

Instructions and recommendations for Filtralite® Pure NC 0,8-1,6 mm

1 General

Filtralite® Pure NC 0,8-1,6 mm is a filter media for purification of water and residual and industrial effluents. 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 NC 0,8-1,6 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 NC 0,8-1,6 mm

Filtralite® Pure NC 0,8-1,6 mm can be used as filter media both in conventional deep bed filters for particle removal and in biological filters. It can be utilized in single media filters as well as top layer in multi media filters. Filtralite® Pure NC 0,8-1,6 mm can be applied 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 NC 0,8-1,6 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 Multi media filters

Down flow dual media filters have the advantage that the total head loss is lower and the storage capacity of the filter is higher compared to single media filters. This gives extended operating time between backwashes.

A normal multi media filter, e.g. dual media filter, has a coarse top layer and a finer bottom layer. When designing a dual media filter it is important that filter materials have unequal settling velocities, this ensures separation of material after backwash. The bottom layer filter media must be heavier and have smaller grains than the top layer media.

Recommended dual media filter design using Filtralite® Pure NC 0,8-1,6 mm:

Filter media	Grain size [mm]	Layer depth [mm]
Filtralite® Pure NC 0,8-1,6 mm	0.8-1.6	500-900
Quartz sand	0.3-0.8	400-800

Filtration rate for potable water dual media 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 NC 0,8-1,6 mm is normally 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 NC 0,8-1,6 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.

Installation with pneumatic blowing is not recommended for Filtralite® Pure NC 0,8-1,6 mm.

4.2 Start up

After the Filtralite® Pure NC 0,8-1,6 mm has been installed in the filter, the filter should be filled with water to above the top of the filter media. Filtralite® Pure NC 0,8-1,6 mm has a low dry particle density, and to avoid loss of material the filter media should be soaked for about **1 week** before washing of the filter media. 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

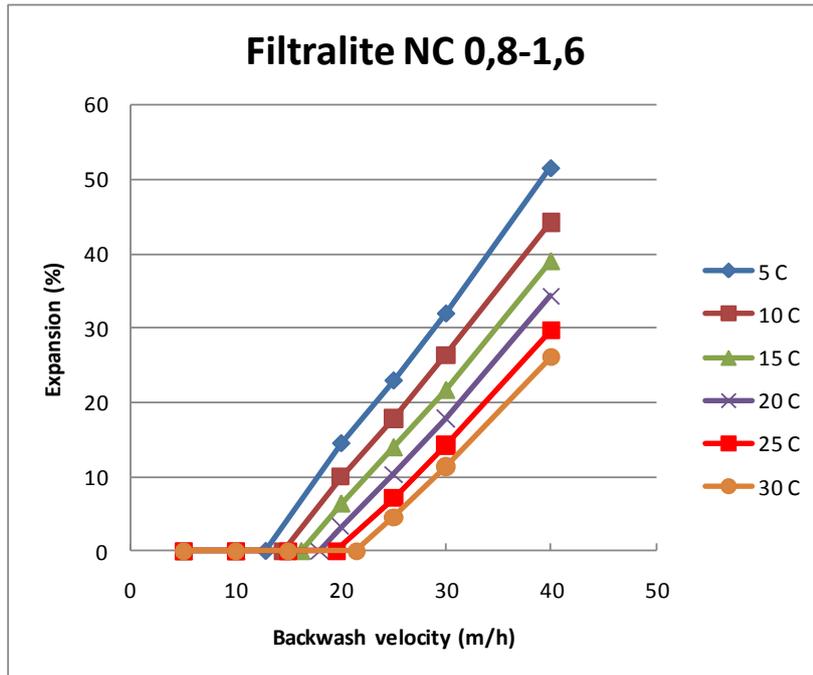
In filtration mode Filtralite® Pure NC 0,8-1,6 mm provides low head loss and high storage capacity for sludge, providing long filter runs between each backwash. See section "Operations and maintenance manual" for more information.

5.2 Backwash

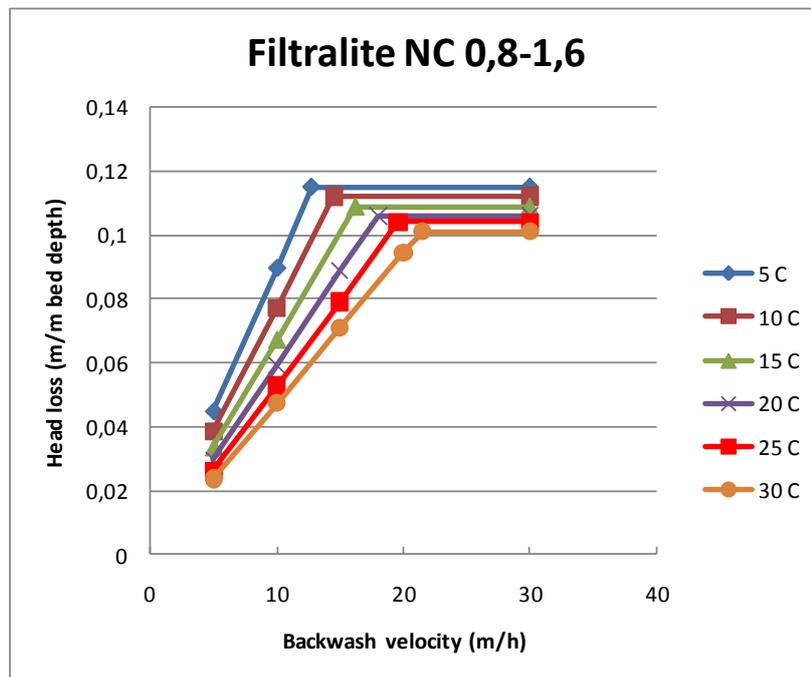
During operation, sludge will attach to the filter and the head loss through the filter may increase. Cleaning of the filter by backwashing is necessary when the head loss reaches maximum allowed level, or there is a breakthrough of particles through the Filtralite® filter media.

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 NC 0,8-1,6 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.



The backwashing procedure of dual media filters must proceed in a manner that ensures continued separation of layers after backwashing. This is usually obtained by fluidizing with water only as the final step of the backwashing procedure. The recommended steps for backwashing a dual media filter with Filtralite® Pure NC 0,8-1,6 mm as top layer is collapsed pulse backwashing:

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. 300 mm below overflow.
3. Pause for 120 seconds.

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4. Flush with water for 600 seconds, or until backwash water is clean, with expansion and water velocity as recommended in the above graph.

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