



MAAGAN FILTRATION
Pure Innovation - Clear Solutions

Municipal Waste Water | Case Study



Project ID



TNUVOT Municipal Wastewater Treatment Plant treats around 7,000 m³/day of effluent, which is used for nearby fruits and vegetable non-limited irrigation. The plant is operated by Electra Greentech.

Tnuvot Municipal Wastewater Treatment Plant



Location:	TNUVOT, Israel
Year:	2019
Application:	Municipal Wastewater Tertiary Treatment
Goal:	Suspended solids, Turbidity and fine particles reduction for agriculture irrigation, compared with existing sand filters
Pilot Capacity:	6.5 m ³ /hr
Full Scale Capacity:	300 m ³ /hr

The Challenge

Tnuvot effluent tertiary treatment plant consist of 6 multi media filters, 2.5 meter diameter each. Total filtration area is 30 m². That gives 10 m/h of filtration velocity which is on the low conservative side for this application.

The sand filters requires high operational costs:

- around 10% of water yield for back wash.
- High concentration of chlorine requirement for the quartz sand media functionality preservation.
- high energy demand, mainly as a result of high delta pressure development on the filters and frequent demand for backwash.

Delta pressure on the sand filters is not stable and tend to rise above 0.5 bar, mainly as a result of:

- Biological fouling development within the media.
- Peaks of sludge coming from the secondary clarifier from time to time. Consequently, the functionality of the sand filters deteriorates.

Parameter	Existing Values before sand filtration	Existing Values after sand filtration	Required Values after tertiary filtration
Total Suspended Solids (TSS) (mg/L)	< 15 @ 80% of the time	< 5 @ 50% of the time	< 5 @ 80% of the time
Turbidity (NTU)	< 10 @ 80% of the time	< 5 @ 50% of the time	< 3 @ 80% of the time
Particles above 5 mi-cron (per ml)	< 15,000	> 50% reduction @ 80% of the time	> 90% reduction @ 80% of the time
Delta pressure on the filter (bar)		Non Stable. < 0.5 @ 50% of the time	Stable. < 0.5 @ 80% of the time

Solution

For over then 3 months, a 6.5 m3/hr MAAGAN FILTRATION Fiber Disc Filter pilot unit is running at TNUVOT WWTP, parallel to an existing sand filtration system.

The Fiber Disc Filter operates in automatic mode, constantly recording the hydraulic parameters of flow and differential pressure, with routine manual sampling of TSS, Turbidity and particles counts (on filters inlet and outlet). Chlorinated filtrate is used as the source for the back wash.



Effluent Tertiary Treatment plant- General view

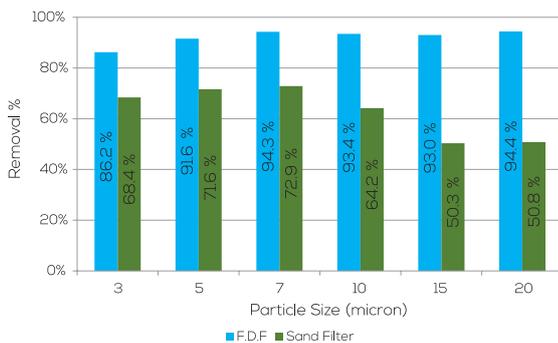
Results

The Fiber Disc Filter achieved, on average, above 93% reduction of particles above 10 micron and above 91% reduction of particles above 5 micron.

Average concentration of TSS after the Fiber Disc Filter was 2.1 mg/L, while average of TSS inlet was 6.7 mg/L. Average of turbidity after the Fiber Disc Filter was 2.6 NTU.



Fiber Disc Filter pilot unit- General view



Comparison between Sand Filters and Fiber Disc Filter particles average percentage removal

Parameter	Achieved Values
Total Suspended Solids (TSS) (mg/L)	< 3 @ 80% of the time ✓
Turbidity (NTU)	< 3 @ 80% of the time ✓
Particles above 5 micron (per ml)	> 90% reduction @ 80% of the time ✓
Delta pressure on the fil-ter (bar)	Stable. < 0.5 bar @ 80% of the time ✓

Conclusions

During the tested period the FIBER DISC FITLER of MAAGAN FILTRATION hydraulic performance was steady.

That is impressive especially given a two weeks period during which a peak of high load of sludge (measured with turbidity above 60 NTU) ran through the filter, with no damage to filter functionality. During that period delta pressure on the sand filter rose to around 1 bar, and its performance deteriorated. Given results so far MAAGAN FILTRATIONS' FIBER DISC FILTER can be used as a better alternative to sand filters in effluent tertiary treatment application, with the following advantages:

- Better performance regarding TSS, Turbidity and fine particles removal
- Hydraulic stability
- Lower foot print
- Lower operational costs