Can we use Reverse Osmosis in place of demineralization resin based systems?

YES, DM plants are used to produce demineralised water. The higher the feed water TDS, the higher is the chemical consumption for regeneration. While in Reverse Osmosis, there is no need for any regeneration. Above 500 ppm inlet water TDS, the operating cost of a Reverse Osmosis system is lower than that of a DM system, and the cost increases with increasing TDS for a DM plant.

Therefore we should use a Reverse Osmosis system if the inlet TDS is > 500 ppm. If the outlet water quality required is lower than that achievable in a single pass Reverse Osmosis system, it is more economical to have either of the following schemes.

<table>
<thead>
<tr>
<th>Scheme</th>
<th>Feed TDS (ppm)</th>
<th>Outlet TDS (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single pass RO</td>
<td>500-40000</td>
<td>20-300</td>
</tr>
<tr>
<td>RO - DM</td>
<td>500-40000</td>
<td>&lt; 10</td>
</tr>
<tr>
<td>RO- DM- MB</td>
<td>2000-40000</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Double pass RO</td>
<td>500-40000</td>
<td>&lt; 10</td>
</tr>
<tr>
<td>RO- MB</td>
<td>500-2000</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>NF</td>
<td>2000</td>
<td>&lt; 500</td>
</tr>
</tbody>
</table>

When do I use an Ultrafiltration system for water treatment?

Ultrafiltration is a complimentary process to reverse osmosis where dissolved salts are not removed from water, which means there is no change in the chemical composition of the product water from an Ultrafiltration system. Large molecular weight organics (1000 daltons- 100,000 daltons) bacteria, colloids, viruses and other substances are removed from the water. This produces sparkling clear safe water.

The three main applications in water treatment are

- Bottled water production where feed water TDS is within limits, but clarity and disinfection is required
- Pre-treatment to reverse osmosis systems to enhance life of the Reverse Osmosis membranes and protect them from fouling. It is a single stage step process which eliminates, settling, sand filtration and polishing cartridge filtration
- Domestic water purifier for producing sparkling, crystal clear, safe drinking water without electricity, chemicals and Ultraviolet rays

Can Perma membranes help in colour removal, BOD and COD from waste water and make water recycle?

Yes, with Permonics's Proprietary ultrafiltration/ nanofiltration membrane elements used as pre-treatment followed by a reverse osmosis system can effectively recycle waste water at least up to 70%. The balance rejected waste has to be solar/ steam evaporated.
Can Perma membranes be used in recovering products from dilute solutions and preconcentrating solutions prior to evaporation?

Yes, we have supplied several systems to recover expensive products from washings and mother liquors. The membranes concentrate the solute and remove water. The lower volume and higher concentration makes it possible to recover the products. The fact that membrane systems do not require the latent heat to remove water, there is a direct energy saving of 80-90% when you use membranes to remove water. The added advantage is that there is no heat damage to products. The savings in operating cost itself pay back for the system in less than a year.

How do I use Perma membrane systems in processing whey?

Whey is produced in the manufacturer of cheese, paneer, and casein. It normally is drained and creates a very high effluent load. Perma ultrafiltration membranes have excellent selectivity to whey proteins and produce protein free lactose permeates and a rich concentrate of Whey protein Concentrate (WPC). This reduces the pollution load on your ETP apart from converting waste into saleable WPC and Lactose.

Can membranes be used instead of azeotropic distillation?

Yes, certain solvents such as ethanol, IPA, Ethyl acetate etc can be dehydrated down to < 0.5% moisture without the need for entrainers. The membranes process is termed as Pervaporation where e.g rectified spirit is heated and passed across a special hydrophilic solvent stable diffusive membrane barrier and water is removed across the membrane, the driving force being the vapour pressure difference in the feed side and the permeate side. Therefore the permeate is kept under vacuum. (For more details contact permionics)

When should I use Reverse Osmosis System?

- If your water source is a bore well
- If your water is hard and salty
- If you are located near an industrial belt or any contaminated source, your ground water must be having harmful chemicals such as heavy metals, nitrates, arsenic, fluorides which even in traces are harmful
- If anyone is hypertensive or has heart disease or weak kidneys, low sodium and low hardness water is essential not to aggravate the symptoms

Is there any cumbersome operation involved in Reverse Osmosis system?

No, the system is provided with controls so that it is a fit and forgets system. Our trained service staff will periodically attend to your unit to ensure its smooth performance.

How Reverse Osmosis system is different from a resin based softener process?
Under no circumstances can you drink resin softened water. Softeners convert hardness which is in the form of Calcium and Magnesium into Sodium. There is no reduction in the total salt content of the water. Softened water is good for washing clothes, preventing scaling in your geyser and washing machines. But under no circumstances it can be used for drinking or cooking. Moreover, a softener cannot remove microbes from water

**What is the difference between conventional Ultra Violet Purifiers and Reverse Osmosis water Purifier?**

Ultra Violet water purifier only inactivates microbes, that too they cannot remove protozoan cysts of amoebae and giardia. Also it does not reduce salt content of water while reverse osmosis water purifiers can virtually make any water potable. Reverse osmosis purifier gives you sweet, pure and safe drinking water eliminating the harmful chemicals, microbes and excess salt and hardness from the water

**What is the difference between the Permionics Ultrafiltration Membrane water purifier and Reverse Osmosis water purifier?**

The Ultrafiltration Membrane water purifier (based on Ultrafiltration membrane technology) filters bacteria, cysts, viruses as well as colloidal impurities, but cannot filter dissolved salts from water