## APPLICATION

## Seawater cooled HVAC-system

The main purposes of an HVAC-system are to help maintain good indoor air quality through adequate ventilation and to provide thermal comfort.

Cooling or heat rejection of air-conditioning systems is based on thermodynamic principles and involves heat transfer between fluids. Heat generated from the process is released to the environment. According to the different cooling medium of condenser, airconditioning system can be divided into two categories, namely air-cooled and water-cooled system. In general, water-cooled airconditioning systems have a higher COP (Coefficient of Performance) than air-cooled air-conditioning system and thus provide energy savings.

The condenser cooling system in a water-cooled air-conditioning system can be of different types; cooling tower or liquid-cooled air cooler. If the building site is situated near seawater, seawater cooled condenser cooling offers substantial energy savings of up to 30%.

A conventional air-conditioning system is designed for production of 6/12°C cooling water for use in ventilation cooling surfaces. When the seawater is cold enough (below 5.5°C) the system can operate in free cooling mode i.e. generation of cooling is maintained without the use of the cooling machine. The seawater is directly pumped to a seawater plate heat exchanger and used to cool the cooling water. The free cooling system is highly energy-efficient since only the seawater pumps are running and not the compressors.

When the seawater temperature is between 5.5°C and 11.5°C, the seawater plate heat exchanger is used for precooling of the cooling water, before it's cooled by a compressor chiller system to the desired temperature. The seawater is then used to cool the refrigerant in the condenser. When the seawater temperature is above 11.5°C, the seawater is too warm to be used for free cooling, and the chillers provide all cooling.

In order to protect the seawater plate heat exchanger from fouling and clogging, the Bernoulli Filter is a vital component in a seawater cooled HVAC-system to provide particle free seawater.



