Understanding an Absorption Chiller

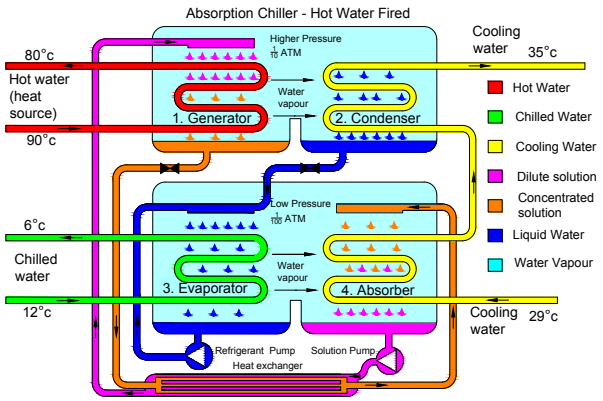
The Absorption cooling cycle explained in a step by step process using a Hot Water Chiller as the example

1. Generator

The dilute and warm solution enters the higher pressure chamber and is sprayed over a heat exchanger containing the heat source (hot water). Heat is transferred to the solution and the dilute solution boils, liberating refrigerant vapour and creating a hot concentrated solution.

2. Condenser

The refrigerant vapour created moves to the right, where it is condensed back to a liquid on the cool heat exchanger containing cooling water.



3. Evaporator

The liquid refrigerant enters the low pressure chamber which is under high vacuum. Due to the vacuum, water in this environment boils at 3.5°C. The liquid refrigerant is sprayed over pipes containing 12°C building cooling water. The refrigerant boils and reduces the building cooling water to 6°C. This cooling water is then circulated through the building's chilled water piping loop before returning to the chiller at 12°C again. Within the chiller the refrigerant vapour liberated from the evaporation process moves right to the Absorber.

4. Absorber

The hot concentrated solution (orange) that has transferred its heat to the dilute fluid (pink) enters the absorber and is sprayed into the water vapour saturated atmosphere. The concentrated solution absorbs the refrigerant vapour creating a dilute solution, which liberates heat to the cooling water that is passing through a heat exchanger in this area.

The process then starts over.

SIMONS GREEN ENERGY

Specialists in energy systems for over 80 years

Recent Installations

Castle Hill RSL Club

Castle Hill RSL Club recently installed a Trigeneration system which is the combination of Cogeneration system (375kWe) and a single stage hot water Absorption Chiller (300kWr). This system provides electricity base load for the building, with free heating, cooling and domestic hot water, delivering energy savings of approximately $250,000 a year.

Applications for Absorption Chillers and Trigeneration

- Commercial and Residential buildings: Comfort cooling or heating – Shopping centres, offices, hospitals, universities, airports, auditoriums, factories etc.
- Industries: Process cooling or heating - Cooling or heating of product like beverages or chemicals. Cooling in manufacturing applications such as injection moulding machines – Plastics, petrochemicals, brewery, printing, pulp mills, palm oil, etc.
- Inlet air cooling for engines or gas turbines – Used to cool the inlet air going to engines or gas turbines to improve the efficiency during hot ambient conditions.

Maitland City Bowls

Maitland City Bowls recently installed a 152kWe Trigeneration system which is the combination of Cogeneration system and a single stage hot water Absorption Chiller. This system converts gas into to electricity, heating, domestic hot water and chilled water for air-conditioning thereby significantly reducing energy costs and the Club's carbon footprint.

Swinburne University

Simons green energy is supplying a 230kWe Cogeneration plant and a 250kWr single stage hot water Absorption Chiller for a brand new campus building.

East Village, Sydney

Simons Green Energy is soon to install 583kWr single stage hot water with auxiliary natural gas fired burner. Absorption Chiller that will provide chilled water for air conditioning with in the building. This system converts gas into into electricity, heating and cooling. The waste heat from the Cogeneration system is converted into chilled water for air conditioning thereby significantly reducing energy costs and carbon footprint.

1 King William Street

Simons Green Energy is supplying a 310kWe cogeneration plant and 275kWr single stage hot water Absorption Chiller. To be housed on the 17th floor rooftop, to aid in increasing the building's energy efficiency during an upcoming refurbishment.

SIMONS GREEN ENERGY

Providing Energy Solutions since 1932
T +61 2 8338 8660 **E** info@simonsgreenenergy.com.au
www.simonsgreenenergy.com