

Filtralite effluent water

Quality

biological filtration

expertise water reuse



*filtralite*

**maxit**  
maxit Group

# Leave the water in the same condition as you found it!

Clean water is a scarce resource around the world. To prevent destroying the water still available, treatment of effluent water is essential.

Nutrients in the effluent water results in overgrowth in lakes and rivers, killing the natural life and making the water unsuitable for use as drinking water. Nutrients can be removed in biological treatment processes and Filtralite has the ideal properties as a support media for biofilms for these processes.

In extra sensitive areas further treatment is needed for retaining the existing water quality, or the water may be reused for irrigation or other purposes. Tertiary treatment of the water is then necessary. Filtralite have proved to work perfect in tertiary filters for reduction of suspended solids, phosphorus etc.



## 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/m<sup>3</sup>, 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

Filtralite is available in different densities. The aggregates can be delivered in a round or crushed, angular form.

## Different Filtralite qualities

TYPE OF MATERIAL	DRY PARTICLE DENSITY		TYPICAL APPLICATION
	[kg/m <sup>3</sup> ]	[lb/ft <sup>3</sup> ]	
Filtralite MC 2,5-4 mm	1100-1300	65-85	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
Filtralite HR 3-6 mm	1400-1600	85-100	Biological filtration
Filtralite HR 4-8 mm	1400-1600	85-100	Biological filtration



# Application of Filtralite

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

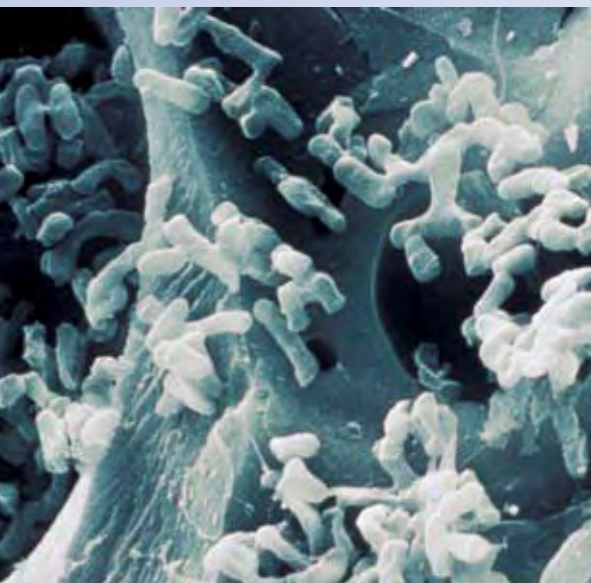
- Biological treatment
- Tertiary filtration
- Odour treatment

## Effluent water treatment

Filtralite's large pore volumes and surface areas make it an ideal media for biological treatment of effluent water. Biofilm processes are excellent for treating water containing nitrogen, BOD etc. Many years of experience has shown that Filtralite is the perfect media for these types of plants.

If extra strict outlet levels are required, tertiary filters are used. Filtralite has the ideal properties for use in mono- or multi media tertiary filters. The large porosity of the Filtralite grains gives low head loss and high storage capacity for suspended solids, resulting in long filter runs and low operational costs.

Filtralite can not only be used in traditional effluent water treatment, but also for odour treatment at sewage treatment works. The porous material is excellent for use in biofilters for removal of hydrogen sulphate and other biodegradable odorous compounds.



## Biological treatment

Among the essential parts in the biological aerated filters, (BAF), is the filter media. The biomass that treats organic and nitrogenous matters is fixed to the Filtralite medium, which also works well as a mechanical filter for suspended solids. Filtralite is used both in processes of aerobe systems (nitrification and organic matter) and anoxic systems (denitrification).

Both crushed and uncrushed Filtralite are excellent as a growth medium for bacteria. In biofilm processes the total efficiency is dependent on the utilisation of support media. Large available growth surface on the media is important and gives a high

concentration of specialised groups of bacteria. This enables the process to be very efficient on volumetric basis. Crushed Filtralite has a rough and angular surface with sharp edges and a large porosity. The crushed particles have a larger surface area than the rounded particles and are therefore more effective in most reactors.

Biological processes are very dependent of time. Therefore it is essential that the contact time, i.e. the time the water is in contact with the filter media and bacteria, is as long as possible. In most cases the contact time for BAF filters is about 20 minutes.

### EXAMPLE OF BIOLOGICAL TREATMENT WITH FILTRALITE:

#### DALIAN

Plant:	Dalian Malian Wastewater Treatment Plant		
Place:	Dalian, China		
Volume of water treated:	120,000 m <sup>3</sup> /day		
Type of process:	Biological aerated filters for nitrification, BOD, COD and SS removal		
Results:	- BOD <sub>5</sub> :	In: 216 mg/l	Out: 3 mg/l
	- COD:	In: 480 mg/l	Out: 30 mg/l
	- SS:	In: 350 mg/l	Out: 8 mg/l
	- NH <sub>4</sub> -N:		Out: 1.1 mg/l
Type of Filtralite delivered:	Filtralite HC 2.5-5 mm and Filtralite HR 3-6 mm		
Volume delivered:	8,000 m <sup>3</sup>		
Year of delivery:	2000		



## Tertiary filtration

As water is a scarce resource in many parts of the world, reuse of water has become more and more normal. To be able to reuse the effluents, tertiary filtration for removal of suspended solids is necessary. The same will be the situation in areas with extra sensitive recipients.

Filtralite has proved to be as good as,

or better than, comparable filter media, both in single- and dual media filters. In dual media filters, by replacing the most traditional top layer filter material, anthracite, with Filtralite, time between backwashes can be increased by about 25%. This means fewer stops for backwash and reduced use of backwash water, resulting in more stable

operation and lower operational costs.

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. Filtralite tertiary filters can operate at up to around 15-20 m/h.

### EXAMPLE OF TERTIARY FILTRATION WITH FILTRALITE:

#### KÄPPALA

Plant:	Käppalaverket		
Place:	Stockholm, Sweden		
Volume of water treated:	140,000 m <sup>3</sup> /day		
Type of process:	Activated sludge followed by dual media filters		
Filter performance:	- Tot P:	In: 1.0 mg/l	Out: 0.22 mg/l
	- SS:	In: 4 mg/l	Out: 0.6 mg/l
Type of Filtralite delivered:	Filtralite MC 2.5-4 mm		
Volume delivered:	1,800 m <sup>3</sup>		
Year of delivery:	1997		



## Industrial effluents

Industrial effluents can have extremely high contents of specific substances. Very specialized treatment processes are therefore necessary for treating these types of waters.

In many types of industrial effluents biodegradable matters like ammonia is a big problem. Filtralite have ideal properties for providing effective removal of ammonia, whatever the concentration is, in fixed film bio-reactors. The very porous Filtralite grains have a large available surface area for bacteria to grow on, resulting in highly effective degrading of the biodegradable substances.

Also for physical filtration of industrial effluents Filtralite is extremely suitable. The angular and porous filter grains allow very long filter runs and a high storage capacity for suspended solids.

## Water reuse

As water is a more and more scarce resource in many parts of the world, alternatives to use of fresh water have to be considered. Especially irrigation of agricultural areas needs a lot of water.

One of the most easily accessible resources of water is effluent water. By treating the effluent water biologically and by filtration it can without any dangers be used for irrigation purposes, as there is no need for water with drinking water quality for this purpose.

By adding even more sophisticated treatment to the process, like membranes and disinfection, the effluent water can be used also as a resource for producing potable water.

### EXAMPLE OF TREATMENT OF INDUSTRIAL EFFLUENTS WITH FILTRALITE:

#### PAPER PULP EFFLUENT

Plant:	Papelera Munne		
Place:	Capellades, Barcelona, Spain		
Volume of water treated:	1,200 m <sup>3</sup> /day		
Type of process:	Biological aerated filters for BOD, COD and SS removal		
Results:	- COD:	In: 2000 mg/l	Out: < 200 mg/l
	- SS:	In: 200 mg/l	Out: < 40 mg/l
Type of Filtralite delivered:	Filtralite HC 2.5-5 mm		
Volume delivered:	45 m <sup>3</sup>		
Year of delivery:	2004		

## 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.

maxit 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. maxit supply, under normal conditions, filter media for pilot plants free of charge.

## Company presentation

maxit as is a part of the international maxit Group, which is fully owned by the German Heidelberg Cement Group. The Heidelberg Cement Group is one of the largest cement and building materials producers in the world. maxit Group has activities in about 30 countries around the world and approximately 4,900 employees.

maxit Group 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, maxit as develops, manufactures and sells filter media to be used for different types of water and wastewater treatment processes as well as odour treatment.

## Certification

maxit'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.

maxit 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.



