



Project ID



Hadera Paper Industries is the largest plant in Israel for the production and recycling of paper.

Hadera Paper Industries



Location:	Israel
Year:	2018- to date
Application:	Industrial effluent filtration for reuse
Goal:	Turbidity, Suspended solids and fine particles reduction before Ultra Filtration
Pilot Capacity:	6 m ³ /hour
Full Scale Capacity:	450 m ³ /hour

The Challenge

The effluent of Hadera Paper Industries is going through the following processes:

- Biological anaerobic-aerobic treatment.
- Softening.
- Coagulation-flocculation- lamella separation.
- Sand filtration.

Effluent contains substantial amount of calcium carbonate crystals+ high load of suspended solids and colloidal matter. Consequently the sand filter tends to block, hence, its performance deteriorates. Also , from time to time, there are peaks of very high influent turbidity (containing high load of starch), which irreversibly defers the functionality of the sand filters.

Parameter	Existing Values	Required Values
Turbidity (NTU)	< 80	Above 80% reduction @ 80% of the time
Total Suspended Solids(TSS) (mg/L)	< 50	Above 80% reduction @ 80% of the time
Particles above 5 micron	Less than 100,000	> 90% reduction @ 80% of the time
Delta pressure on the filter	Non stable. Sometimes above 1 bar	Stable. < 0.5 bar @ 80% of the time

Solution

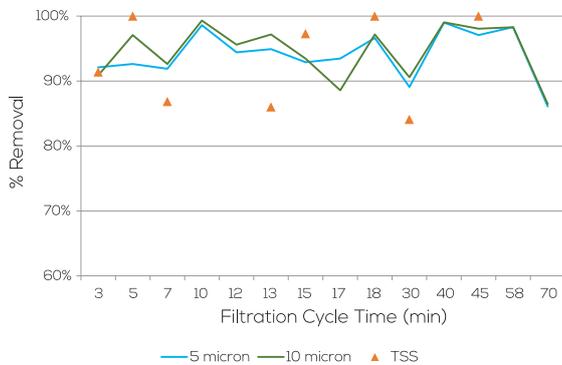
For the last 8 months, a 6 m³/hr Fiber Disc Filter pilot unit has been running at Hadera Paper Industries, parallel to existing sand filter. The fibers were specially adjusted to operate with high TSS loaded effluent.

The Fiber Disc Filter runs in an automatic mode, constantly recording the hydraulic parameters of flow and differential pressure, with manual sampling of TSS & Turbidity (on filter inlet and outlet) every few days.

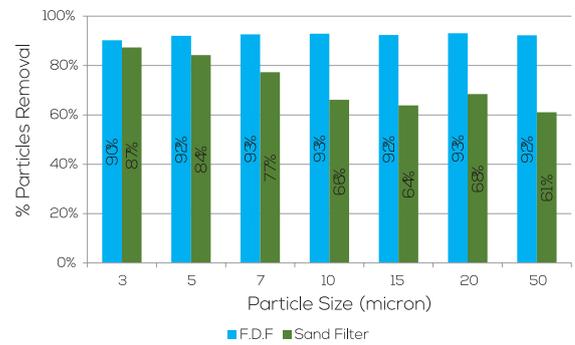


Results

The Fiber Disc Filter achieved on average above 93% reduction of particles above 10 micro, above 91% reduction of particles above 5 micron and above 90% reduction of TSS. Hydraulically the Fiber Disc Filter is performing much better than the sand filter throughout the tested period. Delta pressure on the filter does not surpass 0.3 bar and the filter performs even on hard water conditions. During that period, the sand filter is frequently blocked.



Average 5 & 10 micron particles and TSS percentage reduction in a filtration cycle (average of 80 constitutive filtration cycles).



Particles percentage reduction - comparison with sand filter.

Parameter	Achieved Values
Turbidity (NTU)	Above 90% reduction @ 80% of the time ✓
Total Suspended Solids (TSS) (mg/L)	Above 90% reduction @ 80% of the time ✓
Particles above 5 micron	> 90% reduction @ 80% of the time ✓
Delta pressure on the filter	Stable < 0.5 bar @ 80% of the time ✓

Conclusions

The consistent turbidity, TSS and particles removal, with delta pressure not rising above 0.3 bar throughout the test period indicates that the Fiber Disc Filter performs much better than the existing sand filters.

That is especially promising given the challenging Effluent conditions. During these peaks the Sand Filters were clogged while the Fiber Disc Filter did not.