

CONDITIONS FOR SUCCESSFUL FILTRATION

with ORBIFILT lenticular filter modules

STEP 0 – STORAGE

How to store filter modules properly

The ORBIFILT filter modules should be stored in dry, ventilated conditions without any odour and only in the original packing. It is necessary to eliminate sharp changes of temperature, especially from high to low due to potential condensation. We recommend using the filter modules within 36 months from the date of production. If you have doubts about the use of filter modules, please contact the HOBRA company.

STEP 1 INSTALLATION

How to install the filter module correctly

Always check the overall appearance of the module and its individual elements including filtersheets and seals before installation. If everything is fine, moisten the seal with filtered water and insert the module in the filter (housing). Make sure the module is located in the correct direction (separators between individual lentils should always face down). If you use modules with a flat adapter, put the module directly on the entrance point of the central guide rod and then follow the instruction for the particular filtration equipment (housing). If you use filter modules with a bayonet adapter, put the module on the entrance point so that the wings are positioned exactly in their resting areas. Then press the module slightly from the top. Once the module rests in its lowest position, seize the module with both hands by its external frame and rotate it clockwise until both wings of the bayonet lock on.

STEP 2 – IRRIGATION

How to irrigate the loaded filter modules properly

Open the vent cock; the filter will slowly be filled with water. The irrigation speed should be approximately one minute per each module in the filter. When the filter is flooded and water runs from the valve, you can proceed to the next step.

STEP 3 – FLUSHING

How to flush filter modules properly

Flushing the filter modules before their use is an absolutely essential operation without which trouble-free service of the filtersheets cannot be assured. The flush should last approximately 10 to 15 minutes. It should proceed in the filtration direction with 1.25 and 1.5 multiple of the subsequent output ($l/m^2/h$) of the product at the counter-pressure approximately 0.5 bar. The vent cock stays slightly open throughout the flushing so that all air bubbles can escape. The flushing must last long enough until clear, flavourless water flows through the filter. If the given application does not allow flushing with water (e.g. oil filtration), this operation should be omitted. In this case, you should use the product used for filtration under above mentioned conditions.

The flushing is usually terminated with emptying the filter by shutting off the flush water and opening the vent cock and the discharge valve on the inlet.

STEP 4 – STERILISATION

How to sterilise filter modules properly

Sterilisation of the filter and the inserted filter modules proceeds in the filtration direction. It can be performed in two methods which are described below. It is usually performed on "microbiologically effective" versions of the filter modules.

a) sterilisation with hot water

This is probably the most suitable method. We recommend sterilisation with water warmed between 85-90°C. Hot water is more friendly to all components of the filter (i.e. filtersheets, the filter, fittings and seals) than the below mentioned methods. Procedure:

- ✓ all valves including sample cocks should be slightly open to ensure correct tempering of the whole system
- ✓ the filter should be filled with hot water until the desired sterilising temperature of at least 80°C is reached on all valves and cocks on the outlet side of the filter.
- ✓ keep the inlet temperature on the minimum value of 85 °C for thirty minutes
- ✓ you can stop hot water supply after thirty minutes
- ✓ allow the filter to cool down spontaneously or cool it down with cold (preferably sterilised) water to room temperature.

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b) sterilisation with hot steam

Use steam pressurised to 0.5 bar (50 kPa) with the temperature of 110°. **Important notice!** **The filter must be flooded before steam sterilisation** (see STEP 2). All valves should be slightly open during filling with steam. The filter should be filled with steam until the desired sterilising temperature is reached on all valves and cocks on the outlet side of the filter (or alternatively, the steam spurts are not visible from approximately 10 centimetres) for twenty minutes.

Then allow the filter to cool down spontaneously. The vent cock must stay open during the cooling process to prevent damage of the modules by vacuum. After cooling to approximately 40°C you can start cooling with cold water (preferably sterile) to room temperature. Thus a cooled filter can be used for operating filtration. Or, alternatively, it can be put out of operation for a maximum period of 3 days. In this case the filter should be filled with cold water under the pressure of approximately 1 bar with all valves shut off.

STEP 5 – FILTRATION

What filtration conditions should be set and maintained

The filter is filled with the product (see STEP 2) which is running out of the vent cock and is prepared for filtration. Shut off the vent cock. Slowly open the outlet valve. The output is controlled with regard to the filtration method (pre-filtration, cleaning or sterilising). At the start of the filtration, the vent cock must stay slightly open to allow air bubbles to escape and the filter to be filled properly. There must be no abrupt changes of filtration speed during filtration. It should be controlled very carefully and gently. It is also important to avoid pressure impacts (for instance when the filler is not running) and keep the recommended outputs (l/m²/h) and maximum allowable pressure differences (refer to HOBRA manuals and brochures or go to filtration.hobra.cz).

Interruption of filtration

Interruption of filtration before depletion of the modules is important for filtering efficiency. To interrupt the filtration, shut off the supply of filtered liquid and proceed according to STEPS 3 and 4 with STEP 6 if necessary.

a) short-term interruption (maximum 3 days).

Follows immediately after STEP 4, so after cooling the sterilised filter.

b) long-term interruption of filtration and storing the used modules (for more than 3 days)

For long-term interruption of filtration and storing used modules we recommend filling the filter with a disinfectant (0.2% solution of sulphurous acid or 0.2% solution of peracetic acid) immediately after performing the above mentioned STEPS 3 and 4 (if needed, STEP 6). The modules can also be stored outside the filter in a closed vessel (in 0.1% solution of sodium disulfide pH 3 - acidified with citric acid). The vessel should be regularly inspected (at least every five days) and the solution preserved. We recommend storing the module for two months at most. The module, however, can last a longer time.

The modules can be used again after a flush according to STEP 3. They must not contain any residues of the disinfectant after the flushing.

End of filtration

The filtration ends when the maximum recommended pressure difference is reached or when the module's filtering efficiency has been exhausted. The product remaining in the filter can be retrieved either by draining the filter through discharge valves or it can be pushed out with water or another solution or with pressurised gas. Even here it is necessary to prevent pressure impact during exchange of the product. Exchange of the liquid may result in a change of the pH factor of the solution and consequently breaking the adhesive forces. This can lead to a release of certain particles into the filtrate.

STEP 6 – REGENERATION

How to increase total capacity of filter modules and reduce filtration costs

Regeneration of the filter module basically concerns change of solubility of the captured impurities in the filtered products and water and mechanical release of captured impurities from the internal and external surface of the filtersheets used in the modules. You should carry out regeneration as often as possible, preferably before the pressure difference starts growing.

a) Regeneration of the modules after filtration of water solutions, wine, fruit juices and similar liquids

Regeneration should proceed at the same filtration velocity as the operational filtration. In the first phase, the modules should be rinsed with cold water for at least ten minutes. Proceed according to STEPS 2 and 3. In the second phase, the modules should be rinsed

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with warm water (maximum 50°C) for approximately 10-15 minutes. This will release impurities which cold water does not flush. Never recycle water used for regeneration. In the third phase flush with hot water (80-85°C). In certain applications (e.g. red wine), this method achieves better regeneration effects. When the water running from the filter is clear without any taste, the filter can be cooled down to room temperature or temperature required for the particular filtration (see STEP 4a). Continue with STEP 5 (see above).

b) Regeneration of the modules after filtration of solutions which are not based on water. Conditions for proper regeneration of such solutions must be adapted to the particular substance.

REGENERATION OF FILTER MODULES CAN ONLY BE PERFORMED IN THE DIRECTION OF THE OPERATIONAL FILTRATION!!!

Our experience and tests suggest that properly performed regeneration can increase the total filtration capacity of filter modules and thus significantly reduce the total filtration costs.

STEP 7 – DISPOSAL

How to dispose of the filter modules after use

Based on available materials, we can proclaim that the filtersheets used in the modules can be freely composted without any negative effect on the environment. As the module is made with a polypropylene frame, liquidation in household mixed waste is recommended. Should dangerous substances be filtered, the applied module should be treated according to regulations regarding the particular substance.

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The mentioned information comes from longtime experience and knowledge in development, production and application of filtersheets used in the ORBIFILT filter modules and modules itself by the HOBRA – Školník s.r.o. Company. All information has been provided with our best intention to facilitate work with the company's products. However, this information cannot be guaranteed for the various applications or utilisation of the filter modules. The HOBRA – Školník s.r.o. Company cannot guarantee the above mentioned facts if the products are handled incorrectly or in case of the bad condition of the equipment and products. Improper use of the product will lead to a loss of all guarantees.

