

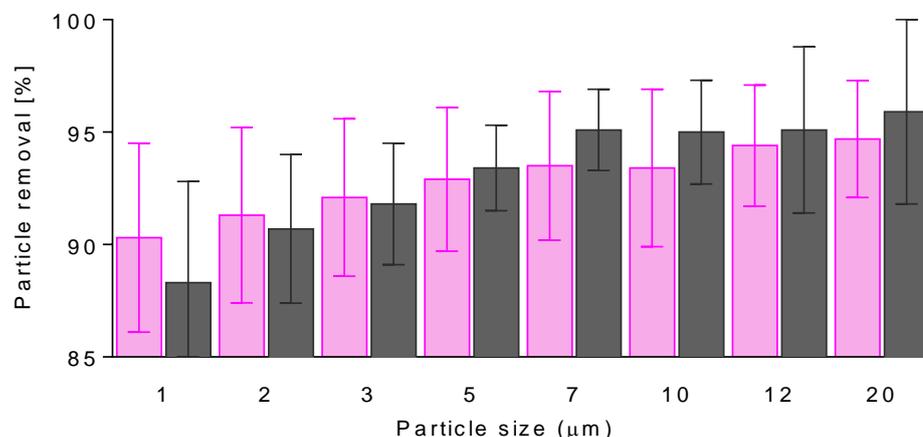
Sheaf Filter Reduces Pre-Treatment Stages at Maagan Desalination Plant

Background: Maagan Michael desalination plant employs reverse osmosis membranes (RO), treating 16 million cubic meters of water annually. The water is sourced from 24 brackish water wells with ~2000 ppm chloride as Cl⁻ and some heavy metals e.g., magnesium (140 ppm as Mg²⁺). A pilot of a single Sheaf filter was conducted using a mix of the brackish water wells directly. The plant currently uses 2 pre-treatment stages sequentially: EBS 15000 sand filters of 25 μm (Amiad, Israel) and cartridges of 1 μm (GES, Israel), which are located before the RO membranes (BW, Toray, USA).

Challenge: The current pre-filtration equipment requires regular maintenance and energy expenses. As part of the routine treatment of the desalination plant the EBS 15000 filters are washed every 45 minutes to once an hour, depending on well water quality, and the cartridges are replaced every month (30-40 days) in addition to undergoing a chemical rinse once a week.

Solution: A sheaf filter was operated in parallel to the EBS and the cartridge filters at Maagan Michael desalination plant at an average ± CV flow rate of 0.4±0.9%. The sheaf used less than 0.33% of the water cycle and was washed once every 24 hours, indicating a high efficiency backwash cycle and low frequency demand. Therefore, the Sheaf has the potential to save significant energy and maintenance costs.

Results: Over a 6 month period turbidity (average NTU±2·SEM) of the sheaf was 0.20±0.006, as compared to 0.22±0.007 for the 2 pre-filtration stages, and particle count removal (average %±2·SEM) was 90±4% and 88±4% for particles above 1 μm, respectively. These results consistently showed that the Sheaf treated the water as efficiently as the two sequential technologies currently employed in the desalination plant.



Particle count results for the sheaf () filter as compared to 2 pre-desalination stages ()

Conclusions: The results strongly indicate that under identical conditions to this pilot there is a high probability that the single sheaf filter configuration can replace sand and cartridge filters. Moreover, the presence of heavy metals did not disrupt the filtration process, so that during the 6 month operation the average ΔP increased by approximately 0.6 meters, meaning only after about 310 cycles will a replacement of the sheaf or a chemical cleaning be needed.