

Bedok NEWater Factory

Application: Tertiary treatment of wastewater for RO pretreatment and water reclamation

Capacity: 11.3 MGD (42,775 m³/d)

Location: Bedok, Singapore

Commissioned: December 2002



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Plant Overview

Water reclamation allows communities to reuse a portion of wastewater effluent and reduce the amount of potable water consumed for non-potable applications.

The Public Utilities Board (PUB), the sole water authority of Singapore, commissioned the Bedok NEWater factory, to produce high quality recycled water for industrial applications. The Bedok plant is the first of four reuse plants initiated by the PUB.

To reclaim water suitable for industrial reuse, a multi-barrier approach was required. ZeeWeed* ultrafiltration (UF) membranes from ZENON Membrane Solutions, part of GE Water & Process Technologies, was selected in December of 2001, as a

part of the approach consisting of UF, reverse osmosis (RO), and ultraviolet (UV) treatment.

The ZeeWeed portion of the Bedok NEWater factory has an initial production capacity of 11.3 MGD (42,775 m³/d). Two additional phases are planned and will increase the total capacity to 31 MGD (117,350 m³/d).

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The membrane is capable of handling solids spikes, and consistently produces an ideal RO feed, typically yielding an SDI < 3. ZeeWeed provides the RO systems with a higher sustainable flux, smaller system size, and lower cleaning frequency, thereby significantly reducing operating and capital costs.

The Bedok NEWater factory has also been designed as an educational visitors center to teach the public on the benefits of water reclamation. Complete with interactive learning centers, a movie theater and plant tours, the plant promotes the value of water as a scarce, natural resource.



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Process Overview

The Bedok NEWater factory treats effluent from the secondary clarifier of a local wastewater treatment plant.

After the secondary effluent is screened through a 0.02 inch (0.5 mm) self-cleaning strainer, the water flows by gravity to the five membrane tanks. As a means of reducing the potential for biological activity in the membrane tanks, chlorine is added to form chloramines prior to the ZeeWeed membrane treatment. The chloramines have an additional benefit of eliminating biogrowth in the RO system, protecting the RO membranes without requiring a dechlorination system.

Filtration is achieved by drawing water to the inside of the membrane fiber using suction created by permeate pumps.

The permeate from the membrane tank is then pumped to an RO system for demineralization, and disinfected by a UV system.

The final product from the multi-barrier approach is termed "NEWater", which is used primarily as a feed for the electronics industry, wafer fabrication plants, and commercial building cooling towers. A small percentage of the NEWater is released back into local reservoirs for indirect potable reuse applications.



Process Flow Diagram

