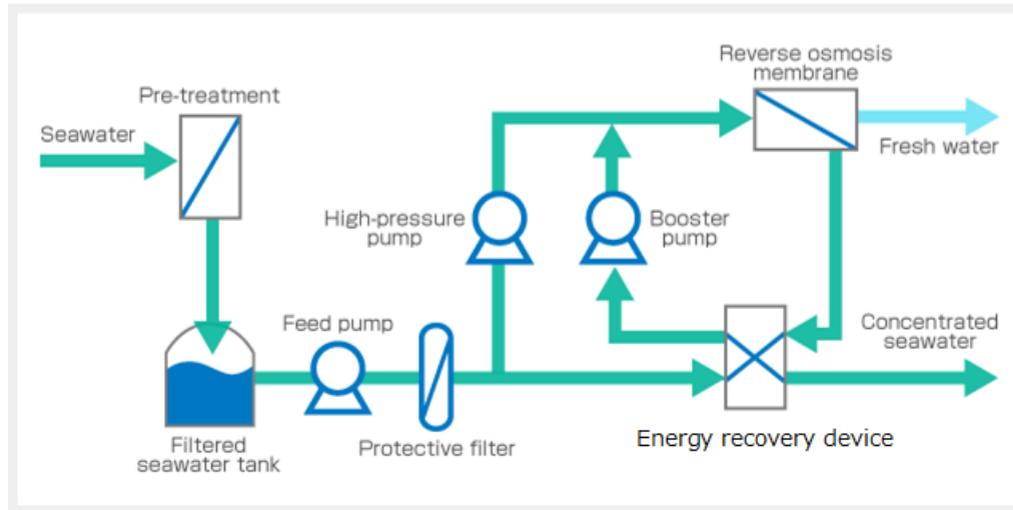




# Hollow Fiber RO Seawater Desalination System

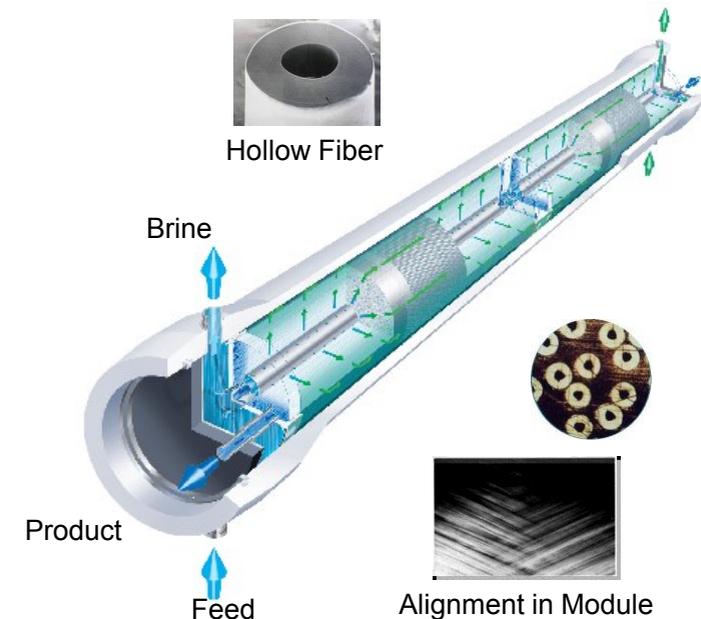
Toyobo Engineering Co., Ltd.

Seawater Desalination System with low running cost and stable operation



Process flow (with Energy recovery)

## Hollow Fiber RO Membrane Module-HOLLOSEP®



### Features

- Employs Toyobo HOLLOSEP®, a highly functional and reliable reverse osmosis membrane that has been used in large-scale seawater desalination systems around the world and in Japan.
- Can also be used to produce demineralized water of pure-water quality from salt-contained well water.
- Can save energy consumption by utilizing Energy recovery device

### Overview (Technical principles, actions, etc.)

Sea water is permeated through Hollow Fiber RO membrane made of cellulose triacetate (CTA), removing various saline, and then supplied as fresh water for industrial water and/or drinking water. The membrane has superior chlorine tolerance and prevents biological fouling by organism in seawater, and therefore has high durability and long membrane life. With this membrane the system can be stably operated with low running cost, by saving membrane exchange cost, chemical cleaning/consumption cost (by low cleaning frequency), and overall maintenance cost.

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## Performance /specifications of technology / product

- Capacity : Several tons/day ~ ← to be designed for customers requirement
- Seawater TDS : Can accept >40,000ppm ← Many experience in Middle-east sea, including Red Sea, containing much organism
- Product TDS : <500ppm ← can be reduced, depends on seawater quality
- Availability : Experience of  $\geq 99\%$
- Recovery ratio : 30%~60% ← to be optimized according seawater quality
- Cleaning frequency : 1 time /year (Normal condition)

## Usage examples / result

### 【Application of Hollow Fiber RO Seawater Desalination System】

- Ensuring supplies of drinking water and domestic water on off-shore islands

#### **Especially small unit for domestic water supply in Resort Island around South-east Asia**

- Industrial water supply to Power plant on the coast →Example(A)
- Drinking water and domestic water on ships
- Manufacturing mineral water from deep ocean water
- Desalinization of water with a high salt concentration and well water near the seashore

### 【Other application with Hollow Fiber RO membrane】

- Advanced Livestock Wastewater Treatment System →Example(B)
- Wastewater Recovery System
- Seawater Concentration System-Salt production →Example(C)
- Concentration and Volume Reduction System-Reducing waste treatment cost
- Pure water system-Analysis water for hospitals →Example(D)



Example(A)



Example (B)



Example (C)



Example (D)