

CONDITIONS FOR SUCCESSFUL FILTRATION

using HOBRAFILT filtersheets of the “N” and “NT” Series

STEP 0 – STORAGE

How to store the filtersheets properly

HOBRAFILT filtersheets shall be stored in a dry, ventilated environment without odours and always in the original packing. Due to possible water condensation it is necessary avoid extreme changes of temperature, especially from high to low. We recommend using the filtersheets within 36 months from the date of production. If you are uncertain as to the usability of the filtersheets, please contact HOBRA.

STEP 1 - INSERTION

How to insert the filtersheets correctly

The input side of the filtersheet is coarse, the output side is smooth (the output side bears the inscription HOBRAFILT, the type of the filtersheet and the identification number of the production batch); see Fig. 1 and Fig. 2. This enables the determination of the identity of the product at any time, even with an used filtersheet. Filtersheets are loaded with their input side corresponding to the input one – fluid distributing draft element (support sheet) and with their output side corresponding to the output one - collecting clear element (support sheet) in a filter. Particular approach is always stated in the operation manual to the sheet filter. The filtersheets must be centered so that they are fixed along the entire perimeter of the supporting board, or so that several millimeters of the filtersheet overlap the edge. Please make sure to perform the work carefully and never use any damaged, broken or otherwise defective filtersheets.

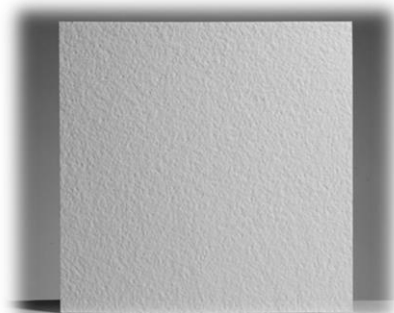


Fig. 1. Input Side of the Filtersheet



Fig. 2. Output Side of the Filtersheet

STEP 2 - IRRIGATION

How to irrigate the filter with filtersheets properly

Tighten the filter slightly and open the input valve slowly to fill the filter with drinking water. The filter output should be closed (reduced) to achieve a pressure of approximately 0.2 bar (20 kPa). Then fill for about 5 minutes, to get water to all sides of the supporting boards and to ensure that the filtersheets will be well soaked everywhere. Then stop the filling and fully tighten the partially tightened filter (during tightening, the protruding edges of the filtersheets may crack longitudinally). If the subsequent filtrate does not allow water irrigation, skip this step.

STEP 3 - FLUSHING

How to flush filtersheets properly

Flushing the filtersheets before use is an absolutely necessary operation, inevitable for trouble-free use of the filtersheets. The flushing itself should last for approximately 10 to 15 minutes, it is done in the direction of filtration at the same output (l/m²/h) as the subsequent effective filtration of product. The flushing should last until clear, flavourless water flows through the filter. If the particular application does not allow flushing with water (e.g. in case of filtering oils), skip this step. In such case, flushing is usually done with the product for filtration under the conditions described above.

STEP 4 - STERILIZATION

How to sterilize the filtersheets properly



Sterilization of the filter and the inserted filtersheets is done in the direction of the filtration. Sterilization can be done in two ways, described below. Sterilization is performed especially on “microbiologically effective” types of filtersheets.

a) hot-water sterilization

This is probably the most suitable form. We recommend performing the sterilization with water at a temperature of 85 – 90°C. In addition, hot water is gentler to all parts of the filter (filtersheets, the filter itself, fittings and packing) than the other forms of sterilization described below. How to proceed:

- ✓ when sterilizing the filter should be tightened only slightly
- ✓ the filter should be filled with hot water until the required sterilization temperature of at least 85°C is reached on all valves and cocks on the output side of the filter
- ✓ keep the temperature at a minimum value of 85°C for twenty minutes
- ✓ then let the filter cool by itself or cool it with cold (preferably sterile) water to room temperature

b) hot-steam sterilization

With this type of sterilization it is necessary to use saturated steam at a temperature of 121°C. Important! Before steam sterilization, the filter must be filled with water (see STEP 2). The filter should be filled with hot steam until the sterilization temperature has been reached on all valves and cocks on the output side of the filter for twenty minutes.

STEP 5 – FILTRATION

Filtration conditions to be set and maintained

- ✓ smooth start and end of the filtration process
- ✓ continual, uniform flow without any abrupt/impact changes of the filtration speed
- ✓ adhering to the recommended outputs (l/m²/h) and maximum permissible pressure difference (for more details, see the information in the HOBRA instructions and leaflets or visit www.hobra.cz)
- ✓ avoid pressure surges (e.g. in case of inactivity of the filler) - backward leading of the filtrate in front of the pump
- ✓ if possible, do not interrupt filtration at all
- ✓ do not allow air to be suctioned in

Interruption of filtration

Ideally the filtration, i.e. the flow through the filter, should never be interrupted. This means that **abrupt changes of the flow of the medium through the filter should never occur!** Interruption of filtration may cause changes of the binding relations between the filtersheet and the captured particles, which may result in these particles getting into the filtrate after the restart of filtration. In addition the pH value of water solutions (e.g. wine) may easily shift towards the neutral point and thus reduce the action of electrostatic and electrokinetic forces (zeta potential). When the filtration is restarted later, these loose particles are washed out of the filtersheet. **Therefore, it is necessary to recirculate the first litres of the filtrate after each necessary interruption of filtration.**

If filtration leads directly into the filler, we recommend installing a feedback line with an outfall through a pump. Thus the filtrate is led into circular bypass when bottling (the flow of liquid) is interrupted. Nevertheless, recirculation should not last too long, because it always means the danger of releasing extractible ions from the filtersheet.

End of filtration

At the end of filtration, the product remaining in the filter is forced out by the water. Here, it is also necessary to ensure that the product exchange proceeds without pressure surges. The exchange of liquid may cause a change of the pH of the solution and thus also the interruption of adsorption bonds. This again may lead to the release of some particles into the filtrate. Another option is to empty the filter by means of the drain cocks and keep the content of the filter for the next filtration.

STEP 6 – REGENERATION

How does one increase the total capacity of the filtersheets and thus reduce filtration costs

In principle, it is possible to extend the lifetime of all types of filtersheets by means of regeneration. There are various ways to achieve this and thus to increase their total capacity. What is the point? During the filtration of liquids, a considerable amount of coarse impurities, fine colloidal particles, micro-organisms etc. is captured inside the filtersheet. However, not all colloids are impurities, but they still influence the filtration output significantly. During the process of flushing the filtersheets with water, many captured



substances are released, dissolved and washed out. This process is known as the “regeneration” of the filtersheet.

The principle of regeneration

In our experience, an effective regeneration of filtersheets can be achieved only by back circulation. This means that **regeneration proceeds in the opposite direction from effective filtration.**

In principle, the regeneration of a filtersheet means a change of the solubility of the captured impurities in the filtered product and water, and mechanical release of the captured impurities from the outer and inner surfaces of the filtersheets.

Regeneration in practice

As mentioned above, the regeneration of filtersheets proceeds by means of back circulation, i.e. in the opposite direction from the filtration! If the maximum recommended pressure difference is not achieved during the filtration cycle (this information can be found in the manuals and leaflets for HOBRAFILT filtersheets), the back circulation may be performed several times.

Before starting back circulation, it is recommended to loosen the filter slightly from the maximum tightness. Ideal results are achieved if the back circulation is performed at a sufficient back pressure (at least 0.5 bar, maximum depending on the recommended maximum pressure difference during filtration). Always use clean drinking water without impurities for back circulation and regeneration.

How to proceed:

- 1) back-flush the filter with cold water for approximately 10 minutes.
- 2) then back-flush with hot water (at least 40 - 50°C) for at least 15 minutes. This releases the impurities which have not been washed off by the cold water. Never recirculate the water used for regeneration.
- 3) in some applications (e.g. red wine), better back circulation results are achieved when using water of a temperature up to 80°C.
- 4) if you regenerate sterile filtersheets, do not forget to sterilize them again before use (for description, see STEP 4)
- 5) if clear, clean, flavourless water is flowing from the filter, it is possible to cool the filter to room temperature or the temperature needed for the intended filtration. Then tighten the filter again and everything is ready for the next cycle. Continue with **STEP 5** (see above)



Our experience and tests show that properly performed back-flush regeneration may increase the total filtration capacity of the filtersheets and thus significantly reduce the total filtration costs.

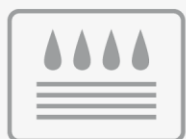
STEP 7 – DISPOSAL

How does one dispose of filtersheets securely after use

On the basis of the available documents it can be stated that HOBRAFILT filtersheets can be composted freely, without negative environmental impacts. In case, that for filtration is used any environmentally objectionable material, the process of disposal is governed by the working standard for this filtrated material.

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Certifikace:
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The stated information is based on many years of experience and knowledge of the development, production and use of HOBRAFILT filtersheets by HOBRA – Školník s.r.o. All data are stated with the best intention to help the customers and users of filtersheets to facilitate work with the company's products. However, this information cannot be guaranteed for all the applications of filtersheets. HOBRA – Školník s.r.o. also cannot guarantee the above in the event of incorrect handling of the products or in case of the bad condition of the equipment and products. Incorrect use of the product voids all guarantees.