressed into the edges.
2. **Pressure**
   Set a counter pressure of at least 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 sterilisation, should be drinking water quality and be free of particles and microorganisms. Contaminated water should be filtered in advance.

Regeneration/Backwashing: 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 50 °C to max. 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 colouring agents, the following parameters need to be adhered to by all means:
- Rinsing water temperature: 70 – 80 °C
- Rinsing direction: diagonal
- Counter pressure at the filter exit: 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 sterilisation**
- Slightly decompress the filter, continue to heat the water to 85 °C and sterilize the filter for at leas t 25 minutes.
- Have counter pressure of at least 0.5 bar at the exit of the filter during sterilisation.
- 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: 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_2.
- Close valves and let the filter set with excess pressure (at least 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 sterilised again and rinsed with cold water due to safety reasons.

Safety

When used as directed and handled correctly, there are no known hazardous effects associated with this product.

An EC safety data sheet is available on request.

Disposal

BECOPAD is suitable for composting, product contaminants retained in the sheet permitting.

Relevant current regulations must be adhered to depending on the filtered product.

Storage

BECOPAD consists of strongly adsorbing materials. The product must be handled carefully during shipping and storage.

Store **BECOPAD** in a dry, odour-free, and well-ventilated place. **BECOPAD** must not be exposed to direct sunlight.

BECOPAD is intended for immediate use and should be used within 36 months of delivery.

Delivery Information

All common square or round filter sizes are available for delivery. Special formats are available on request.

For further information, please contact the regional sales manager responsible for your area or call BEGEROW directly at +49 6704 204-0.

Quality Control according to DIN EN ISO 9001

The comprehensive BEGEROW quality management system is certified according to DIN EN ISO 9001.

This certification confirms that a fully functioning and comprehensive quality control system covering product development, contract review, supplier selection, receiving inspection, production, final inspection, inventory management, and delivery has been implemented. Extensive quality assurance measures comprise the adherence to technical criteria regarding the function as well as the confirmation of chemical purity and quality recognized as safe under the German law governing the production of foods and beverages.

The depth filter media used meet the requirements of regulation (EG) 1935/2004, LFGB (German Food, Commodity and Feed Act), recommendation XXXVI/1 regarding the by the BfR (Federal Institute of Risk Assessment), and the test criteria of FDA (Food and Drug Administration) Directive CFR 21 § 177.2260.

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