



# RISK-FREE ENHANCED RECOVERY

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## CUSTOMER

Public Utility Board (PUB) and Singapore National Water Agency

## LOCATION

Kranji, Singapore

## PROJECT TYPE

Retrofit of existing RO desalination facility

## COMMISSIONED

2017

## CAPACITY

10,680 m<sup>3</sup>/day

## STATUS

Operational

## OVERVIEW

ROTEC's Flow Reversal process was retrofitted into an existing RO system at PUB NEWater in Kranji, Singapore, increasing recovery from 75% to 90%, without interference or downtime of the plant during installation. The Flow Reversal process was monitored over the course of 18-months, demonstrating a significant increase in permeate production, while reducing chemical consumption.

The retrofit project was completed in a very short time, meeting budget and engineering specifications, with continuous successful operation.

As a result of the impressive demonstration at Kranji, ROTEC's Flow Reversal technology was implemented in PUB's TUAS Water Reclamation Project – one of the largest wastewater reuse facilities in the world.



## THE NEED

PUB, a global pioneer and world leader in the water desalination field, renowned as an "early adopter" of new technologies, was constantly looking for ways to increase water production from their NEWater wastewater treatment desalination plants which were limited to a 75% recovery rate due to the relatively high concentration of calcium, phosphate, iron and organics.

The PUB delegation visited Shafdan, the largest municipal wastewater treatment facility in Israel in 2015. During the visit, ROTEC demonstrated one of its Flow Reversal RO systems on tertiary wastewater at an unprecedented 90% recovery rate. The company was impressed with ROTEC's proprietary game-changing technology, our professional team of experts, along with their agility and care, and decided to implement it. ROTEC was granted a retrofit of an existing Kranji NEWater desalination plant, providing 450 m<sup>3</sup>/day water in Singapore, for the purpose of increasing its recovery rate from 75% to 85-90%, while minimizing risk and downtime.

## THE PROCESS

ROTEC's Flow Reversal process was retrofitted into an existing RO system. A two-staged array system was retrofitted to a three-stage system, without interference or downtime of the plant during installation.

The main challenges in increasing the recovery rate were the formation of mineral scaling (mainly saturation of CaPO<sub>4</sub> and BaSO<sub>4</sub>) and a design limitation involving operating with the current two-staged array at higher process recovery (lower brine flowrate results in a high Beta factor). In order to address these challenges, the ROTEC retrofit design comprised the following:

- Modification of the RO system from current two stages (49:24) to retrofitted three stages (45:25:10).
- Applying Flow Reversal technology via added pneumatic valves and the ROTEC program to periodically reverse the flow between the 1st stage and the 3rd stage pressure vessel.

## THE GOLD STANDARD IN WATER RECOVERY

The increased recovery from 75% to 90% enabled by the ROTEC retrofit, led to the following benefits:

- 20% increase in water production capacity
- 60% reduction in waste brine volume for disposal
- Lower cleaning (CIP) frequencies followed by shortened plant shutdown events and chemical savings
- Proven efficiency to inhibit Bio-fouling growth on membrane surface

**ROTEC boldly and vigorously pushed the boundaries of desalination to new levels, delivering clear water value and enhanced peace of mind.**

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## LOOKING TO GAIN MORE FROM WATER? LET'S TALK.

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Title

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ROTEC provides holistic, modular reverse osmosis desalination solutions and services. With our eco-friendly approach based on our FR-RO technology, we enhance water recovery, efficiency, and reliability, supporting healthy communities.

### Keep in touch

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