

Filtralite drinking water

filtralite



Water is a necessity for all life

Drinking water is our most important source of nutrients, and water quality requirements are, and should be, strict.

To achieve good quality drinking water, different types of treatment are used, based on the quality of the raw water. For many of these treatment processes Filtralite® is an excellent filter media.

Filtralite properties

Filtralite filter media is made by burning of clay at about 1200° C, followed by crushing and sieving. The material has a porous structure and when crushed, a large surface area is exposed. Dry particle densities in the range 500-1,600 kg/m³, and aggregate sizes in the range 0-20 mm, can be «tailor-made» to the specific application. The aggregates do not release harmful substances, and the acid solubility is minimal. Despite its low density and high porosity, Filtralite has high abrasion and impact resistance.



Filtralite qualities

Three main types of Filtralite are available, with three different densities. For drinking water applications crushed material is used. This gives angular grains and allows the porous core to be exposed to the water.

Different Filtralite qualities

TYPE OF MATERIAL	DRY PARTICLE DENSITY		TYPICAL APPLICATION
	[kg/m ³]	[lb/ft ³]	
Filtralite NC 0,8-1,6 mm	1000-1200	60-75	Dual media filtration, biological filtration
Filtralite NC 1,5-2,5 mm	1000-1200	60-75	Dual media filtration, biological filtration
Filtralite MC 0,8-1,6 mm	1300-1500	80-90	Mono or dual media filtration, biological filtration
Filtralite MC 1,5-2,5 mm	1200-1400	75-85	Mono or dual media filtration, biological filtration
Filtralite MC 2,5-4 mm	1100-1300	65-85	Biological filtration
Filtralite HC 0,8-1,6 mm	1500-1700	90-105	Mono or dual media filtration, biological filtration
Filtralite HC 1,5-2,5 mm	1400-1600	85-100	Mono media filtration, biological filtration
Filtralite HC 2,5-5 mm	1400-1600	85-100	Biological filtration



Fredrikstad Water Treatment Works, Norway.



Application of Filtralite

Filtralite is inert ceramic particles with a dense shell surrounding a porous core. This makes it suitable for use in different drinking water treatment processes, such as:

- Physical filtration
- Biological filtration
- Pre-treatment for desalination

Drinking water treatment

Filtralite's large pore volumes and surface areas make it an ideal media for biological treatment of drinking water. Biofilm processes are excellent for treating raw water containing ammonia, manganese, iron etc.

Tests have shown that Filtralite works perfectly in these kinds of processes. In conventional filtration processes Filtralite can be used in different ways.

In dual media filters Filtralite can be used in

combination with sand. Tests have shown that Filtralite operates as well as or better than traditional filter media in these types of filters. Filtralite can not only be used in traditional drinking water treatment, but also in treatment of saline water.

In desalination plants one of the most important parts is the pre-treatment process. Filtralite is an excellent filter media for use in pre-treatment filters in desalination plants.



Physical Filtration

Filtration of water is the most traditional type of water treatment. Filtralite has the ideal properties to work as a good filter media in both mono and dual media filters for filtration of coagulated water.

Compared to traditional filter media like sand and anthracite Filtralite has much higher porosity, which gives lower initial head loss, slower head loss build up and higher storage capacity. These advantages

result in much longer filter runs between backwashes, which mean reduced energy and water consumption and higher water production, giving reduced operating costs.

By replacing sand with Filtralite in single media filters the operating time between backwashes can be extended by up to 500%. For dual media filters a change from sand and anthracite to the dual media Filtralite

Mono-Multi, consisting of two different qualities of Filtralite, can give up to 800% longer filter runs. If only the top layer is replaced with Filtralite and the bottom layer of sand is kept the filter runs can be extended by up to 50%.

For existing filters with low backwash velocities a change from sand to Filtralite will help in keeping the filters clean, as Filtralite is much lighter than sand and there-

fore need lower backwash rates for cleaning.

Filters with Filtralite can be operated within a large range of filtration rates. The filtration rate will always be dependent of the configuration of the filter and the treatment process. Existing Filtralite filters operate from about 2 m/h up to around 20 m/h.

Biological filtration

In biological filters bacteria attach to the filter media and a biofilm arises on the surfaces of the filter grains. A large available surface area for biofilm growth is one of the most essential properties of filter media used in biofilm processes. The crushed Filtralite grains have a large surface area, resulting in Filtralite being an ideal

media for use in biological treatment processes.

Tests have shown that Filtralite is as good as or better than alternative carrier materials for biological treatment of drinking water. Ammonia, iron, manganese and other biodegradable substances can be effectively removed in biological treatment using Filtralite as a carrier media.

An important factor for an efficient biological treatment process is the time the water is in contact with the biofilm.

The most common way to quantify the contact time is the Empty Bed Contact Time (EBCT), which is defined as the time the water needs for passing through the entire filter volume. The needed EBCT vary for different

water qualities and treatment systems, but about 20 minutes is quite normal for many systems. To be able to define the correct EBCT for a specific system it is recommended to run a pilot test.

Existing Filtralite biofilters operate with filtration rates up to about 30 m/h.

EXAMPLE OF SINGLE MEDIA FILTRATION WITH FILTRALITE:

SLUVAD

Plant:	Sluvad Water Treatment Works
Place:	Pontypool, Wales, United Kingdom
Plant rehabilitation:	Single media sand filters changed to single media Filtralite filters
Results:	Time between backwashes: - 40 hours for old sand filters - 120 hours for new Filtralite filters
Type of Filtralite delivered:	Filtralite MC 0.8-1.6 mm
Year of delivery:	2009-2010

EXAMPLE OF BIOLOGICAL TREATMENT WITH FILTRALITE:

TAI PO

Plant:	Tai Po Water Treatment Works
Place:	Hong Kong
Volume of water produced:	250,000 m ³ /day
Type of process:	Biological aerated filters for removal of ammonia and manganese
Results:	- Ammonia removal: > 90% - Manganese removal: > 50%
Type of Filtralite delivered:	Filtralite HC 2.5-5 mm
Volume delivered:	3,000 m ³
Year of delivery:	2001



Pre-treatment for desalination

In desalination plants it is of great importance for the operation of the entire plant that the pre-treatment of the water is good before the salt is to be removed. For reverse osmosis (RO) desalination plants a good pre-treatment is essential for avoiding membrane fouling, resulting in reduced water production and increased operational costs.

Filtralite has excellent properties for use in pre-treatment filters in desalination plants, both in filters for filtration of coagulated water and in

biological processes. Use of Filtralite will provide low SDI values, reduced danger for bio-fouling of the RO membranes and long filter runs between backwashes.

The extra porosity of a Filtralite filter can also be used to increase the capacity of existing filters. As the head loss in a Filtralite filter is less than for less porous filter media, the Filtralite filter can take higher filtration velocities and therefore produce more water than filters with traditional filter materials.

EXAMPLE OF DESALINATION PRE-TREATMENT WITH FILTRALITE:

BECKTON

Plant:	Beckton Desalination Plant
Place:	London, United Kingdom
Volume of water produced:	150 000 m ³ /day
Pre-treatment process:	Pressure filters with single media Filtralite in front of UF membranes
Type of Filtralite delivered:	Filtralite HC 0.8-1.6 mm
Volume delivered:	930 m ³
Year of delivery:	2009

Research and Development

The development of Filtralite filter media is carried out in close cooperation with universities and research institutes both in Norway and around the world.

A doctoral thesis on drinking water filtration using Filtralite is completed. Several reports and papers have been written on different aspects of the use of Filtralite in treating drinking water.

Weber operates a sophisticated laboratory for filter media testing, and co-operates both with Norwegian and international research laboratories.

Pilot plants

Running a pilot plant is usually the best way of achieving information on the performance of a specific process or a material used for water treatment. Weber supply, under normal conditions, filter media for pilot plants free of charge.

Company presentation

Weber in Norway is a part of the international Saint-Gobain Weber company, again a part of Saint-Gobain. Saint-Gobain is the world leader in the habitat and construction markets, designs, manufactures and distributes building materials, providing innovative solutions to meet growing demand in emerging economies, for energy

efficiency and for environmental protection.

Weber specialises in the manufacture of high quality expanded clay and premix products, and is one of the largest expanded clay manufacturers in the world.

In addition to building sector activities, Weber develops, manufactures and sells filter media to be used for different types of water and wastewater treatment processes as well as odour treatment.

Certification

Filtralite is certified for use in drinking water applications in accordance with the European Norm EN 12905.

Weber's quality and environmental control system is certified according to ISO 9001 and 14001.

Transport and delivery

Filtralite can be delivered both in bulk and in big bags. The bags can be lifted from the top or they can be placed on pallets thus allowing the use of forklifts for loading and off-loading.

Most types of Filtralite can be installed either pneumatically or hydraulically.

Weber possesses considerable transportation and logistics expertise, based on several successful deliveries of Filtralite to many parts of the world, both in big bags and in bulk.



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