



# AquaR2RO™

Integrated, Ultra-High Recovery  
Membrane Process



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# AquaR2RO™

**Robust**

**2 x Reject Concentration**

**Reliable**

**Optimized Cost**



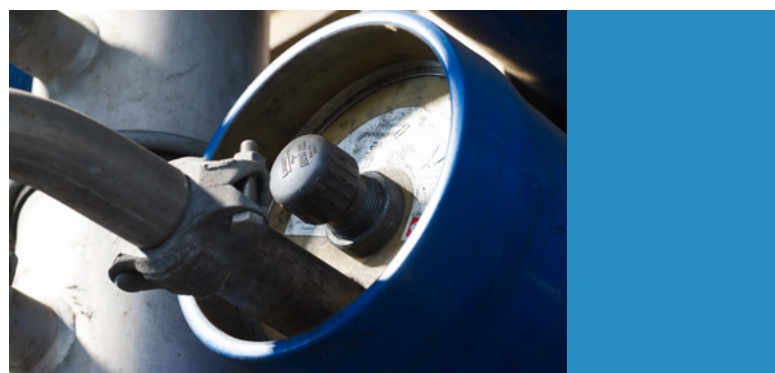
# AquaR2RO™

## Ultra-High Recovery Process

AquaR2RO™ is an enhanced reverse osmosis (RO) process that integrates a unique membrane configuration to treat water that is difficult to render with conventional membrane processes. The system is specifically designed for use in facilities requiring Zero Liquid Dis-charge (ZLD) or Minimal Liquid Discharge (MLD).

The AquaR2RO™ process renders ultra-high recovery (99%) in treating high TDS water due to its ability to withstand higher than normal operating pressures. Ultra-high recovery across the membranes reduces the foot print of thermal equipment, which constitutes the majority of the CAPEX and OPEX of recycle systems.

AquaR2RO™ treats high TDS preconditioned waters with contaminants like high turbidity, organics, COD, and oil and grease as it operates at high cross flow velocities and a low per pass recovery. The salts rejected at the surface of the membranes do not cause precipitation or a concentration polarization effect, rather they immediately diffuse into bulk solution and the concentration happens gradually. The system configuration uses plate and frame design and is able to handle high pressures of up to 2000 psig depending on water quality.

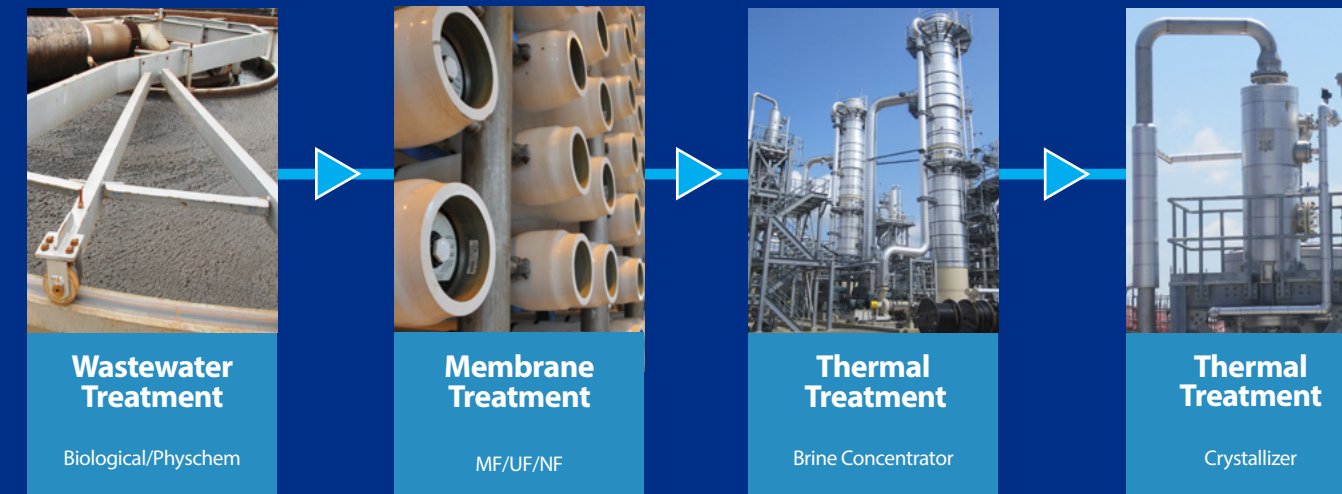


## Technical Features

- Feed pressure tolerance up to 140 bar
- Smaller flow, high concentration reject streams of >12% TDS
- Low susceptibility to scaling compared to conventional RO systems
- High resistance to organic fouling (COD up to 2000 ppm in the feed)
- Tolerance to high turbidity water >10 NTU and to dissolved oil up to 50 ppm
- Overall recovery >98%

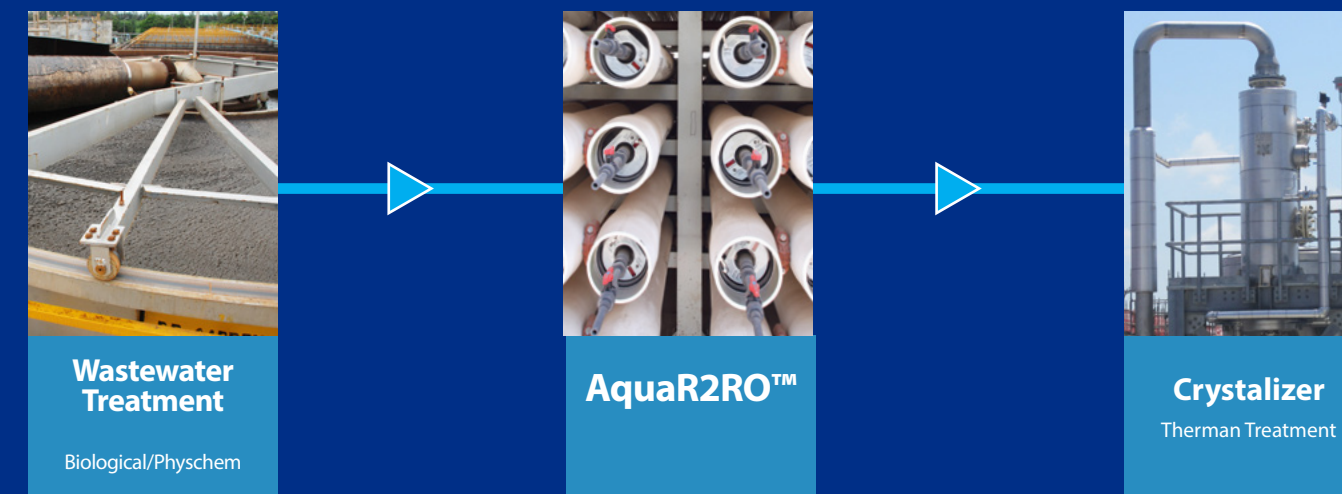
# REDUCE CAPEX AND OPEX OF YOUR WATER REUSE SYSTEM

## Traditional Approach



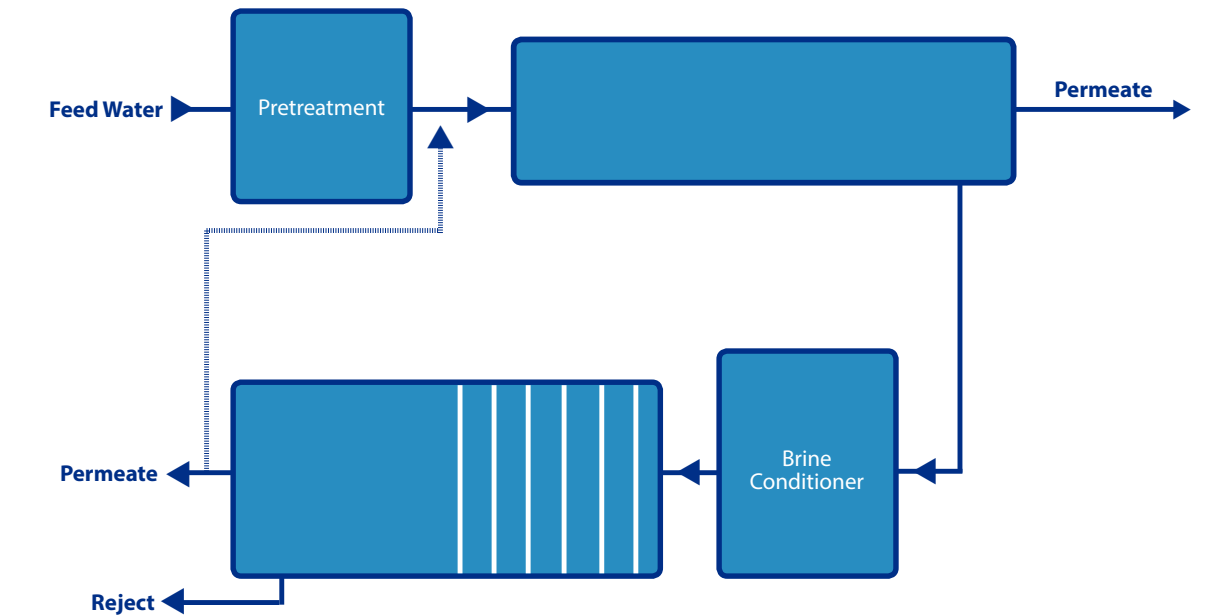
# AquaR2RO™ Direct Membrane To Crystallization

## AquaR2RO™ Process



# Integrated Process

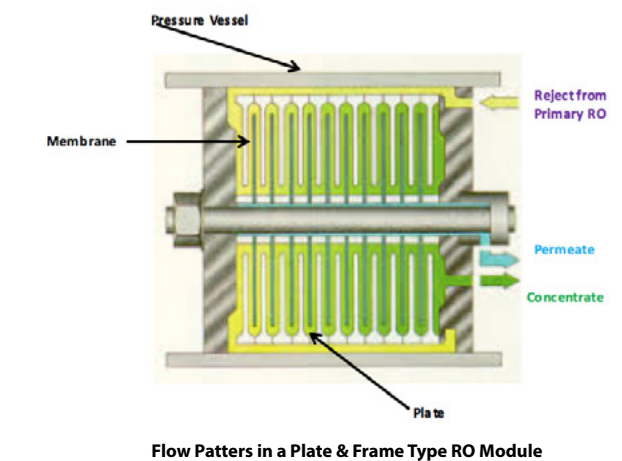
## Flow Scheme of AquaR2RO™



The membrane is located between two plates where feed water flows between the plates and permeate is collected inside the membrane. The unique plate design provides a feed distribution pattern and turbulent flow that prevent foulants/scalants from depositing on the plate or membrane surface. In a given RO module, there are several of such plate and membrane element pairs, thus providing exceptional filtration area and processing capacity.

Due to the unique geometry of the plates and the way membrane elements are placed in the module, the feed water SDI is no longer a limitation unlike spiral wound RO membrane elements where SDI has to be 5 or less. This is the primary difference between conventional spiral wound RO membrane modules and this alternative RO solution.

Another significant feature of this module assembly is the ability to operate at a design pressure of 2000 psig, whereas the spiral wound RO membrane is limited to 1200 psig. Higher design pressure of this membrane module enables the reject stream TDS to go as high as 140,000 ppm. This provides a much higher recovery compared to conventional RO systems.



Flow Patters in a Plate & Frame Type RO Module