

Business opportunities

Active Filter Media --

Are sand filters a thing of the past!

- ▶▶ The purity and quality of our drinking water is of vital importance to everyone. It is equally important not to pollute the environment with chemicals, especially if the chemicals bio-accumulate in the environment, and enter the food chain. Currently sand filters treat most of the drinking water in the UK and throughout Europe. Sand is also used for the tertiary treatment of some sewage effluent prior to discharge of the water back to rivers or directly to the sea.

Simple technology has served us well

Sand filtration has served us well for hundreds of years, and other than the move away from slow bed filters to rapid gravity and pressures very little has changed in the technology. Sand has proved to be an excellent substrate for the cultivation of bacteria, helping to purify the water, but in rapid gravity and pressure filters the bacteria cause problems!

Rapid gravity and pressure filters are used extensively and are responsible for filtering 80% of our drinking water supplies. These filters operate at a much higher flowrate and take up less space than slow sand filters. But alginates excreted by bacteria bind the sand grains together and cause the water to by-pass or channel through the sand, resulting in unfiltered water entering the public supplies.

Responsible for serious water quality and public health issues...

Chlorine keeps the water sterile, but some organisms that cause gastroenteritis, such as cryptosporidia and giardia oocysts are resistant to chlorine. Organic matter in the water also reacts with chlorine to produce carcinogenic chemicals such as THMs (Trihalomethanes). The coagulation of the sand is therefore responsible for serious water quality and public health issues, and there is no easy way for the water companies to solve this problem without resorting to very high capital cost filtration systems. However changing the sand in the sand filters to **Active Filter Media** (AFMs) provides a viable solution.

A new generation of water filtration

AFM is the first of a new generation of self sterilizing water filtration media designed to replace sand in sand filters.

The product is manufactured by **Dryden Aqua** in Edinburgh from reprocessed glass. The research that proved the technology was supported by

the European Commission, under the Life Environment initiative, in cooperation with the UK water industry.

AFM actively resists bacteria, thereby preventing coagulation and channelling of water through the filter bed. By replacing the sand with AFM, the performance of the filters can be improved by 30%. AFM is an environmentally sustainable product, and the first recycled filtration media to achieve certification for use in drinking water.

Sewage effluent...

In wastewater treatment, such as sewage effluent, there is a much higher level of organics and bacteria in the water. The rapid growth of bacteria in these systems makes it virtually impossible for standard sand filters to be used. However AFM has been shown to be effective of dealing with sewage effluent, indeed it is possible to produce an effluent close to drinking water quality.

Sewage effluent contains a whole host of substances including organic matter, nitrogen and phosphates. AFM deals with all of these substances, but sewage effluent also contains very low concentrations of chemicals that persist and become bio-accumulated in marine ecosystems. Examples include TBT (tributyltin), PCB (polychlorinated biphenols) and metals such as mercury to name but a few. The levels of these chemicals may be under detection level, however through chain amplification they accumulate in the ecosystem to end up at high concentrations in fish, birds and marine mammals. Fish meal is used in animal feed, so the circle is closed and the chemicals end up back in our food.



Slow filter



Rapid Gravity Filter



Pressure filter



Dr. John Hargreaves (Chief Executive Scottish Water PLC) & Minister for the Environment Mr. Ross Finnie MSP visit our AFM system in Scottish Water

In sewage effluent the toxic chemicals are normally bound up with the bacteria cell biomass, AFM can remove the bacteria from the wastewater and thereby break the cycle and prevent the discharge and bio-accumulation of toxins in the environment.

AFM has the potential to eliminate 15% of waste glass

AFM was developed as a means of solving a problem with sand filters, not as a glass recycling strategy. However around 150,000 tonnes per year of filter sand is used and sent to landfill every year. AFM is manufactured from glass bottles of which we consume around 1 million tonnes per year in the UK. The production of AFM therefore has the potential to eliminate around 15% of the waste glass. With regards to the water industries the self sterilizing media provides "life cycle" cost savings and a means of complying with the tighter EC water directives without resorting to capital intensive systems or changing the infrastructure. However the main beneficiaries are the environment, and the public who have cleaner safer water.

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