

Instructions and recommendations for Filtralite® Pure HC 2,5-5 mm

1 General

Filtralite® Pure HC 2,5-5 mm is a filter media for purification of water. It is made of expanded, clay granules that are crushed and sieved. The porous, sharp-edged grains have strong resistance against mechanical abrasion and low acid solubility. Filtralite® Pure HC 2,5-5 mm is an inert, ceramic material and complies with the requirements of EN 12905 (Products used for treatment of water intended for human consumption - expanded aluminosilicate).

2 Application of Filtralite® Pure HC 2,5-5 mm

Filtralite® Clean HC 2,5-5 mm can be used as filter media in biological treatment of drinking water. It can be utilized as single media filters in both open and closed filters for treatment of ground water, surface water, seawater and effluents.

3 Recommendations for filter design

3.1 Biofilters

Due to its porous structure and large specific surface area, Filtralite® Pure HC 2,5-5 mm is ideal as support media for biofilms in fixed bed biofilters. Biofilters are normally single media filters.

To obtain biological degradation of substances in the water, it is important that the contact time (the time it takes for water to pass through the filter) is sufficient. The needed Empty Bed Contact Time (EBCT) is dependent on the type of matter to be removed, concentration, temperature etc. Experience from plants and tests show that the EBCT should not be shorter than 15-20 minutes. It is recommended to run a pilot test to define the correct EBCT for a specific water quality.

3.2 Particle removal filters

Filtralite® Pure HC 2,5-5 mm is only suitable for use in single media, rapid granular filters.

Recommended filter depth using Filtralite® Pure HC 2,5-5 mm:

Filter media	Grain size [mm]	Layer depth [mm]
Filtralite® Pure HC 2,5-5 mm	2.0-5.0	600-1200

Filtration rate for potable water open gravity filters designed according to the table above is normally 5-15 m/h. For other applications filtration rate can be lower or higher.

4 Installation and start up

4.1 Installation

Filtralite® Pure HC 2,5-5 mm can be delivered either in big bags or bulk. When delivered in big bags the installation of the material can be done by lifting the big bag over the filter cell by a crane or fork lift and then cut the bottom of the big bag so that the filter media falls into the filter. To avoid any dispersion of dust attached to the filter media, water should be filled into the filter cell before the Filtralite® Pure HC 2,5-5 mm is filled in. Most of the dust will then stay in the water.

If the material delivered in big bags are to be stored at the plant, make sure to store the big bags on pallets to avoid degradation of the bottom of the big bags and for reducing the risk for contamination of the filter media. The big bags should not be stored outdoors for a longer period than 3 months without being covered by tarpaulin or similar to avoid degradation of the big bags. The big bags should also be kept away from direct sunlight. If big bags are stored at temperatures below 0 °C, the material may freeze and cause difficulties with the handling of the material.

For delivery in bulk the Filtralite® Pure HC 2,5-5 mm media can be installed by pneumatically blowing it into the filters. To avoid excessive abrasion to the media through the hose/pipe, the hose used should not be less than 4" diameter. It is also important to avoid bends in the hose. If bends are unavoidable, the radius of the bends should be as large as possible. To avoid excessive dust in the area where the filters are located, water may be added to the hose (1/2" hose, with about 6 bar water pressure). To allow all dust to be fully wetted, water should be connected to the hose around 5-10 m before the nozzle end. The total blowing distance (length of hose) should not exceed 60 meters.

4.2 Start up

After the Filtralite® Pure HC 2,5-5 mm has been installed in the filter, the filter should be filled with water to above the top of the filter media. The filter media should be wetted for about **48 hours** before washing of the filter media starts. After the soaking period the media must be cleaned by backwashing 4 x 30 minutes.

If the backwash procedure can be operated manually, the first backwash can be carried out only with water that runs through the filter until the outlet wash water is clean. If the backwash system only operates with a fixed procedure, this procedure should be repeated until the water is clean. After the filter media is cleaned, the filter can be put into operation.

5 Operation

5.1 Filtration

In filtration mode Filtralite® Pure HC 2,5-5 mm provides low head loss and high storage capacity for sludge, resulting in long filter runs between each backwash. See section "Operations and maintenance manual" for more information.

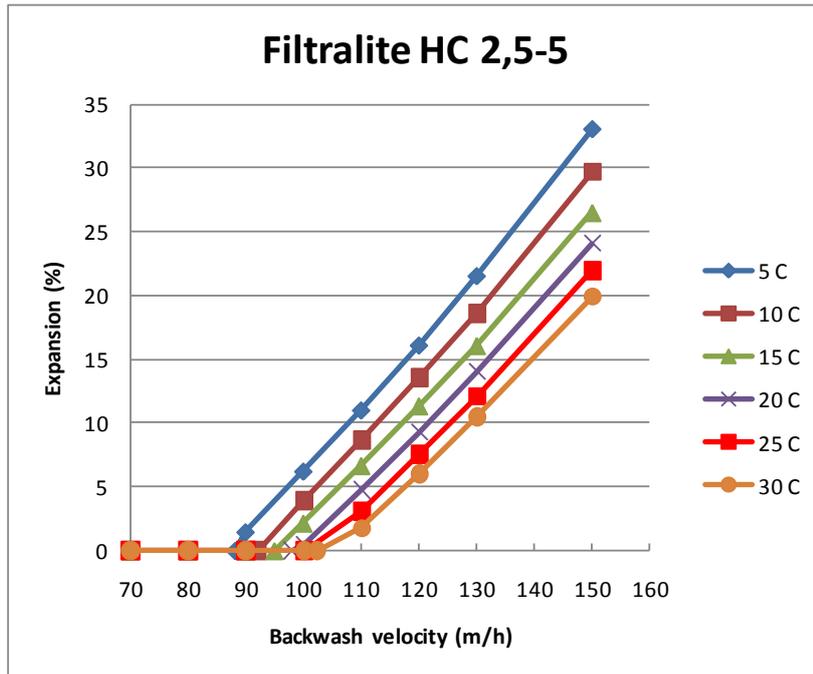
5.2 Backwash

During operation, sludge will attach to the filter and the head loss through the filter may increase. Cleaning of the filter by backwashing is necessary when the head loss reaches maximum allowed level, or there is a break-through of particles through the Filtralite®.

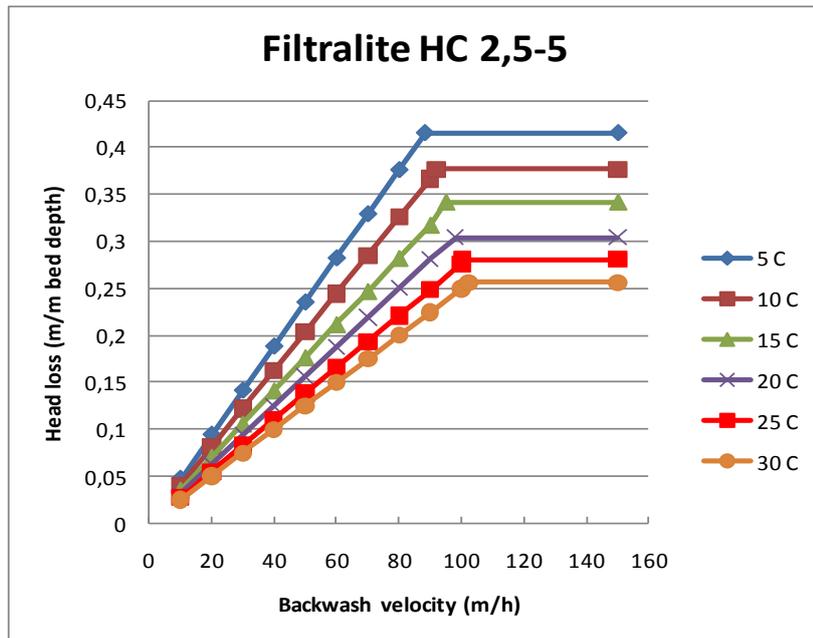
Single media filters with Filtralite® Pure HC 2,5-5 mm are most effectively backwashed with a combination of air and water. The absolutely most effective backwash is to backwash with air and water in combination followed by water alone with a velocity that gives about 15-30% expansion of the material (see curve below). This solution requires large pumping capacity and is therefore not commonly used for single media filters.

For dimensioning of the backwash system it is important to know the water velocity needed for fluidizing the filter media. The following diagram shows the expansion of Filtralite® Pure HC 2,5-5 mm during backwash without air for different water velocities and temperatures.

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The following diagram shows the correlation between head loss and backwash velocities without air for different water temperatures.



As the primary washing effect is contributed by the injected air, which loosens dirt from the filter grains, the water velocity can be moderated to a lower level. The main function of the water is transporting dirt out of the filter. Recommended backwash procedure for a single media filter with Filtralite® Pure HC 2,5-5 mm:

1. Lower the water level to approx. 100 mm above the top of the filter media.
2. Flush with water in combination with air until the water level is approx. 500 mm below overflow.
3. Pause for 120 seconds.
4. Flush with water for 600 seconds, or until backwash water is clean, with expansion and water velocity as recommended in the above graph.

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If additional cleaning is necessary to achieve clean backwash water, repeat step 2 and 3 before final step 4.

5.3 Stopping the operation

If the filter is taken out of operation for a short period, it is important to wash the filter intensively before it is stopped. The filter can then stay water filled for a couple of weeks. If the filter has to be taken out of operation for a longer period, the water should be drained off to avoid biological growth in the water and filter media.

5.4 Restart of filter after standstill or re-fill of filter media

Before restarting a filter after that has been out of operation for a longer period, the filter has to be backwashed intensively several times. If the filter was stopped for re-fill of filter media, the procedure for start-up of a new filter (section 4.2) should be followed.

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