



Project ID



The array of Sand filters in Afkey Mayaim Desalination plant

IDE Technologies | 

Location:	Afikey Mayim – ISRAEL
Year:	2020
Application:	Brackish Water Reverse Osmosis (BWRO) Pre-Filtration
Goal:	SDI and Particles Reduction
Pilot Capacity:	2 m ³ /h
Full Scale Capacity:	350 m ³ /h

The Challenge

- Frequent clogging of existing Reverse Osmosis membranes (RO) and Cartridges pre-treatment as a result of organic and biological fouling that led to extensive operational costs.
- High SDI and particles concentration. Most particles are in the 1-7 micron range.
- Variation in water quality (two different water sources). SDI varied between 6 to over 40 (immeasurable).

Parameter	Existing Values	Required Values
Removal of Particle of 2 microns and above	Particle concentration of 2 microns or more varied between 900-29,000 particles per ml	> 80% @ 90% of measurements
SDI ₁₅	Up to > 40 (immeasurable)	< 5 @ 80% of the measurements
Hydraulic Stability		Stable process of the filter (defined by flow rate and pressure drop)

Solution

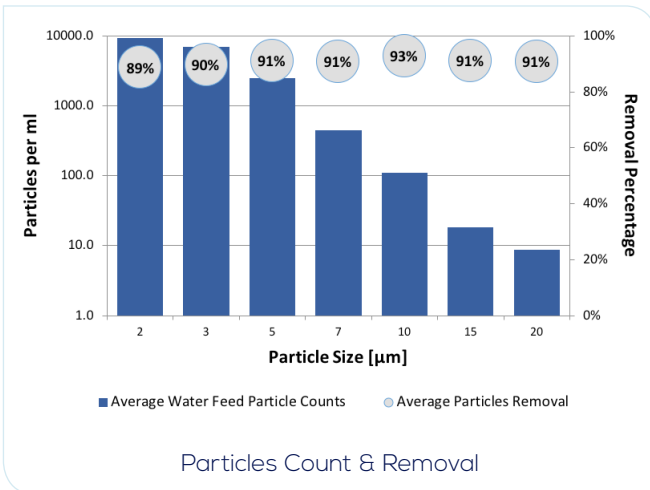
A 2 m³/h Fiber Disc Filter pilot unit which is designed for efficient filtration of fine particles in high containment water sources was running for 5 consecutive weeks at 'Afkey Mayim' desalination plant. The Fiber Disc Filter was located on a downstream of sand filters.

The Fiber Disc Filter constantly recorded the hydraulic parameters of flow and differential pressure. Manual testing of particle counts (on filter inlet and outlet) and SDI₁₅ (on filter inlet and outlet) was performed a few times every week.

Results

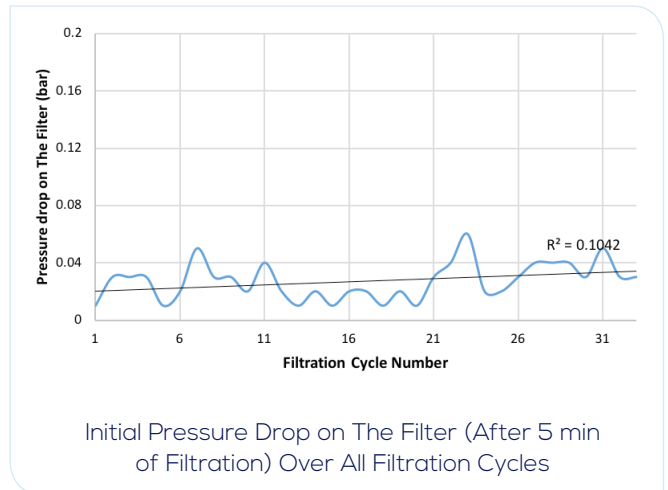
The Fiber Disc Filter achieved, on average, 89% removal of 2 or more micron particles with highly challenging inlet particle concentration (the max. removal of 2 micron particles was 98%).

The outlet SDI was between 3.08-5.44 (average of 4.1), and SDI < 5 for more than 80% of the data collected, while inlet SDI was between 5-40.



The initial pressure drop on the filter (after washing) remain around 0.03 bar, which indicates good cleaning of the filter. The pressure drop on the filter does not surpass 0.3 bar and even with hard water conditions, the filter performs the same.

Backwash frequency was in average every 9 hours, resulting in less than 1% yield for backwash (comparing to more than 4% for Sand filters).



Parameter	Required Values	Values Achieved
Particle removal of 2 or more microns	> 80% @ 90% of measurements	✓
SDI ₁₅	< 5 @ 80% of the measurements	✓
Hydraulic stability (defined by flow rate and pressure drop)	Filter had a stable process for the entire pilot period	✓



Conclusions

The consistent particle and SDI removal rates, with the stability of the initial pressure drop at 0.03 bar throughout the test period indicates that the Fiber Disc Filter is able to perform steadily and efficiently as a pre-filtration stage in very harsh brackish water Desalination. That is especially promising given the challenging water conditions on site.

The extremely low pressure drop throughout the tests indicates the low energy requirement for filter operation, and the filter ability to operate even at very low inlet pressure conditions.