



Dow Water & Process Solutions

Subzero Operating Conditions Are No Match for DOW FILMTEC™ Seawater Reverse Osmosis Elements

FAST FACTS

Plants location:	Antarctic: Rothera & Signy Research Stations
Operation:	Seawater filtration at very low temperatures
DOW FILMTEC™ RO element:	SW30-4040
Permeate flow:	15 m ³ /d (Rothera) and 5 m ³ /d (Signy)
Permeate flux:	< 12 LMH
Feed water TDS:	35,011 ppm
Minimum temperature:	-1.5°C
Operating pressure	> 65 bar
OEM:	Salt Separation Services, UK



The Rothera and Signy Research Stations, located in the Antarctic, operate 15 m³/d and 5 m³/d seawater reverse osmosis (RO) plants, respectively. Designed and built by Salt Separation Services in the United Kingdom, both facilities were fitted with DOW FILMTEC™ SW30-4040 Elements in 2003. During operation the elements are exposed to temperatures as low as -1.5°C, yet the elements show no sign of damage and have provided stable performance to the facilities for more than 12 years.

Plant Configuration

The Rothera unit, shown in Figure 1, and Signy unit consist of self-contained skid mounted plants, including: sand filter, cartridge filters, antiscalant dosing (Rothera only), a clean-in-place (CIP) system and rehardener.

Operation & Maintenance

The Rothera Research Station facility has operated for more than 12 years, providing potable water to base personnel.

During that time the elements were replaced twice after several years in operation. During the visit in 2015 the plant was found to be in excellent condition, being maintained on a regular basis by base personnel.

Stable Performance

In the first two and a half months of operation, the normalized salt rejection and permeate flow data was collected almost daily. During this time, the temperatures were between 3.4 and 1.6 °C, as shown in Figure 2 and 3.

The values in Figure 2 are compared to a Dow system design tool, Reverse Osmosis System Analysis (ROSA). The data values, equal or lower than the ROSA projected values, show excellent element performance.

The normalized permeate flow remained very stable during the data collection timeframe, indicating no effect of long term low temperature operation.



Figure 1. Images of Rothera plant (A. Sand filter and B. RO unit), courtesy of Salt Separation Services, UK.

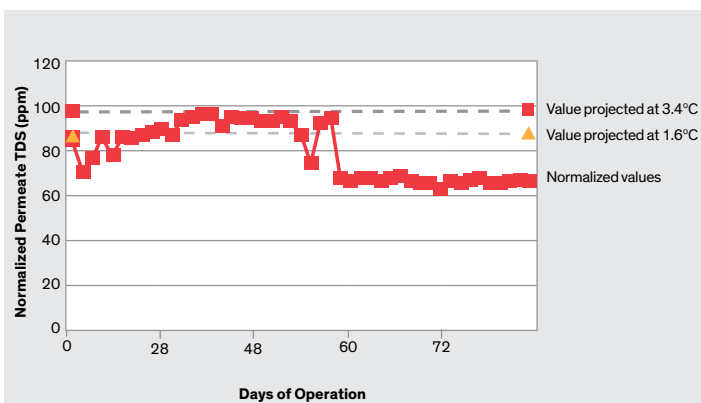


Figure 2. Normalized permeate TDS registered at Rothera plant.

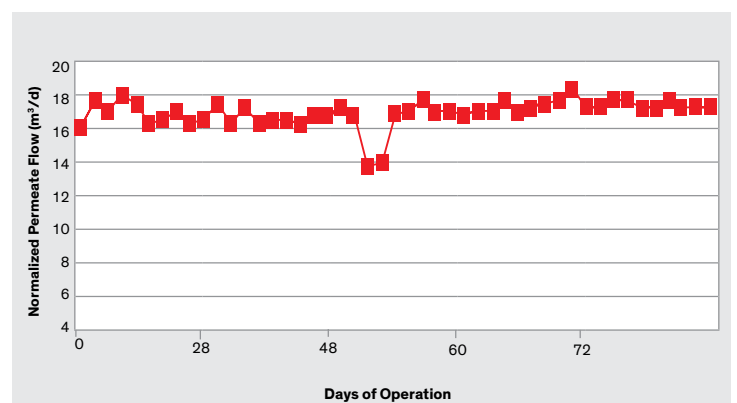


Figure 3. Normalized permeate flow registered at Rothera plant.

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