MAAGAN FILTRATION
Pure Innovation - Clear Solutions

Sheaf Filter Offers Improved Solution for Swimming Pool Filtration

Background: A pilot of a 4 Sheaf filter was conducted at the Kibbutz Maagan Michael swimming pool. The pool operates from May until October and can accommodate at its peak 1000 people. The Sheaf filter was placed in parallel to a diatomaceous earth (DE) filter, which is currently in place, treating and then recirculating the treated water back to the pool.

Challenge: Within the swimming pool market, the DE filter produces one of the finest quality filtrations for swimming pools. However, the filter is increasingly prohibited in new pool installations due to its carcinogenic risks, primarily to the pool operators. The filter is also more labor intensive than conventional filters and requires manual backwash using a high volume of water. An equally effective yet less labor intensive and non carcinogenic filter option is needed for swimming pool water treatment.

Solution: The 4 Sheaf filter operated for more than 3 months in this pilot at a flow rate of 23 L/min and a ΔP of 0.42 bar. Over the period of 102 days the Sheaf filter was washed once every 24 hours using less than 0.33% of the water cycle, indicating a high efficiency backwash cycle and low frequency demand. The DE filter is washed twice a week on average, but in total requires over 30% more water than the Sheaf filter.

Results: The water turbidity at the exit of the Sheaf filter in comparison to the water turbidity of the DE filter is shown in figure 1. The turbidity at the exit (average±2·SEM) was 0.19±0.007 NTU for the Sheaf filter and 0.20±0.008 NTU for the existing DE filter, indicating similar water quality of the permeate of the 2 treatments during the 102 days operation of the pilot.

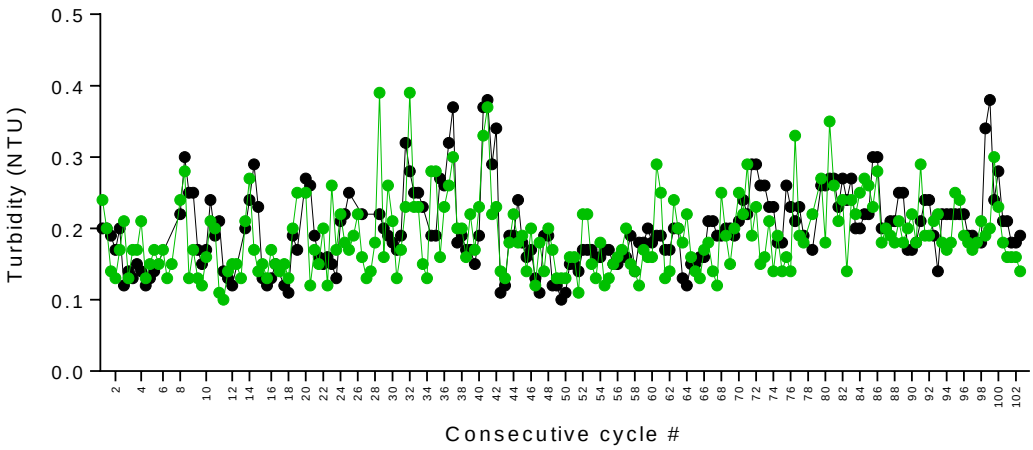

Figure 1. Turbidity of the permeate during the 102 days for the Sheaf filter (•) in comparison to the diatomic earth filter (•).

Figure 2 demonstrates the particle count (#/ml) results of the pool water treated by the Sheaf filter in comparison to the DE filter. The data here indicates better water quality filtered by the Sheaf filter in comparison to the DE filter, with an average particle count of 90±3% for the Sheaf filer and 84±5% for the DE filter for particles equal to or greater than 1 µm.

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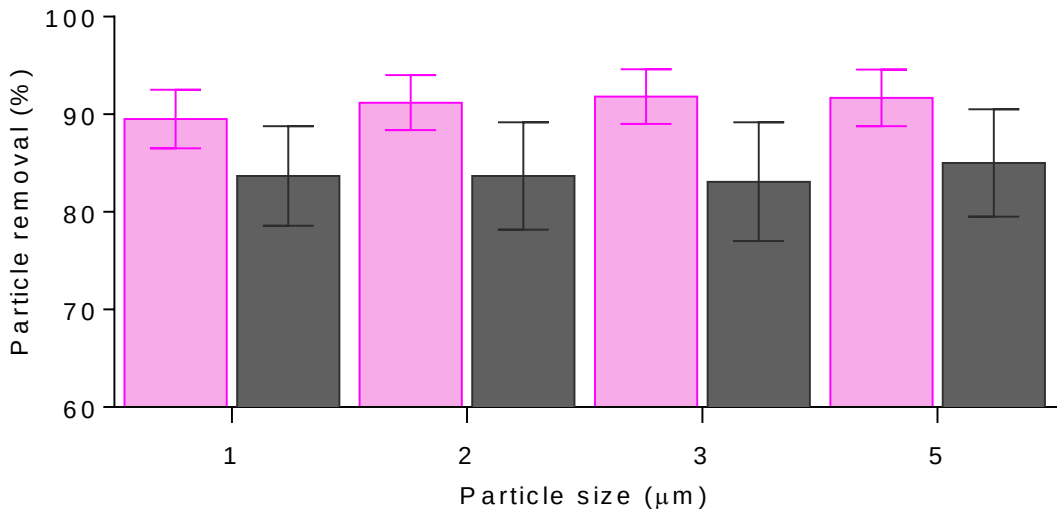

Figure 2. Percent of particle removal based on the particle counts at the exit of the sheaf filter ( ) and in comparison to the DE filter ( ).

A chemical and microscopic analysis of the fibers before and after the sheaf wash cycle, performed at the end of the pilot, showed minimal change in the fibers. This result demonstrates the high resistance of the filter fibers to the long term exposure to common pool chlorine concentrations (2 ppm). A wide range of pH levels were tested separately, also showing a high degree of resistance.

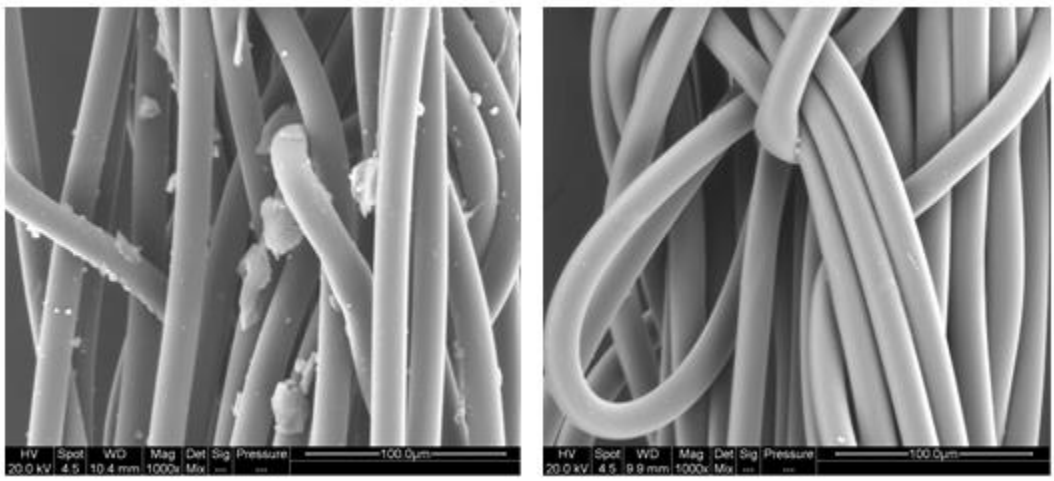

Figure 3. Scanning Electron Microscope (MIKA center, Technion) pictures of the filter fibers at the end of the pilot at the Maagan Michael swimming pool before wash (left panel) and after wash (right panel).

Conclusion: The turbidity and particle removal results here demonstrate that the water quality received from the Sheaf filter is similar or better than the DE filter, meaning that there is a high probability that under similar conditions the Sheaf filter can replace other DE filters. Furthermore, the pilot indicates that the Sheaf filter has a high resistance to chlorine. In summary, the Sheaf filter is presently a true environmentally friendly and sustainable alternative for treating swimming pools while ensuring a high level of water quality.

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