



## Utility Comparison for Ceramiflo Microfiltration V's Sand Filtration

Site: Stretford Sports Village  
September 2021

Date: 27<sup>th</sup>

Author: Chris Thornhill, Total Pool Filtration

### Introduction

Total Pool Filtration have gained six years' experience in the application and operation of their microfiltration system, Ceramiflo. We have six installations in the UK, with the latest being the two-pool new build in Neath due for commissioning in May 2022.

Total Pool Filtration have some key benefits over their closest competitor;

	Ceramiflo	Competitor
<b>Pore Size</b>	3mu so removes finer particulates and more bacterial load	4mu
<b>Flow Rate / membrane</b>	20m3/h	15m3/h
<b>Footprint</b>	Est. 25% smaller than competitor	N/A

### Stretford Sports Village

Ceramiflo was installed at Stretford Sports Village to filter the main pool water in January 2020. The original pool plant was 2 x 2.44m diameter steel filters and the total pool volume of 453m<sup>3</sup>. The filters had previously been patch repaired but now one of the filters was offline due to more serious defects. Trafford Leisure needed to make a decision for a swift replacement. Total Pool Filtration were introduced to Trafford by Richard Lamburn of Swim England. Two of the key benefits of the Ceramiflo system are that it can be installed without disruption to pool operation and that it could be dismantled and brought in through difficult access ways.

The key benefits of the system are;

- 3mu filtration so removes finer particulates and more of the smaller bacteria species
- Compact footprint
- Fully automated operation and cleaning cycle
- Energy savings as lower pressure drop across system is maintained
- Water savings due to more efficient backwash
- Chlorine savings due to reduced water make up
- 24/7 remote monitoring by TPF and manufacturer

Twenty months down the line we can show some very encouraging feedback in terms of savings in utilities and chlorine consumptions that are being achieved at Stretford.



## Quarterly Water Bill

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

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	Ceramiflo microfiltration

Source: Kevin Henderson Trafford Leisure

- Attendance may still be less than a comparable period in previous years.
- However, a reduction of around 1/3 is very considerable.
- Difference of even £3K \* 4, = £12K per annum.
- Ceramiflo is a more efficient means of filtering pool water and can reduce water consumption considerably.

## Annual Electricity Renewal Price

Below table shows the Electricity Renewals as of 22nd Sept 2021

Stretford has been compared with two neighbouring sites within the Trafford authority of similar age and size. All three have had same upgrades including LED plus CHP.

Site	Renewal Price
Altrincham Leisure Centre	£63,000.00
Sale Leisure Centre	£62,000.00
Stretford Leisure Centre	£40,000.00

Source: Kevin Henderson Trafford Leisure

- The only significant difference in these three sites is that Stretford had Ceramiflo microfiltration installed in January 2020.
- The difference suggests a saving of around £22K per annum can be achieved.
- The system uses less water, therefore less heating of make-up water is required.
- With Ceramiflo variable speed drives are typically running at 38.5 Hz, 77% to maintain flow of 120m<sup>3</sup>/h.
- Pre Ceramiflo variable speed drives were running at 45Hz, 90% to maintain flow of 120m<sup>3</sup>/h.
- The greater pump efficiency is the main driver for energy savings that are demonstrated above.

## Energy Rating Certificates

Again, comparing Stretford with its two neighbouring sites of similar size, age and with LED and CHP upgrades we can see a favourable energy rating of 28 B measures up favourably against Altrincham and Sale Leisure Centres.

Site	Energy Rating	Issue Date
Stretford Sports Village	28 B	23.09.20
Sale Leisure Centre	47 B	23.09.20
Altrincham Leisure Centre	63 C	23.09.20

See Appendix 1

## Water Usage Figures 2021

Recent monthly water usage figures have been collected since the ease of lockdown to present day.

Water usage has been collected by a flow meter dedicated to the main pool make-up

Month / Year	M3 mains Top-up
May 2021	20
June 2021	76
July 2021	33
August 2021	35
<b>Average Monthly</b>	<b>41</b>

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

## Water Usage Figures 2019

Weekly Water Usage	M3 mains top-up	M3 mains top-up **(corrected)
06.10.19	45	60
13.10.19	35	50
20.10.19	30	45
27.10.19	75	90
<b>Total Monthly</b>	<b>185</b>	<b>245</b>
03.11.19	30	45
10.11.19	16	31
17.11.19	22	37
24.12.19	23	38
<b>Total Monthly</b>	<b>91</b>	<b>151</b>
01.01.20	37	52
08.12.20	0	15
15.12.19	51	66
22.12.19	38	53
<b>Total Monthly</b>	<b>126</b>	<b>186</b>
29.12.19	2	17
05.01.20	0	15
12.01.20	48	73
19.01.20	26	41
<b>Total Monthly</b>	<b>76</b>	<b>146</b>
<b>Average Monthly</b>	<b>119.5</b>	<b>182</b>

\*\*Weekly Water Usage while operating 1 x 2.44m sand filter (second filter was out of service)

The corrected column allows for an estimated additional 15m<sup>3</sup> 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

- Comparing the water usage figures pre and post Ceramiflo the following can be seen;
- Saving 66% of water compared with operation of one sand filter
- The pools are not yet operating at normal capacity but the savings considerable.

## Salt usage 2021

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

Weekly Salt Usage	Kg
18.08.21	50
25.08.21	50
01.09.21	56
08.09.21	56
<b>Average</b>	<b>53</b>

Source: Taken from site staff records

## Salt usage 2019 before Ceramiflo

Weekly Salt Usage before on Sand Filtration

Weekly Salt Usage	Kg
06.10.19	69
13.10.19	50
20.10.19	50
27.10.19	81
03.11.19	62
10.11.19	100
17.11.19	62
24.12.19	69
01.01.19	88
08.12.20	88
15.12.19	88
22.12.19	94
29.12.20	69
<b>Average</b>	<b>74</b>

Source: Taken from site staff records

- Total salt usage is now 28% lower than it was back in 2019 before Ceramiflo
- Saving of one bag salt per week. Est. £650 per annum (52 x £12.50)
- Positive CO2 impact relating to the mining of salt.

## Comparison of occupied Floor Area

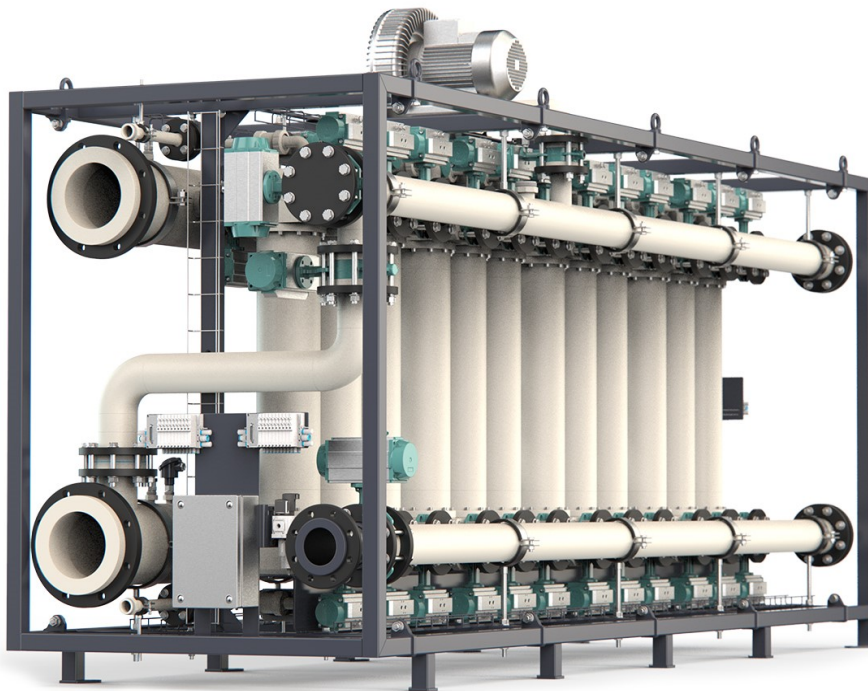


*Sand filtration: 2 x 2.44 steel filters with associated valve and pipework occupies a total of 19.2 m<sup>2</sup>*

*CeramiFlo Mark II: The footprint that the 6-membrane system occupies is 7.33 m<sup>2</sup>*

Recently the CeramiFlo system has been re-designed and is now significantly more compact.

The Mark II CeramiFlo, 6 membrane model as installed at Stretford now has a footprint of 2165mm x 1155mm. Total area 2.5 m<sup>2</sup>



**Mark II  
CeramiFlo offers  
an even more  
compact  
footprint**

*9-membrane example shown*

## Total Financial Annual Savings Summary

Savings	Annual Saving
Electricity	£22,000
Water	£12,000
Salt (chlorine donor)	£650
<b>Total</b>	<b>£34,650</b>

- Comparing Ceramiflo to traditional sand filtration we can see that significant savings can be achieved.
- Positive impact on CO2 emissions.

Appendix 1

# Display energy certificate (DEC)

Trafford Leisure STRETFORD LEISURE CENTRE GREAT STONE ROAD STRETFORD M32 0ZS	Operational rating <span style="font-size: 2em; font-weight: bold; color: white;">B</span>	Certificate number: 8380-8210-1082-8600-4896 <hr/> Valid until: 31 October 2021 <hr/> Total useful floor area: 6025 square metres
--	---	---

**Energy performance operational rating**

The building's energy performance operational rating is based on its carbon dioxide (CO<sub>2</sub>) emissions for the last year.

It is given a score and an operational rating on a scale from A (lowest emissions) to G (highest emissions).

The typical score for a public building is 100. This typical score gives an operational rating of D.

Score	Operational rating	This building	Typical
0-25	A		
26-50	B	28   B	
51-75	C		
76-100	D		100 -
101-125	E		
126-150	F		
150+	G		

**Previous operational ratings**

Date	Operational rating
October 2020	28   B

**Total carbon dioxide (CO<sub>2</sub>) emissions**

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO<sub>2</sub>.

Date	Electricity	Heating	Renewables
October 2020	84	307	124

**Assessment details**

Assessor's name	Paul Bixley
Accreditation scheme	Elmhurst Energy Systems Ltd
Employer/Trading name	Greenday Energy Ltd
Employer/Trading address	The Avenue, Princes Risborough, HP27 0HL
Issue date	23 October 2020
Nominated date	31 October 2020
Assessor's declaration	Not related to the occupier.

**This building's energy use**

Energy use	Electricity	Other fuels
Annual energy use (kWh/m <sup>2</sup> /year)	25.24	262.38
Typical energy use (kWh/m <sup>2</sup> /year)	182.99	667.89
Energy from renewables	59.8%	0%

# Display energy certificate (DEC)



Trafford Leisure  
ALTRINCHAM LEISURE CENTRE  
OAKFIELD ROAD  
ALTRINCHAM  
WA15 8EW

Operational rating

**C**

Certificate number: 1354-3110-2632-5000-3098

Valid until: 31 October 2021

Total useful floor area: 4913 square metres

## Energy performance operational rating

The building's energy performance operational rating is based on its carbon dioxide (CO<sub>2</sub>) emissions for the last year.

It is given a score and an operational rating on a scale from A (lowest emissions) to G (highest emissions).

The typical score for a public building is 100. This typical score gives an operational rating of D.

Score	Operational rating	This building	Typical
0-25	<b>A</b>		
26-50	<b>B</b>		
51-75	<b>C</b>	<b>63   C</b>	
76-100	<b>D</b>		
			100
101-125	<b>E</b>		
126-150	<b>F</b>		
150+	<b>G</b>		

## This building's energy use

Energy use	Electricity	Other fuels
Annual energy use (kWh/m <sup>2</sup> /year)	52.32	570.88
Typical energy use (kWh/m <sup>2</sup> /year)	177.33	640.12
Energy from renewables	51.8%	0%

## Previous operational ratings

Date	Operational rating
October 2020	<b>63   C</b>

## Total carbon dioxide (CO<sub>2</sub>) emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO<sub>2</sub>.

Date	Electricity	Heating	Renewables
October 2020	141	544	152

## Assessment details

Assessor's name	Paul Bixley
Accreditation scheme	Elmhurst Energy Systems Ltd
Employer/Trading name	Greenday Energy Ltd
Employer/Trading address	The Avenue, Princes Risborough, HP27 0HL
Issue date	23 October 2020
Nominated date	31 October 2020
Assessor's declaration	Not related to the occupier.



# Display energy certificate (DEC)



Trafford Leisure  
SALE LEISURE CENTRE  
BROAD ROAD  
SALE  
M33 2AL

Operational rating

**B**

Certificate number: 9007-0203-1110-6392-3900

Valid until: 31 October 2021

Total useful floor area: 4710 square metres

## Energy performance operational rating

The building's energy performance operational rating is based on its carbon dioxide (CO<sub>2</sub>) emissions for the last year.

It is given a score and an operational rating on a scale from A (lowest emissions) to G (highest emissions).

The typical score for a public building is 100. This typical score gives an operational rating of D.

Score	Operational rating	This building	Typical
0-25	<b>A</b>		
26-50	<b>B</b>	<b>47   B</b>	
51-75	<b>C</b>		
76-100	<b>D</b>		
			100 –
101-125	<b>E</b>		
126-150	<b>F</b>		
150+	<b>G</b>		

## This building's energy use

Energy use	Electricity	Other fuels
Annual energy use (kWh/m <sup>2</sup> /year)	83.42	472.33
Typical energy use (kWh/m <sup>2</sup> /year)	224.50	871.65
Energy from renewables	37.5%	0%

## Previous operational ratings

Date	Operational rating
October 2020	<b>47   B</b>

## Total carbon dioxide (CO<sub>2</sub>) emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO<sub>2</sub>.

Date	Electricity	Heating	Renewables
October 2020	216	432	129

## Assessment details

Assessor's name	Paul Bixley
Accreditation scheme	Elmhurst Energy Systems Ltd
Employer/Trading name	Greenday Energy Ltd
Employer/Trading address	The Avenue, Princes Risborough, HP27 0HL
Issue date	23 October 2020
Nominated date	31 October 2020
Assessor's declaration	Not related to the occupier.