**RO technology has come a long way.**

The concepts of osmosis were studied as early as 1748 among scientists. But it was only in early 1960’s when asymmetric cellulose acetate membranes with relatively high water fluxes and separations were made available that RO separation processes became possible and practical for industrial purposes. Since then, the continual development and improvement of RO membranes have resulted in many RO applications. Apart from seawater and brackish water purification processes, RO membranes have also been used in wastewater treatment, production of ultrapure water, water softening and many others.

**Typical filtration spectrum of RO membranes.**

A typical RO membrane has a pore size range of 0.0001 - 0.001 microns. Among all the separation materials in the industry, it is by far the finest in terms of pore sizes available. In addition to removing all organic molecules and viruses, RO membranes also remove most minerals that are present in the water. They also remove monovalent ions, which means they are able to filter out salt (desalination) and metallic ions from water.

**From brackish water to seawater.**

Wide spectrum of applications.

RO technology can be used to remove up to 95-99% of Total Dissolved Solids (TDS), and most other contaminants, present in water of different sources. It is capable of purifying water of many sources, to qualities required by a wide spectrum of applications. With the high efficiency of most established membranes and the cost savings from availability of energy recover devices, RO technology has become a very widely adopted way worldwide to achieve high quality water needed for domestic consumption and a wide spectrum of industrial uses. It has also been used popularly for wastewater reclamation, and for industrial production processes such as concentration of fruit juice, maple syrup production etc.
Seawater Reverse Osmosis (SWRO) desalination.

Seawater abundant. But every drop counts.

Seawater desalination remains the costliest mean of producing potable or industrial water. Poorly designed, equipped and instrumented systems make every drop of usable water extracted from the seas even less economically viable for the end-users. The longer an inferior one is in use, the costlier it will be exponentially.
Minimising energy cost. Invest in ERD. Payback in no time.

The cost of energy in a SWRO process can be between 30% and 50% of the total production cost of desalinated water. In an environment where power cost is exorbitant, this can go up to 70% of the total cost of production. Invest in a SWRO system that is equipped with a good ERD. It may help save 50% or more of the energy required, and the savings will help recoup the capital cost of the ERD within a relatively short time.
Certified standard and modular SWRO systems.

Our standard SWRO systems are certified by ABS (American Bureau of Shipping) and certifiable by DNV (Det Norske Veritas) for the most stringent applications in the oil and gas, maritime industries and more. We also upgrade our systems to meet the explosion-proof specifications if required by our clients.
And well equipped and instrumented for 24/7 hassle-free operations.

Lots of high quality and performing parts and components, electrical and electronic instrument are packed with our SWRO systems too. Getting most out of every drop of seawater also means that there shall be least downtime, and this absolutely requires rather fool-proofed systems packed with high quality hardware, well instrumented and programmed functions that need least human attendance. Our systems are designed and packed to do just that.
Pre-designed systems.

Short production/delivery lead-time.

One of the biggest advantages of a standard and modular water treatment system is the saving of time required to design, and to determine the specifications. It is pre-designed. And specifications and quantities of parts and components are pre-determined. This allows our production teams to commence production immediately upon a confirmation of order from our agent, distributor or end-user customer.

<table>
<thead>
<tr>
<th>TDS &lt; 300 ppm</th>
<th>pH : 6.5 ~ 6.8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product water</strong></td>
<td></td>
</tr>
<tr>
<td>TDS &lt; 34,000 ~ 36,000 ppm (or more)</td>
<td>pH : 7.6 ~ 8.4</td>
</tr>
<tr>
<td><strong>Feed water</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Output Water Capacity (m³/day)

<table>
<thead>
<tr>
<th>Output Water Capacity (m³/day)</th>
<th>Estimated Dimensions (Length x Width x Height)</th>
<th>Connection (ANSI Flange)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25.0</td>
<td>3100 x 2150 x 2600 mm</td>
<td>2” 1” 1½”</td>
</tr>
<tr>
<td>50.0</td>
<td>3300 x 2350 x 2614 mm</td>
<td>2” 1” 1½”</td>
</tr>
<tr>
<td>75.0</td>
<td>4000 x 2400 x 2700 mm</td>
<td>3” 1” 2”</td>
</tr>
<tr>
<td>100.0</td>
<td>5000 x 2500 x 2780 mm</td>
<td>3” 1½” 2”</td>
</tr>
</tbody>
</table>

Note: All data are subject to changes from time to time.

### Containerised SWRO system.

**Like a magic box.**

Seawater from one end. And potable water from the other.
EPC/turnkey engineering expertise and capabilities.
That is how versatile we can be.

For large SWRO desalination plants beyond applications of standard and modular systems, we support our regional partners with our plants’ design expertise and supplies of systems and equipment, covering from seawater intake facilities to pre-treatment, SWRO and remineralisation processes for potable water applications (there shall be BWRO and demineralisation processes post-SWRO systems if for boiler water applications). Where market sectors or territories are not covered by any of our regional partners, we have the capabilities and track records for undertaking the projects on an EPC/turnkey engineering basis.

Designed-and-built large SWRO desalination plants.
5 MLD, 10 MLD, 25 MLD, 50 MLD and larger.
SWRO desalination.

The most sustainable water solution to many applications.

Our oceans are the most sustainable sources of water. As desalination solutions and processes are increasingly more economical, more and more social and economic sectors worldwide adopt seawater desalination technologies as solutions to applications. Our SWRO systems and plants have been used in a wide range of applications - oil rigs, gas platforms, oil service barges, ports and jetties, resorts, island communities, power plants, refineries, military outposts and more.

Applications.

Wide spectrum.

Remote island fishing community.

Drinking water for a remote island.

Our skid-based standard and modular UF and SWRO systems made the shipment and transportation to an exceptionally remote finishing island of Indonesia so easy. With little skilled labour available on the island, our systems were still installed on-site rather hassle-free. The systems were fast commissioned to much delight of the island’s inhabitants.
Oil rig platform.

**Potable water for oil rig’s operators.**

Our teams overcame 2 main challenges - time constraint and limited access - to install and commission a standard SWRO system onboard a docked oil rig platform of a regular customer. Pre-engineered designs of our systems saved our teams a lot of time for production. Our system was flexible for demolition on the oil rig’s open deck, and for re-assembly within the constrained space. The system was commissioned way ahead of the oil rig leaving the shipyard’s maintenance dock in Singapore.

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Military camp on an island.

**Containerised water maker for island camp.**

Our containerised SWRO system met the military client’s stringent requirements, and saved the customer hassles of building any shelter structures at the resource-limited base. Completely plug-and-play, the system was installed and commissioned within a week. Both the containerised water maker and our technical personnel were transported respectively to the island base by designated military aircraft for security reasons.

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