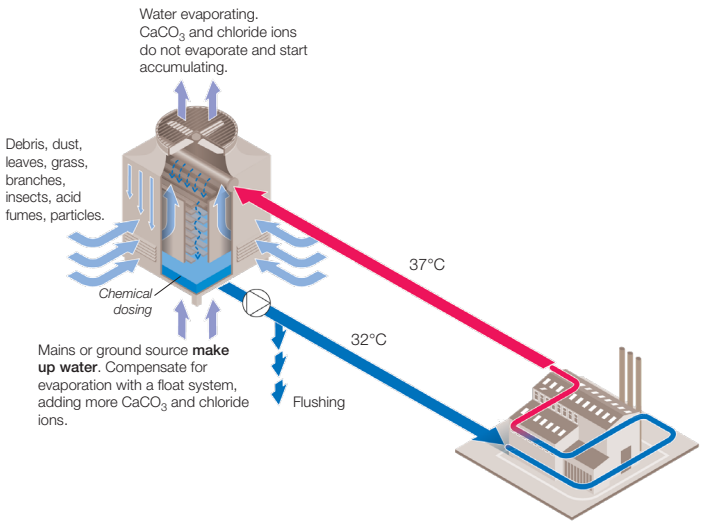
Solutions for sustainability

Cooling tower interchanger

Open cooling towers are a major source of fouling for industrial plants, causing the need for frequent maintenance of other equipment in the plant. The plant cooling loop is normally completely closed and chemically treated, other than the open cooling tower - which forms the only interface with the atmosphere.

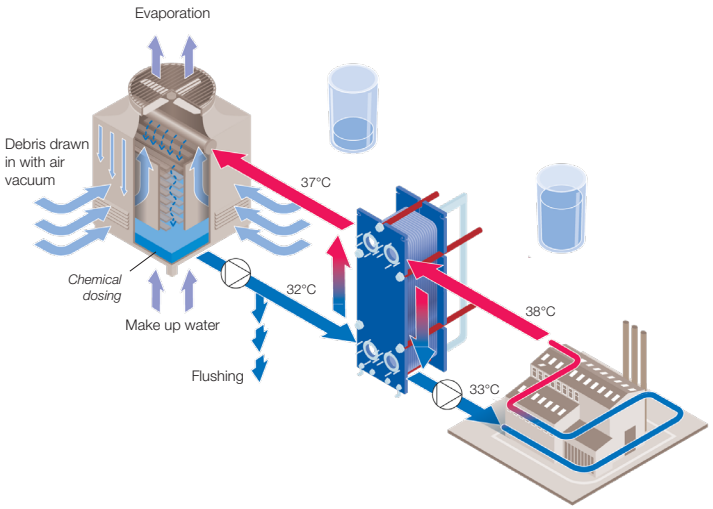
As the cooling water, circulating through the plant, falls freely across the cooling tower packing, the fan(s) pull in fresh air, creating a vacuum around the tower, which attracts air borne particles in close vicinity. These many and varied debris will find their way inside the plant's cooling equipment such as shell-and-tube heat exchangers. The debris settle in low flow areas or dead spots and cause high costs in maintenance, unplanned shut down, condensers' losses in heat transfer efficiencies and additional pumping costs.

Open cooling tower systems are also a source for increasing levels of calcium carbonate and corrosive chloride ions in the circulating cooling water. These unwanted minerals enter via make-up water and accumulate over time to unacceptable levels. The water in the open cooling tower water loop evaporates, but the minerals stay and increase in concentration in the cooling system. **Over a six-month period, calcium carbonate and chloride ions can double in concentration!** The only way to rid the system of these unwanted minerals is to periodically flush the loop. This means increased operational costs and is normally not done, as water costs are high (typically in western Europe at 1 euro per m^3).



Alfa Laval gasketed plate heat exchangers as an interchanger

Plate type heat exchangers with countercurrent flow are commonly used as a 'cooling water loop circuit breaker' because of their excellent flow regime making it possible to achieve a **temperature approach of as low as 1°C**. With the help of an Alfa Laval gasketed plate heat exchanger installed as an interchanger, instead of sending 32°C dirty cooling tower water to the plant, it is possible to supply 33°C closed clean water.



Benefits of a gasketed plate heat exchanger as an interchanger

- Closed loop cooling with clean cooling water that is free of debris and steady acceptable levels of calcium carbonate and chloride ions.
- Savings in pumping costs with clean pipes, which diameter has not reduced due to adhesion of calcium deposits on inner hot pipe surfaces.
- Savings in reduced maintenance costs of downstream cooling equipment like shell-and-tube heat exchangers.
- Savings in heat transfer area, not having to plug tubes of a shell-and-tube due to crevice corrosion caused by high levels of chloride ions.
- Less money spent on chemical dosing and treatment of a smaller volume of open cooling tower loop. Typically, 10% of overall cooling loop in volume.
- Savings in unplanned shut downs interrupting processes due to mechanical corrosion and needs of maintenance.
- Plant's low grade steel equipment will be protected from corrosion as a gasketed plate heat exchanger interchanger with Alloy 316 stainless steel plate material, will handle up to 300 ppm of chlorides at 40°C.
- Fast simple and easy cleaning of gasketed plate heat exchanger by a single person in a few hours.