



FTMicron4

# THE FUTURE OF POOL WATER TECHNOLOGY

An introduction to our ceramic  
membrane filtration system





# An introduction to MICROFILTRATION

- Filtration process
- Ceramic membrane
- Aggressive chemicals and fluids
- Extreme temperatures
- Filtering range 0.1–10  $\mu\text{m}$



**Microfiltration** is a physical filtration process where a contaminated fluid passes through a specific pore sized membrane to separate out microorganisms and suspended particles.

This is not a new form of filtration. Microfiltration has been used in many industries for over 30 years, including:

- Treatment of potable water supplies.
- Sterilisation of beverages and pharmaceuticals.
- Petroleum refining.
- Dairy processing.
- Production of paints and adhesives.
- Biochemical and bioprocessing applications.

The most common material used for microfiltration system membranes is *ceramic*, or *silicone carbide*. This material is perfectly suited to the harsh and aggressive fluids passed through the membrane and can cope with extreme temperature ranges.

Microfiltration processes can remove particles from 0.1–10 $\mu\text{m}$ . In terms of swimming pools, most current filtration technology (eg media bed filtration) will filter between 5–10  $\mu\text{m}$ .

# WHY CHANGE?



95% of public swimming pool filtration systems in the UK use media bed filtration to remove particulate. We have installed thousands of sand filters; this technology is simple and effective. It has been proven to achieve good quality pool water.

But media bed filters come with a few challenges, both in terms of design and operation.

## **Design challenges:**

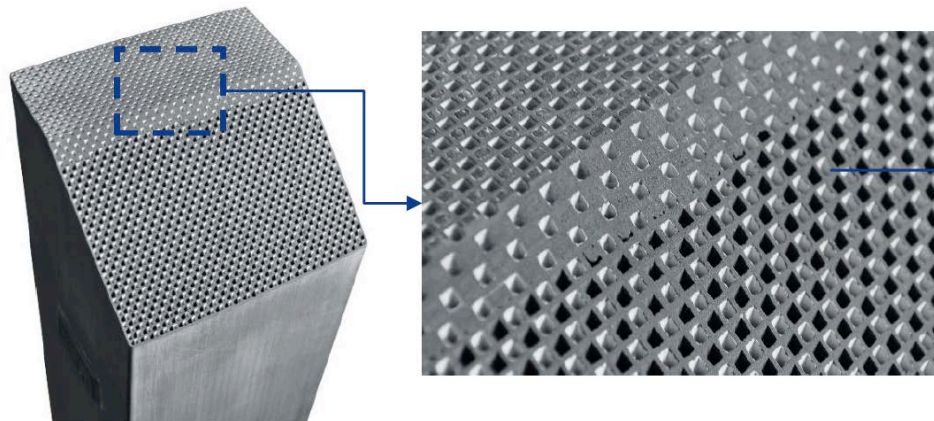
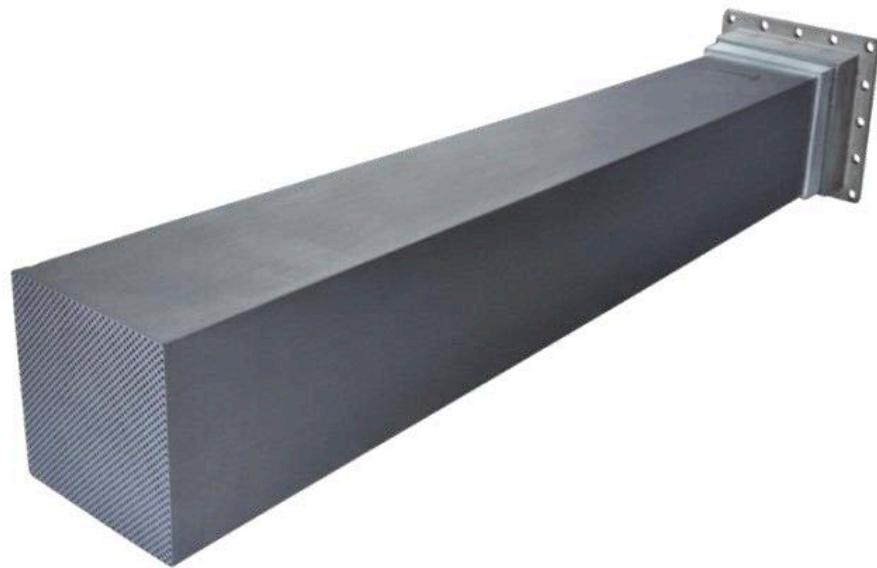
- Plantroom space for filters and future replacement.
- Plantroom height, typically 3.5m minimum.
- Logistics/access during install and future maintenance.
- Structural loading - up to 20tonnes operational weight.
- Drainage systems for backwashing - up to 50ltrs/sec.

## **Operational challenges:**

- Ensuring correct backwash flowrates.
- Manual backwashing and air scouring processes.
- Ensuring PAC dosing system is correct.
- Media replacement every 7-10 years.
- Steel filter shotblasting and relining.
- GRP filter replacement.



**In partnership with...**



FT Leisure are swimming pool water treatment and filtration specialists; we know and understand the processes involved. However, we are not raw material manufacturers. We needed to team up with a specialist and we found the perfect partner: **Saint-Gobain.**

Saint-Gobain is an institution in the field of advanced engineered materials, providing unmatched expertise when it comes to ceramics technology. More specifically, Saint-Gobain Performance Ceramics & Refractories have been providing unique and high added value silicon carbide-based solutions for decades, including the first-to-market recrystallized silicon carbide (R-SiC) product. This outstanding ceramic forms the basis of their Crystar® filtration technology.

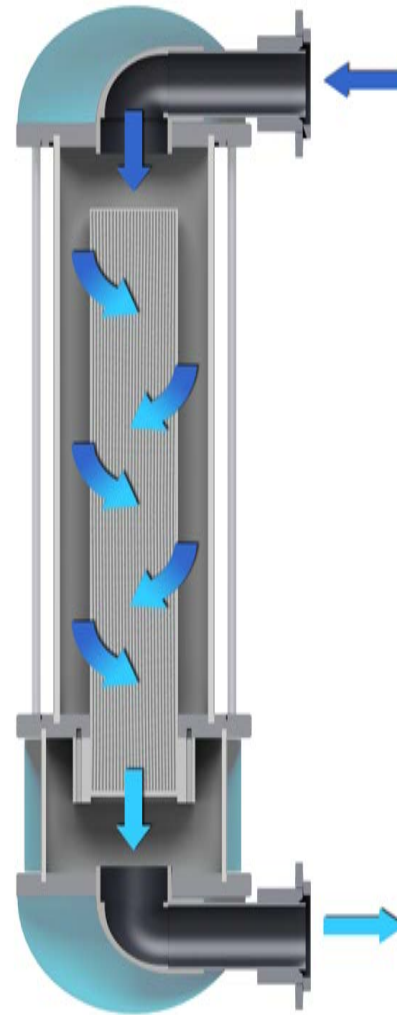
Crystar® FT is designed for liquid purity, security, and sustainability. The demands of filtration have changed dramatically over the years, as a growing global population forces industries to adopt more demanding processing capabilities to satisfy the needs of global sustainability efforts.

FT Leisure and Saint-Gobain have entered into a Bilaterally exclusive supply agreement for UK, Ireland and Channel Islands.

# HOW IT WORKS



- 15m<sup>3</sup>/hr per membrane
- Filtration rate <1.4m<sup>3</sup>/m<sup>2</sup>/hr
- Guaranteed filtration of 4Microns (4µm)



## Filtering

Swimming pool water is pumped through each ceramic membrane at a rate of 15m<sup>3</sup>/hr. The honeycomb structure of the ceramic membrane has alternately plugged channels, thereby forcing the water through the porous material.

Each individual membrane has a filtration area of 11m<sup>2</sup>. That's a filtration rate of less than 1.4m<sup>3</sup>/m<sup>2</sup>/hr, compared to traditional media bed filtration which is typically 25m<sup>3</sup>/m<sup>2</sup>/hr.

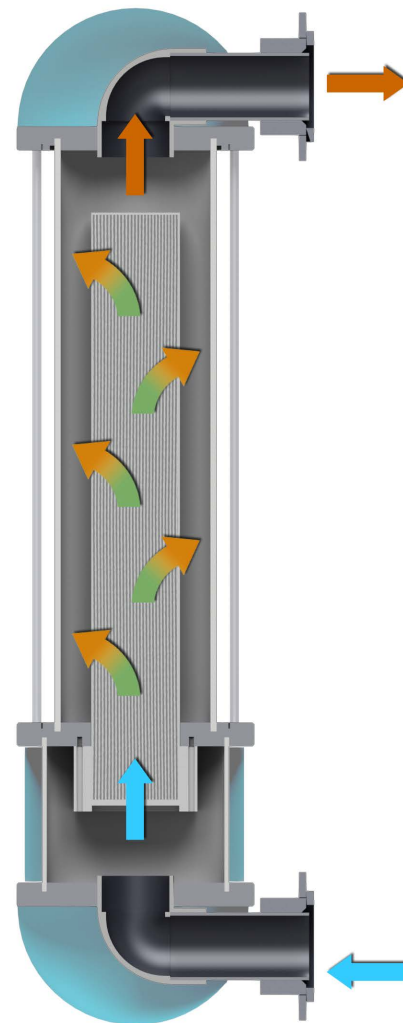
The Crystar® FT Hiflo ceramic filters the pool water to 4µm. This is a guaranteed maximum pore size in the material, proven through mercury testing.



# HOW IT WORKS



- Fully automated washing process
- No interruption of pool use
- Pressure losses controlled
- No retention of bacteria in Filter



## Washing

As particulate is collected in the pores, the pressure across the membrane increases. At a pre-set pressure or on a time-clock, a washing process will be automatically activated.

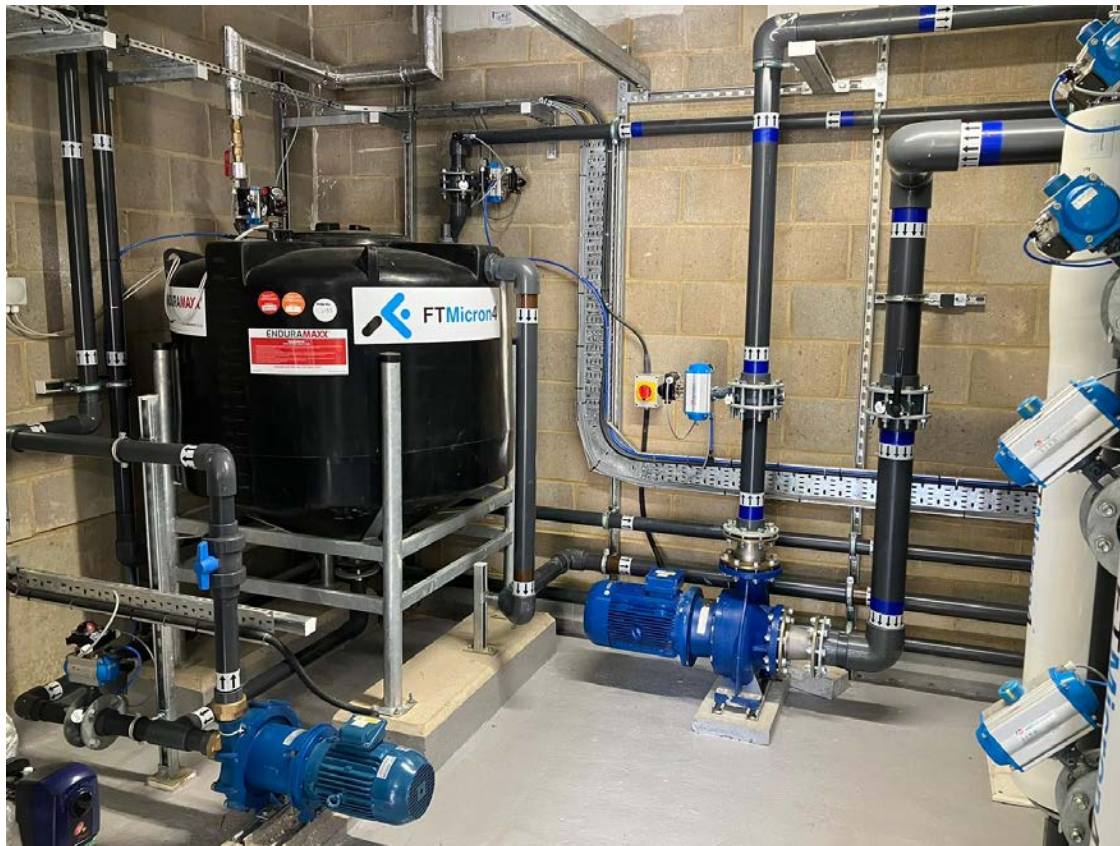
Washing takes place in pairs; whilst each pair is washed, the other remaining membranes continue to filter as normal. Once a wash is activated, the whole system will be washed.

The pair of membranes are drained down and high pressure air (4 bar) from compressor/receiver is used initially to dislodge particles. The particles are then flushed out to drain using a dedicated rinse pump (33.3ltrs/sec), using only 100litres of water at high velocity. This whole process typically occurs 4-6 times a day, depending on bathing loads and levels of pollution, whilst the pool remains open.

# HOW IT WORKS



- Fully automated cleaning process
- Out of hours operation
- Acid & Alkali dosing systems provided
- Hot water for more effective cleaning



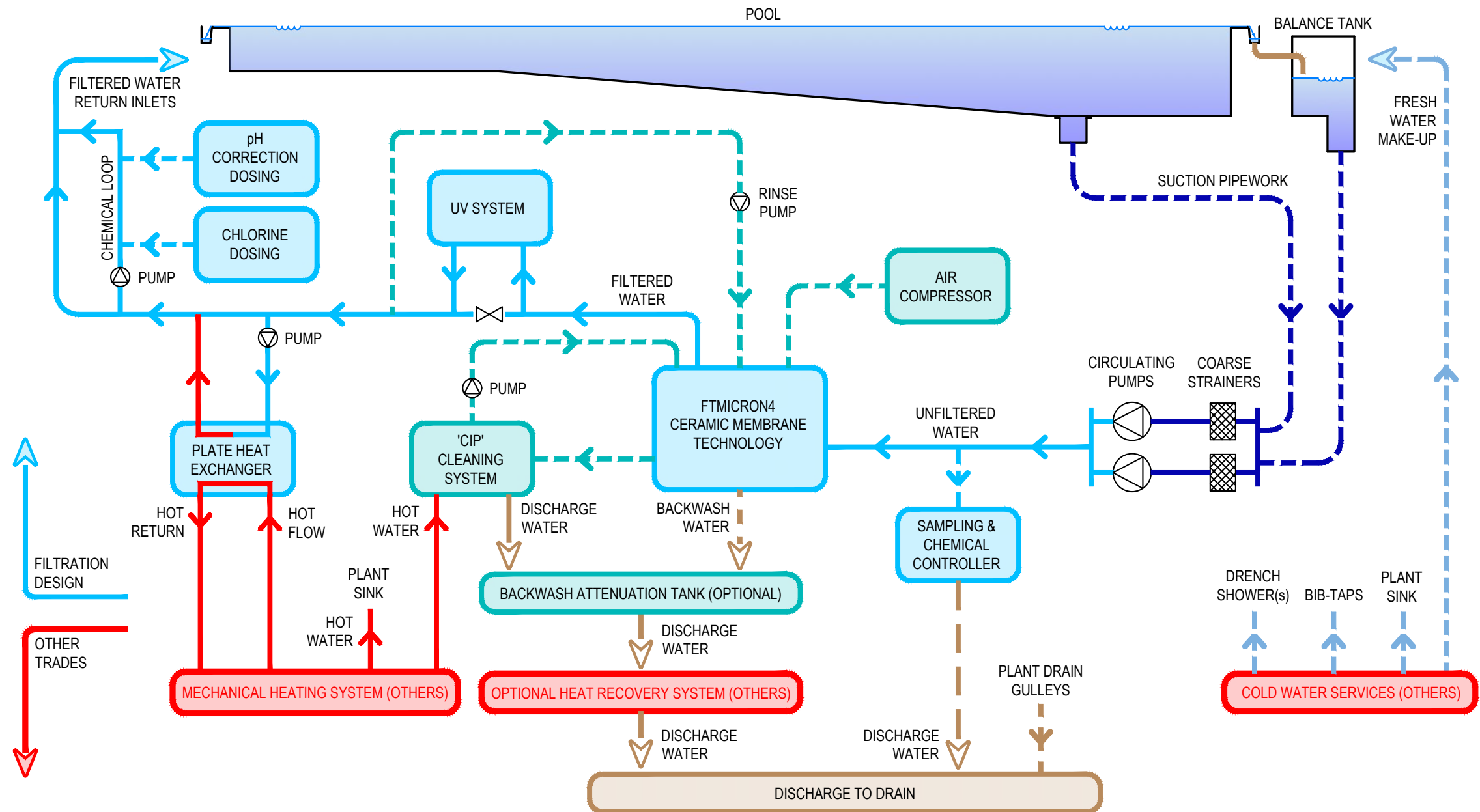
## Cleaning

Over a period of time, the pressures in the system will build up due to greases, oils and biofilm, that the above washing process cannot remove.

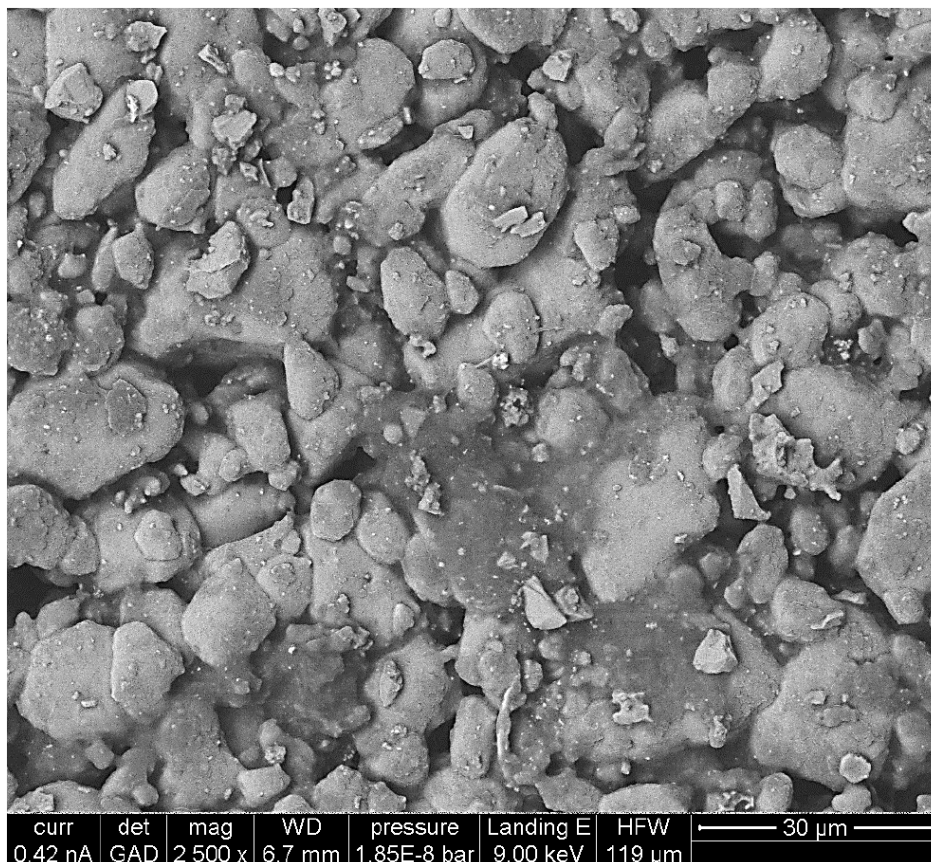
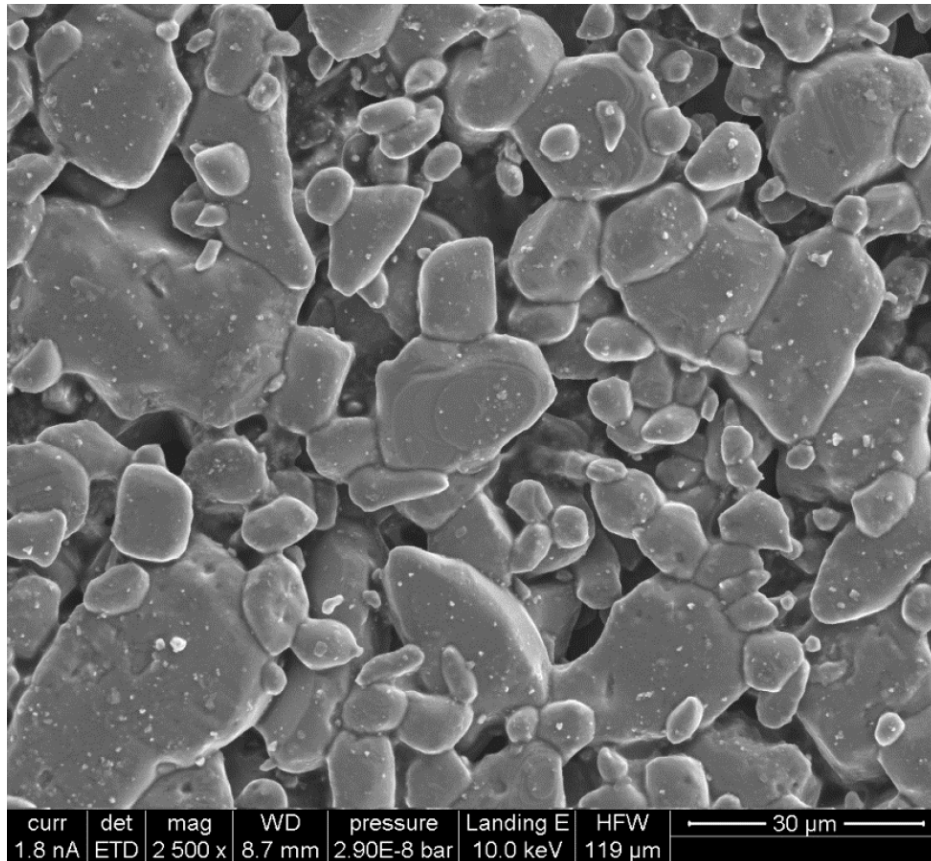
An automatic CIP system therefore intermittently cleans the membranes, typically twice a month, depending on bathing loads and pollution levels. The whole system is shut down (out of hours) and 55°C hot water is pumped around the membranes and Alkali detergent is dosed to achieve a high pH level (12). If scaling is an issue, a similar process can be carried out using an Acid chemical.

Once the CIP is complete, the system is refilled and filtering recommences, with no involvement required from the operator. The CIP process will return the membranes to their clean state.

# HOW IT WORKS







# SAFETY FOR THE BATHER

Every person that uses a public swimming facility has different needs and expectations. Their motive may be relaxation, leisure, exercise, competitive sport, training, play or even therapy. All of these bathers however, have something in common; they all want to enjoy the experience.

Safe and clear water is a fundamental part of that experience. The Crystar® FT ceramic membranes have been laboratory tested and we can prove that FTMicron4® is achieving a much higher standard of pool water:

- Cryptosporidium - 99.996% efficiency
- Giardia Lamblia - 99.997% efficiency
- Legionella - 99.96% efficiency
- Pseudomonas - 97% efficiency
- Food contact performance - EU 1935-2004
- Pool and drinking water conformance - US NSF 61/50



# ADVANTAGES FOR THE BUILDING

Accommodating swimming pool technology into a building is complex. Our systems interface with architecture, structural, civil, mechanical and electrical design services. Failure to integrate pool technology in the building design will inevitably result in operational issues and potentially lower quality pool water.

Microfiltration is easier to accommodate than media bed filtration:

- Less plantroom footprint due to reduced access zones
- Greater flexibility on location of filtration plant
- Only 2.8m plantroom height required
- No large backwash attenuation tank required
- Less drainage infrastructure
- Smaller balance tanks for level deck pools
- Less structural load on plantroom slab
- Reduced access requirements
- Lower mains power supply





# ADVANTAGES FOR THE OPERATOR

Swimming pools are expensive to run. They consume a lot of absorbed power, water, heat and chemicals; this is a real challenge to the facility business plan. Microfiltration can help!

1. **Up to 40% less absorbed power** - as a result of the regular washing process, the friction loss across the membranes is kept to a minimum. Pumps can therefore be designed with as low as 10m head.
2. **Up to 40% less water** - microfiltration removes more particulate than media bed filtration, thereby helping keep TDS levels under control. Microfiltration pools can operate using only 20ltrs per bather dilution.
3. **Less heating and chemicals** - the potential to reduce water consumption leads to a reduction in the amount of chemicals and heat load.
4. **Less operator time** - a completely automated and remotely monitored systems. No manual operations.



# ADVANTAGES FOR THE OPERATOR



With traditional filtration systems, it's the operator's responsibility to ensure that the plant is running efficiently. There are limited monitoring systems available with media bed filtration. Maintenance is therefore generally scheduled around the facility resource, not necessarily around water quality parameters.

FTMicron4® is a fully automated system, with remote monitoring services. We will support you by monitoring the performance of your system and where necessary, we can make adjustments remotely. Washing and cleaning processes can be carefully managed to ensure they are proportional to your bathing loads.

There is no daily, monthly or annual maintenance for you to carry out. We will carry bi-annual inspections of the mechanical elements of the system.

The membranes have a lifetime guarantee. *No refurbishment required.*





# ENHANCE YOUR POOL WATER

If you have a swimming pool filtration system that's reached the end of its serviceable life or if you are simply looking for opportunities to reduce your pool operating costs, FTMicron4® can be retrofitted to existing swimming pool systems.

Ideally the units are pre-fabricated, pre-tested and commissioned in our production facility, to reduce the amount of time on site. However, existing buildings often have restricted access openings, which make it challenging to get the system into the plantroom as a single unit. FTMicron4® can therefore be delivered in smaller components and assembled on site.

Older pool systems often have compromised pool water distribution systems, such as freeboard scum channels and cast iron pipework with reduced internal bores. We have retrofitted FTMicron4® to pools with these compromises and have achieved significantly enhanced pool water quality.



# COST ANALYSIS

## Construction savings:

- Smaller plantroom footprint
- Reduced plantroom height
- Smaller balance tanks
- No backwash attenuation
- Less drainage infrastructure
- Smaller access requirements

As with any new technology, which has been developed, researched and tested prior to launch, it carries a higher capital cost than existing technology. However, some of that increased capital cost is cancelled out by savings in construction.

Whilst the overall capital cost is slightly higher than traditional media bed filtration, the operating costs are substantially less....for the life of the building.

Here's some figures based on a typical 25m 6 lane pool:

## Capital Costs

- FTMicron4® - £262,000.00
  - Sand filtration - £237000.00
- (includes estimated reduction to construction costs)

## Operating Costs

- FTMicron4® - £67,000.00 pa
- Sand filtration - £87,000.00 pa

**Payback period only 1.3 years!**

(NOTE: operational costs including utilities are based on August 2024 rates)





**FTMicron4**

THE FUTURE OF POOL WATER TECHNOLOGY



# CAN WE HELP?

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