

# FilmTec™ Fortilife™ CR100

provides optimal solution for wastewater reuse at soil aquifer treatment plant

## Background

Irregular rainfall and a shortage of potable water in Israel need the use of treated industrial and municipal wastewater for agricultural irrigation. In fact, roughly 70% of the farms in the Negev Desert area are irrigated today using treated municipal wastewater effluents from Shafdan WWTP, the largest WWTP in Israel, which is operated by Mekorot, Israel Water Company. Shafdan treats more than 350,000 cubic meters per day.

## The Challenge

Until recently, Shafdan primarily relied on the Soil Aquifer Treatment (SAT) method, which requires land for infiltration fields. However, as the population continues to grow, so does the effluent output, and the cost and scarcity of land will make it impossible to construct a new SAT infiltration field. This will in turn result in excess secondary effluent that cannot be used for irrigation.

## The System

Mekorot required a system for treating Shafdan's excess secondary effluent to a standard and quality suitable for unrestricted irrigation in agriculture.

## System requirements included:

- Optimized performance, low in energy and chemicals consumption
- Capable of treating the excess effluent's high fouling potential and relatively high organic load, including micro pollutants and pathogens
- Ideally, a membrane system with minimal in place cleaning requirements



# Key Benefits

- FilmTec™ Fortilife™ high fouling resistance
- Reduced cleaning frequency
- Lower differential pressure
- Energy savings

# 50%

Reduction in the number of cleanings

## Fast Facts

**Project:** Shafdan Membranal Demonstration Plant

**Location:** Shafdan Wastewater Treatment Plant, Dan Region, Igudan, Israel

**End user:** Mekorot Water Company, Ltd.

**OEM:** Mekorot Water Company, Ltd.

**Source:** Municipal Wastewater

**Application:** Water reuse for agricultural use

**Market:** Municipal wastewater treatment

**Key Solution:** FilmTec™ Fortilife™ CR100



# Solution

Mekorot required a system for treating Shafdan's excess secondary effluent to a standard and quality suitable for unrestricted irrigation for agriculture.

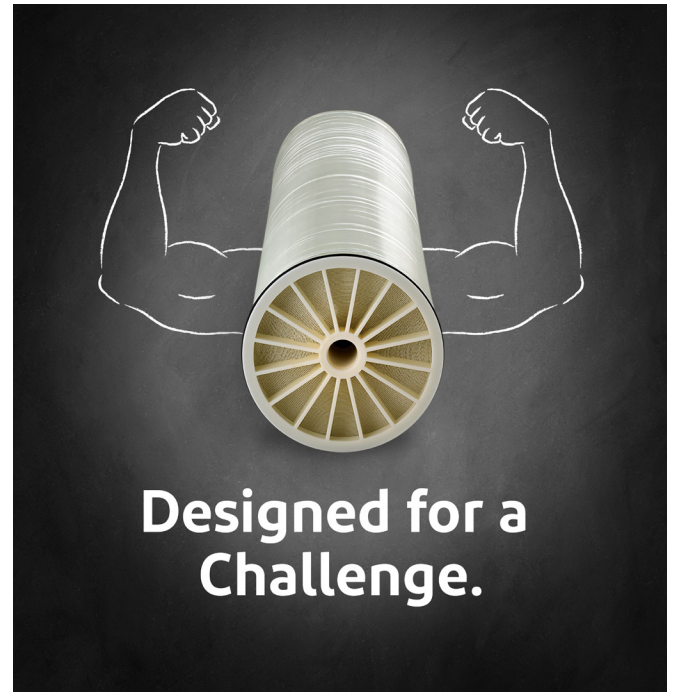
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DuPont Water Solutions recommended installing a demonstration within the plant equipped with 35 FilmTec™ Fortilife™ CR100 Reverse Osmosis (RO) elements pretreated with a submerged ultrafiltration system. FilmTec™ Fortilife™ CR100 is one of the industry's most advanced fouling resistant technologies designed to provide relief from biological fouling. At the same time, the element's ultra-low differential pressure affords improved hydraulic balance in biological fouling environments, such as wastewater treatment.

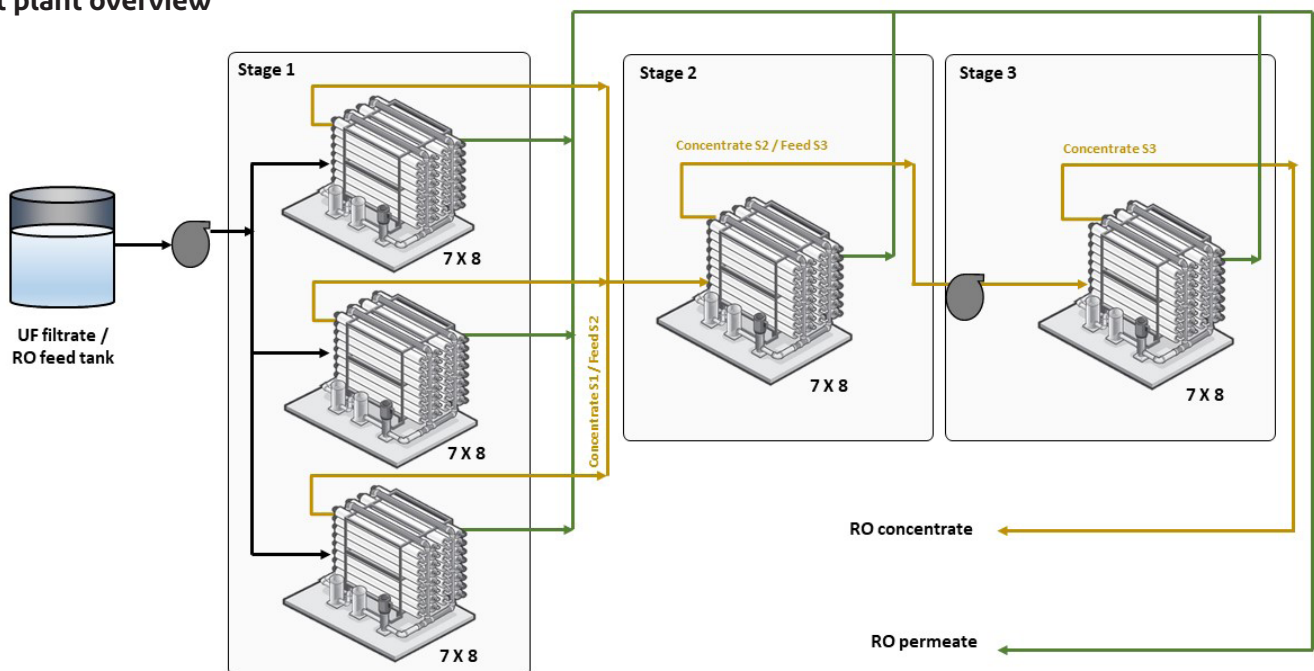
The solution also provides:

- Reliable and durable membrane chemistry
- Organic fouling resistance
- Low energy operation
- Excellent solute rejection and Cleanability



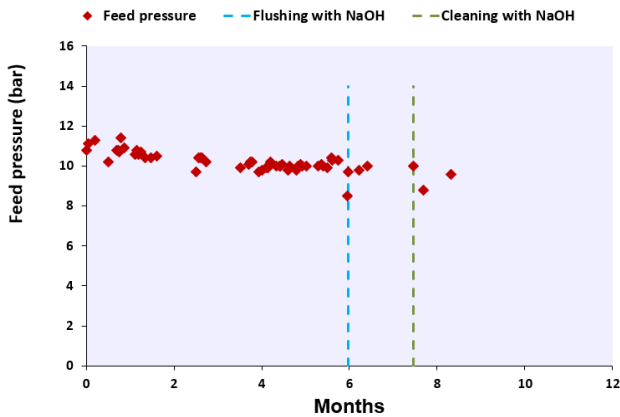
## The membranes were installed in three stages, as shown below

### Pilot plant overview



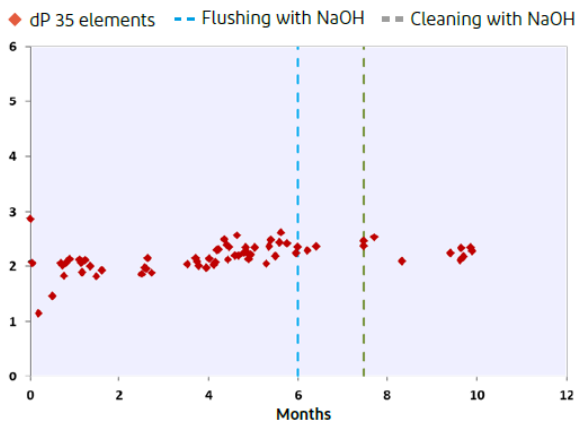
# Results

After ten months online, FilmTec™ Fortilife™ CR100 demonstrated stable operation at 85 percent recovery, with a total differential pressure less than 2.5 bar for the whole system – a significantly lower pressure drop compared to conventional RO elements. Fouling resistance was also excellent. Despite high levels of organic and biological pollutants in the effluent, there was no significant increase in differential pressure or feed pressure. In addition, operations sustained at high recovery for six months before an initial short chemical flushing was conducted, and the system did not require any in-place chemical cleaning until the eighth month of operation – being the only required complete cleaning during the ten months of operation.



**Figure 1: Feed pressure didn't increase over time**

Feed pressure shown in the diagram below did not increase over time, indicating that the elements did not suffer from organic fouling and maintained their initial permeability – even with the high fouling potential of secondary effluent



**Figure 2: Low differential pressure**

Low differential pressure observed during the ten-month period of operation

Overall, the FilmTec™ Fortilife™ CR100 system demonstrated high performance, a high recovery rate, as well as reduced energy and chemical consumption compared with other alternatives. This technology also offers the possibility of producing high quality permeate water with a conductivity of lower than 100 uS/cm for water reuse.

The following table provides an overview of ten-month performance:

Metrics	Units	FilmTec™ Fortilife™ CR100
Feed Flow	m <sup>3</sup> /h	29
Flux	LMH	19.3
Feed Pressure	Bar	10
Total DP	Bar	<2.5
Recovery	%	85
CIP Frequency	Per Year	1 to 2







## Conclusion

Through the use of FilmTec™ Fortilife™ CR100, DuPont Water Solutions helped the Mekorot Water Company address specific water reuse challenges. The fouling resistance of these RO elements offers reduced cleaning frequency and lower energy requirements compared to conventional RO elements, making them ideal for challenging secondary effluent.

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