



POOL WATER TREATMENT CASE

**Membrane microfiltration vs. sand
filtration.**

Refurbishment of Pool Filtration System

One of our pool distributors, Total Pool Filtration Ltd in the UK, was appointed to install microfiltration at Stretford Sports Village on behalf of Trafford Leisure.

The existing steel filters had reached the end of their life and needed replacement. As the site is also now coming to the end of its lifespan, Trafford Leisure faced the problem of spending money on a facility that would be redundant in the near future.

Filter refurbishments can often be very difficult in established plant rooms, and the one at Stretford is no exception.

Access into the plant room for removal and replacement of conventional filters would have meant some major construction work as part of the plant room roof would have to be removed. This would have caused pool closure for a period of time and would have been costly.

Total Pool Filtration was asked to provide a proposal for our microfiltration pool system, which uses membrane filtration rather than sand filtration.

The system has many benefits, including full automation, significant water and chemical savings, and unrivaled water quality. Conventional pool filters remove particulates ranging from 6-10 microns, whereas the LiqTech ceramic membrane pool system removes particles as small as 2-3 microns. Hence, the water clarity is vastly improved.

LiqTech microfiltration pool system was an ideal choice as the system could be brought into the plant room through pedestrian access, meaning the roof would not have to be removed.

The compact system has been located in a redundant corridor at the end of the plant room, so they also saved the expense of cutting up and removing the old filters.

The whole installation was taken care of with no interruption, which meant that the public could retain full use of the facility. To fit sand filters would have caused the pool to be closed for up to 4 weeks with an estimated loss of revenue of £50,000.

Finally, when the pool facility is replaced, the microfiltration system can be easily dismantled and relocated to the new site, saving Trafford Leisure the cost of new filters.

The key benefits of the system are:

- 3-micron filtration that removes finer particulates compared to sand filtration (10-15 micron)
- Compact footprint
- Fully automated operation and cleaning cycle
- Energy savings as the lower pressure drop across the system is maintained
- Water savings due to more efficient backwash
- Chlorine savings due to reduced need for top-up water
- 24/7 remote monitoring by TPF and manufacturer

Twenty months down the line, Total Pool Filtration can show some very encouraging feedback regarding savings in utilities and chlorine consumption achieved at Stretford.

Quarterly Water Bill

The below table shows water bills for Stretford LC for the May / June / July quarters in 2017, 2018, 2019, and 2021.

- Attendance may still be less than a comparable period in previous years due to the period being right after covid lockdown - However, a reduction of around 1/3 is still very considerable.
- Difference of even £3K * 4, = £12K per annum.
- Ceramic membrane pool filtration is a more efficient means of filtering pool water and can reduce water consumption considerably by having much more efficient backwashes.

PERIOD	YEAR	ACTUAL BILL	FILTRATION
May / June / July	*2017	£10,732.00	Sand Filters
May / June / July	2018	£10,481.00	Sand Filters
May / June / July	2019	£11,079.00	Sand Filters
May / June / July	2020	No reliable data C19	
May / June / July	2021	£7,020.00	LiqTech Pool Microfiltration

Annual Electricity Renewal Price

The below table shows the Electricity Renewals as of 22nd Sept 2021. Stretford has been compared with two neighboring sites of similar age and size within the Trafford authority. All three have had some upgrades, including LED plus CHP.

- The only significant difference between these three sites is that Stretford installed a LiqTech microfiltration system in January 2020.
- The difference suggests a saving of around £22K per annum can be achieved.
- The system uses less water; therefore, make-up water needs less heating.
- With LiqTech pool filtration, variable speed drives typically run at 38.5 Hz, 77%, to maintain the flow of 120m³/h.
- Pre microfiltration system variable speed drives were running at 45Hz, 90% to maintain the flow of 120m³/h.
- The greater pump efficiency and reduced need for heating of top-up water are the main drivers for energy savings that are demonstrated below.

SITE	ELECTRICITY RENEWAL PRICE
Altrincham Leisure Centre	£63,000.00
Sale Leisure Centre	£62,000.00
Stretford Leisure Centre	£40,000.00

Water Usage – Membrane Filtration vs. Sand Filtration

Recent monthly water usage figures have been collected from the ease of lockdown to the present day. Water usage has been collected by a flow meter dedicated to the main pool make-up.

Comparing the water usage figures pre and post LiqTech pool filtration system, the following can be seen:

- Saving 66% of water compared with the operation of one sand filter (87% if corrected numbers are used).
- The pools are not yet operating at standard capacity, but the savings are very considerable.

Water Usage Figures 2021 - Membrane Pool Filtration

Source: Site staff records taken from in-situ water meter

MONTH / YEAR	M ³ TOP-UP WATER
May/21	20
Jun/21	76
Jul/21	33
Aug/21	35
Average Monthly	41

Water Usage Figures 2019-2020 - Sand Filtration

**Weekly Water Usage while operating 1 x 2.44m³ sand filter (the second filter was out of service). The corrected column allows for an estimated additional 15m³ of water /week which would have been attributed to the backwashing of filter two should this have been operational.

Source: Site staff records taken from in-situ water meter

WEEKLY WATER USAGE	M ³ MAINS TOP-UP	M ³ MAINS TOP-UP **(CORRECTED)
Total Monthly October 2019	185	245
Total Monthly November 2019	91	151
Total Monthly December 2019	126	186
Total Monthly January 2020	76	146
Average Monthly	119.50	182

Salt Usage Comparison

Salt is used for chlorine generation via electro-chlorination. The quantities used are attributed to the main pool (LiqTech pool filtration system) and the small pool.

- Total salt usage is now 28% lower than before membrane filtration.
- Saving of one bag salt per week. Est. £650 per annum (52 x £12.50).

Source: Taken from site staff records

MEMBRANE MICROFILTRATION

SAND FILTRATION

Weekly salt usage	Weekly salt usage
53 kg	74 kg

Comparison of Occupied Floor Area

SAND FILTRATION

Sand filtration: 2 x 2.44 steel filters with associated valve and pipework occupies a total of 19.2 m².



POOL MEMBRANE FILTRATION

LiqTech Pool Filtration: The 6-membrane system occupies a total of 7.33 m².





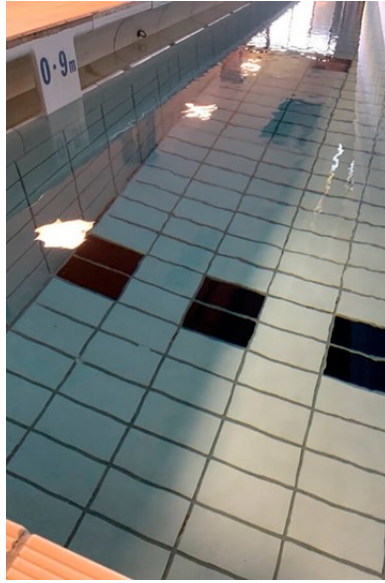
We Offer an Even More Compact System

By installing our LiqTech microfiltration pool filters, the customer reduced the footprint of their filtration system by 62%!

This becomes even more impressive with our new redesigned system only taking 2.5 m², meaning a footprint reduction of 87% is possible!

Excellent Water Quality

The excellent quality of the filtration, with the much-reduced pore size, has led to some superb turbidity readings at Stretford after the LiqTech filtration system was implemented. The Turbidity reading showed an NTU of 0.2 compared to the NTU reading of the previous sand filtration of 0.4 NTU - this shows another benefit of low pore size filtration done by LiqTech's ceramic filtration systems.



Total Financial Annual Savings Summary

SAVINGS	ANNUAL SAVING
Electricity	£22,000
Water	£12,000
Salt (chlorine donor)	£650
Total	£34,650



Summary

At Stretford Sports Village, refurbishing their filtration system, from a traditional stainless steel sand filter set up to a LiqTech ceramic filtration system, has brought considerable savings.

They have achieved a 66% actual reduction in water spending compared to the same period in 2019. Although still impacted by implications of a recently lifted covid lockdown, this saving is still very considerable, and much can be accredited to the change in filtration solution.

Implementing ceramic filtration has also impacted Stretford Sport Village's energy efficiency. When Stretford Sports Village was compared to two similar, neighboring sites, it showed a 36% lower energy bill. The significant reduction is believed to come from increased pump efficiency and the reduced heating of top op water.

Lastly, a significant reduction in salt for chlorination of the pool has been obtained, due to the more frequent but efficient backwash of the ceramic filtration, allowing for dirt and influent to be removed more often while limiting water consumption.

The excellent results of the LiqTech pool filtration have led to our UK distributor, Total Pool Filtration, just receiving another purchase order within the Trafford Leisure jurisdiction for one of their other sites. This new unit is set to be installed and commissioned in 2022.

We are here to help you