LG Chem

Our Stories

SEAWATER DESALINATION

SWRO Plant Reduces Energy Consumption After Improving Permeate Quality by 15%

Product type: **2nd Gen High Rejection SWRO**
RO model: **LG SW 440 R G2**

Application:
Seawater Desalination

Background

La Caleta is a seawater reverse osmosis (SWRO) plant located in southern Tenerife, one of the two major islands in the archipelago. The plant had an initial capacity of 10,000 m³/day. In 2019, the plant replaced one full train (5,000 m³/day) with LG NanoH₂O™ TFN RO membranes to improve performance in permeate quality, permeability and energy consumption. Additionally, LG NanoH₂O™ membranes were installed in two containerized plants, increasing the overall capacity of this site to 12,000 m³/day.

Operating Conditions:

• **Recovery: 45%**

• **Temperature range (°C): 19–21**

• **Operating flux (lmh): 13–13.5**

• **Production capacity: 5,000 m³/d**

• **RO configuration: 54 PV x 7M**

Pilot Study

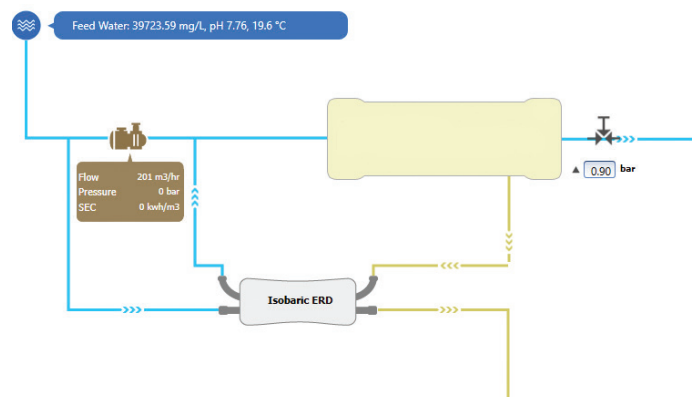In early 2020, the plant ran a pilot study to test the 2nd generation of LG NanoH₂O™ SWRO membrane model LG SW 400 R G2 with salt rejection up to 99.88%*. This model was evaluated and compared with the first-generation TFN membranes, which feature a salt rejection specification of up to 99.85%. The pilot ran for over 15 months. Figure 1 illustrates the membrane configuration from the train and the pilot, and Table 1 lists the RO system configurations from the first and second-generation SWRO models.

*Currently, LG SW SR G2 and SW GR G2 membrane models provide up to **99.89%** breaking the record for the industry's highest salt rejection.

Figure 1: RO System Configuration

Feed Water: 39723.59 mg/L, pH 7.76, 19.6 °C

Flow   201 m3/hr
Pressure   0 bar
SEC   0 kwh/m3

0.90 bar

Isobaric ERD

Nano H₂O™

Table 1: RO System Configuration		
System type	Full-scale train	Pilot system
Configuration	SW 440 GR x 2 SW 440 R x 5	SW 440 R G2 x 7
System permeability	250 m³/d	262 m³/d
Nominal salt rejection	99.85%	99.88%

Comparison Test of Generation 1 vs. 2 TFN SWRO Membranes at La Caleta Desalination Facility
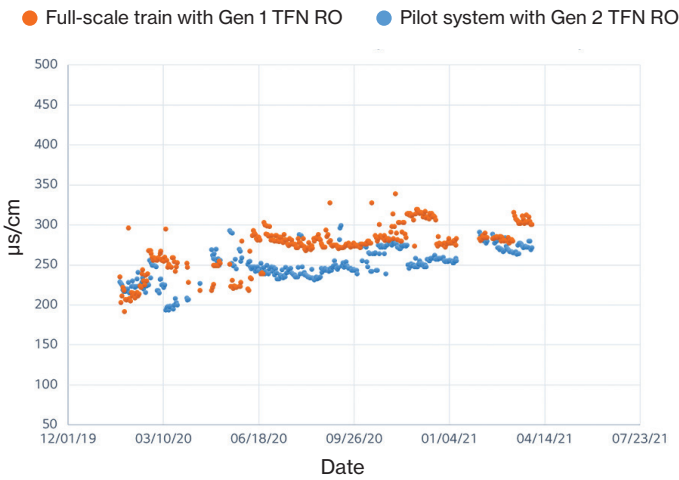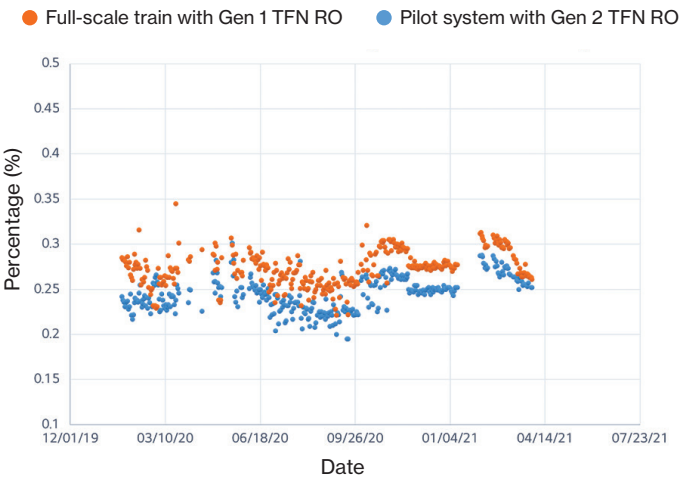
Figure 2: Permeate Conductivity

● Full-scale train with Gen 1 TFN RO   ● Pilot system with Gen 2 TFN RO

Figure 3: Normalized Salt Passage

● Full-scale train with Gen 1 TFN RO   ● Pilot system with Gen 2 TFN RO

Results

LG SW 440 R G2 solution delivered an improved permeate water quality with a lower energy consumption compared with the 1st generation of TFN RO membranes. The operation improvements consist of the following:

LG G1   vs   **LG G2**

Permeate quality improved by   **15%**

Permeability increased by   **5%**

Above results represent an energy savings of   **1.1%**

Outcome

LG NanoH$_2$O™ SWRO membranes are establishing the future of desalination. With higher salt rejection and competitive permeability, their TFN technology enables a membrane configuration with lower energy requirements, which can also outperform in permeate quality results.

*Nano*H$_2$O™
Global No. 1
in Seawater RO

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