



MODERNWATER

Evaporative Cooling Systems

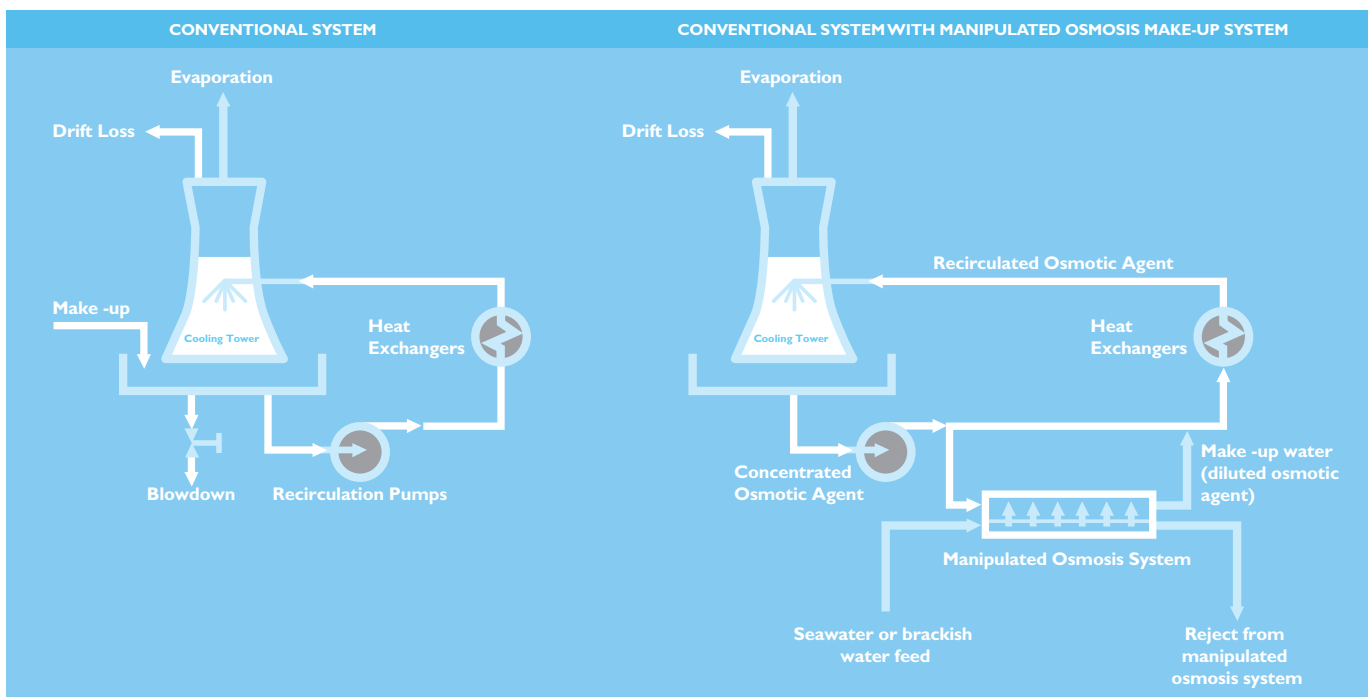
Modern Water's patented process makes the use of evaporative cooling practical and economical in areas where only brackish or seawater sources are available.

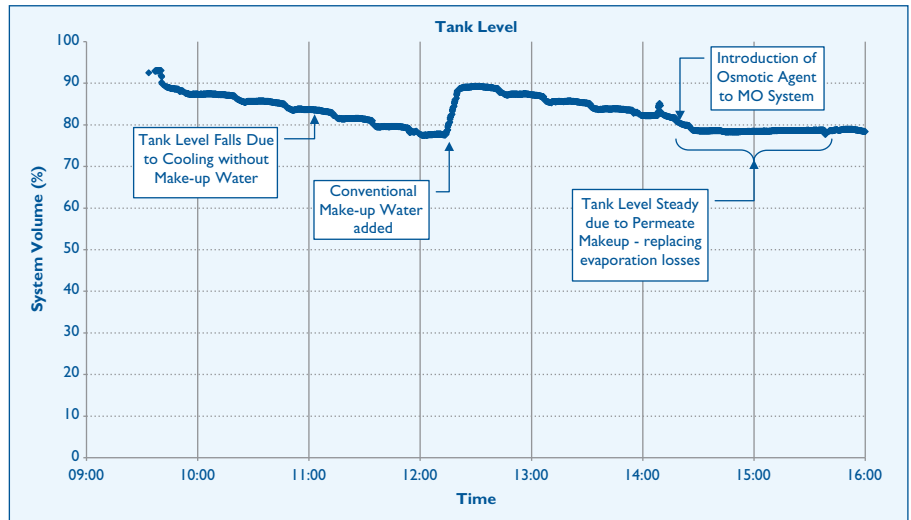
POTENTIAL OPPORTUNITIES:

- Consider evaporative cooling instead of conventional vapour-compression air conditioning
- Reduce capex and opex for district cooling applications
- Displace the use of potable water for makeup in existing cooling tower applications
- Reduce cost of industrial cooling by providing low cost and high quality make-up
- Enable cost effective use of evaporative cooling when the use of once-through cooling is restricted due to environmental concerns

In an evaporative cooling system, the water lost by evaporation from the cooling circuit needs to be replaced to maintain the level of cooling water in the system. This make-up water must be of high quality or there will be a build-up of salts within the circuit which may cause corrosion, scaling and fouling of the heat transfer surfaces as well as the cooling tower internals.

Conventionally, the make-up water may come from mains potable water, treated river water, desalinated water or occasionally tertiary treated effluent. Until now, unless there is treated river water available, the cost of providing high quality make-up water often makes the use of evaporative cooling uncompetitive.





Modern Water's process explained

Modern Water has developed a patented process to produce high quality make-up water using brackish (including tertiary effluent) or seawater sources at a fraction of the cost associated with conventional desalination processes. The Modern Water process utilises our platform technology of manipulated / forward osmosis to directly produce the high quality make-up by the natural process of osmosis. Unlike conventional desalination processes, this process occurs at low pressure and at ambient temperatures. The low energy consumption of the process is not only cost effective, but also environmentally friendly when compared to the alternatives.

The key to the process is that the recirculating cooling water is treated by the addition of a non-toxic "osmotic agent". The properties of the resulting solution mean that pure water make-up can be extracted from any suitable source, such as seawater, when the two fluids are separated by a semi-permeable membrane. Pure water flows by the natural process of osmosis, at low pressure, from the feed solution (eg seawater) to the osmotic agent. This pure water replaces the water lost by evaporation within the cooling tower and maintains the level in the system.

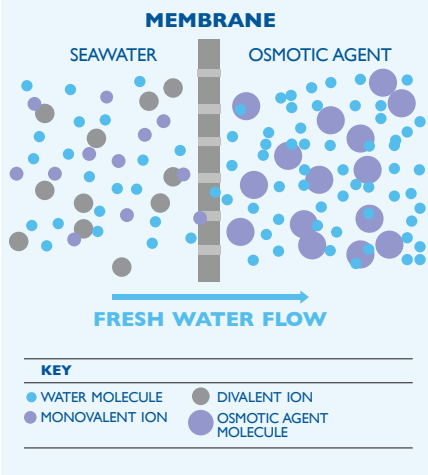
Unlike other desalination systems that provide make-up water, Modern Water's process becomes increasingly cost effective the more challenging the source solution, in terms of both total dissolved solids and fouling potential.

Evaporative cooling can now be considered in areas where previously the cost of providing make-up water was uncompetitive, and retrofitting of the system to existing installations provides the opportunity for significantly reduced running costs.

Key advantages of Modern Water's cooling tower make-up water process are:

- Allows the economic use of seawater for cooling tower make-up via manipulated osmosis
- Lower capital cost compared to alternatives, in particular with challenging source waters
- Significantly lower energy consumption compared to competing processes
- Easily retrofitted to existing installations, where there is an appropriate feed source
- Forward osmosis membranes are chlorine tolerant and compatible with a variety of biocides
- Forward osmosis membranes are fouling resistant

EXTRACTING FRESH WATER FROM SEAWATER USING MANIPULATED OSMOSIS



MORE INFO:

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