



## Salt water and extreme environment applications

### Refinery, Saudi Arabia

### Case story

Due to limited water resources, a refinery in the Middle East needed to use the water from the Red Sea for its plant cooling needs. The large salt content of sea water causes high fouling and corrosion concerns which generally make it extremely difficult for cooling.

Traditionally a cooling tower has been used to directly cool the sea water which in turn is circulated in an open loop to plant heat exchangers. In this case, each plant heat exchanger would need to be constructed with exotic materials. In addition, fouling would still be an issue leading to inefficiencies and added maintenance.

An Alfa Laval WSAC with FlexWater feature was the best choice. In this application, we cool potable water inside the tubes providing closed loop cooling to the plant heat exchangers. The outside of the tubes are drenched with an open sea water loop providing the evaporative latent heat cooling. Titanium tubes with all prime surface (no fins) minimize fouling. FRP (fiberglass reinforce plastic) was used for the tube bundle casings. The sea water is used at 2.2 cycles of concentration.

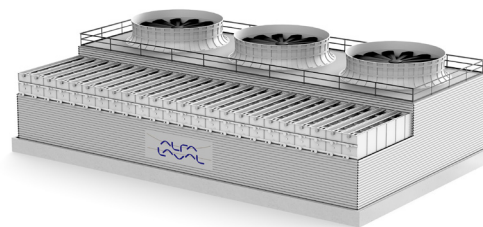


#### Results

- Heat rejection–169,553,000 BTUH achieved
- Cooling 24,000 GPM potable water
- Low fouling and low maintenance
- All plant heat exchangers able to be low cost standard materials
- No thermal pollution back to the sea



**WetSurface**  
Maximum cooling efficiency and lowest possible outlet temperature.



**FlexWater**  
A WSAC can operate on recycled water of low quality such as blowdown water.

### Why Alfa Laval Wet Surface Air Coolers (WSAC)

#### Maximize uptime

- High reliability
- Minimal maintenance

#### Cut costs

- Minimal energy consumption
- Reduced maintenance costs

#### Increase capacity

- WSAC maximizes cooling performance for increased production

#### How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at [www.alfalaval.com](http://www.alfalaval.com).

Alfa Laval reserves the right to change specifications without prior notification.

PEP00138-3-ENUS 2403