Building on tradition

A new technology is making a name for itself in potable water filtration. And, according to AMT Systems, it is the most cost-efficient advance since the introduction of the dual media filter.

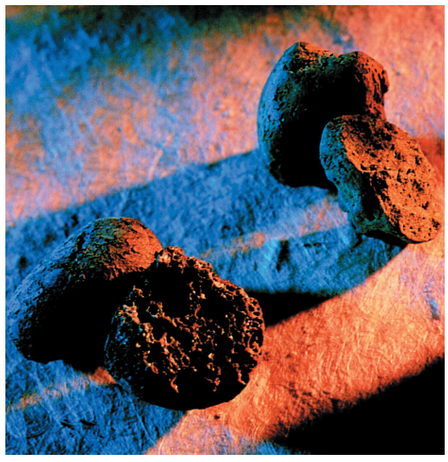
YOUR FILTERS need to be washed every day. What would your energy, water and waste treatment saving be if they only required washing every four or five days?

You need to increase the output of the works. Are the filters the existing throttle point? Can you achieve your revised target by reducing wash water rather than building more filters while simultaneously reducing operating costs? Can you save the expense of building new clean and dirty wash water tanks by reducing backwash requirements?

The velocity of your existing backwash system is not sufficient to produce your required filter bed expansion. What is the cost of replacing your backwash system including pumps, pipes and wash water tanks? Will installation of a lighter density filter media solve the problem while also increasing filter run times with associated cost reductions?

According to AMT Systems, the simple answer to all the above questions is a purpose-designed EN 12905 certificated filter media for use in potable filters – Filtralite.

Filtration is the most traditional water treatment process. Filtralite properties are suitable for both single and dual media filters for filtration of coagulated water. In dual media filters the company has found Filtralite to be better than traditional anthracite or sand media.



Filtralite is an inert ceramic particle with a dense shell surrounding a porous core produced by heating clay to about 1,200° C

By replacing the anthracite with Filtralite, the time between backwashes can be increased by more than 25%, the company says. This means fewer stops for backwashing, and reduced use of backwash water. This results in more stable water quality and lower operational costs. Changing to Filtralite could have a payback period of a few weeks depending on existing processes.

According to AMT, enhanced performance can be obtained by replacing the sand in a dual media bed with Filtralite. The Filtralite Mono-Multi filter, comprising a bottom layer of Filtralite HC 0.8-1.6mm and a top layer of Filtralite NC 1.5-2.5mm, gives low head loss and good water quality. Due to the low density of both layers, the water velocity needed for backwashing is much lower than for filters using sand as a bottom layer.

Filter run times of more than 400% are being recorded when sand is replaced with Filtralite.

SPECIFICATIONS AND APPLICATIONS

Filtralite grade	Dry bulk density (kg/m³)	Dry particle density (kg/m³)	Wetted particle density (kg/m³)		Typical application
			1 day	28 days	
NC 0.8-1.6mm ES 0.95 mm	330	1,000-1,200	1,584	1,793	Dual media filtration Biological filtration
NC 1.5-2.5mm ES 1.7mm	235	1,000-1,200	1,038	1,115	Dual media filtration Biological filtration
MC 0.8-1.6mm ES 0.95mm	500	1,300-1,500	1,792	1,876	Mono or dual media filtration Biological filtration
MC 1.5-2.5mm ES 1.7mm	550	1,200-1,400	1,638	1,820	Mono or dual media filtration Biological filtration
MC 2.5-4mm ES 2.6mm	625	1,100-1,300	1,440	1,680	Biological filtration
HC 0.8-1.6mm ES 0.0mm	700	1,500-1,700	1,980	2,112	Mono or dual media filtration
HC 1.5-2.5mm ES 1.7mm	750	1,400-1,600	1,920	2,048	Mono media filtration Biological filtration
HC 2.5-5mm ES 2.7mm	800	1,400-1,600	1,798	1,984	Biological filtration

Substance removal

Filtralite filters can be operated within a large range of filtration rates, the company says. The filtration rate will always be dependent on the configuration of the filter and the treatment process but existing Filtralite filters operate from about 2m/h up to about 20m/h.

In biological filters, bacteria attach to the filter media and a biofilm arises on the surface 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. Crushed Filtralite grains have a large surface area, resulting in Filtralite being an ideal media for use in biological treatment processes. AMT says tests have shown that Filtralite is as good or better than alternative carrier materials for biological treatment of drinking water. And Ammonia, iron, manganese and other biodegradable substances can be 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 to pass through the entire filter volume.

The required EBTC varies for different water qualities and treatment systems but about 20 minutes is average for many systems. To be able to define the correct EBTC for a specific system, it is recommended to run a pilot test. Existing Filtralite biofilters operate with filtration rates up to about 30m/h.

Filtralite is an inert ceramic particle with a dense shell surrounding a porous core produced by heating clay to about 1,200° C, followed by crushing and sieving. The material has a porous, labyrinthine structure, which, when crushed, exposes a large surface area.

Its large pore volume and surface area make it a suitable media for biological treatment of drinking water. Biofilm processes are excellent for treating raw water containing substances including ammonia and manganese.

The major difference between Filtralite and all other filter media, AMT says, is the ability to produce a range of densities to suit specific applications. Dry particle densities in the range 500-1,600kg/m³, and aggregate sizes in the range 0-20mm can be designed to suit specific applications.

The aggregates do not release harmful substances, and the acid solubility is minimal. Despite its high porosity, Filtralite has high abrasion and impact resistance. For drinking water applications crushed material is used allowing the porous core to be exposed.

Reduced costs

Filtralite has been used extensively in the UK and worldwide in bio-filters for tertiary applications and worldwide on potable plants for many years. Due to the understandably conservative nature of the UK potable water sector, it had not been used outside the laboratory for potable water filtration until the end of 2006.

Full-scale UK commercial trials are now under way. Technical papers assessing the more recent UK installations will be presented during 2007/8. (For existing papers, contact Murray Esplin on 01427 890022.) ■

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