Potable water supply –
One of the greatest challenges of our time

97.5% of the Earth’s water is saltwater. A mere 0.9% is in principle available to humans as fresh water, only 3% of it on the surface. And even more important is it’s uneven distribution. Due to population growth, climate change and urbanization, water deficiency will continuously get worse. In addition, there is increasing dry land salinity in coastal areas. According to prognoses, already in 2040, 33 countries could suffer from extreme lack of water.1 Desalination technologies play an ever increasing role in securing the worldwide supply of potable water. However, conventional processes are continually reaching their limits. Local circumstances are responsible for increased salt content. The conversion of highly saline water is intricate for membrane-based technologies such as reverse osmosis. Conventional thermal processes on the other hand, depend on mid temperature heat e.g. from nearby power plants, hence competing in water or power generation. Both methods are limited with regard to their yield of fresh water.

The UPWaterSystem achieves a breakthrough in the efficient and high quality supply of desalinated drinking water by combining distillation and a hydrophobic microporous membrane.

The innovative UPWaterSystem by EvCon has the potential to revolutionize the desalination of saltwater. Using an entirely new separation method, even water with a very high salt concentration can be purified efficiently and with excellent separation quality.

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UPWaterSystem in Saltwater Desalination

1. **SUPERIOR ENERGY EFFICIENCY** — through low temperature evaporation in vacuum and repeated evaporation effects
2. **EXCELLENT SEPARATION QUALITY** — with extremely clean product water by means of a hydrophobic, microporous membrane
3. **PARTICULARLY SUITABLE FOR WATER WITH HIGH SALINE CONTENT** — as high as 150,000 ppm and more
4. **HIGH YIELD AND RELIABLE OPERATION** — through the process itself and the use of corrosion-resistant plastics
5. **VERY GOOD SCALABILITY** — through modular set-up

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1. Source: World Resources Institute
Revolutionary technology: The VMEMD process

The key to this future-forward desalination method is the innovative VMEMD technology (Vacuum Multi Effect Membrane Distillation). This is a thermal separation method that takes water vapour through a micro-porous, hydrophobic membrane and thereby separates pure water from salt, solved solids and other impurities.

The entire process takes place in vacuum – so that the temperatures required for heating the process lie well below 100 °C.

VMEMD facilities are constructed modularly and can therefore be tailor-made to suit specific requirements. This makes facilities starting from 500 and up to 1’000’000 m³ per day possible.

Maximum yield – minimum energy use

In the modules of the UPWaterSystem, numerous thermal effects are aligned behind each other. This leads to a very high yield of very clean water with minimum waste water output.

In this respect, the heat supplied to the system can be used repeatedly. Together with the low temperature required by the vacuum process, the result is a phenomenally efficient total process.

Heart of the process: the hydrophobic membrane

The VMEMD process combines the phase transition desalination with the use of a micro-porous, hydrophobic membrane. The result: very clean potable water of excellent separation quality.

Water salinities:

<table>
<thead>
<tr>
<th>Type</th>
<th>Salinity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea water</td>
<td>35’000 ppm</td>
</tr>
<tr>
<td>Concentrated brine</td>
<td>70’000 ppm</td>
</tr>
<tr>
<td>WHO drinking water limit</td>
<td>1’000 ppm</td>
</tr>
<tr>
<td>EvCon VMEMD</td>
<td>&lt; 10 ppm</td>
</tr>
</tbody>
</table>

Let’s talk about it!

Our experts are happy to show you how you can design the desalination of saltwater with the UPWaterSystem in a highly efficient and sustainable way.