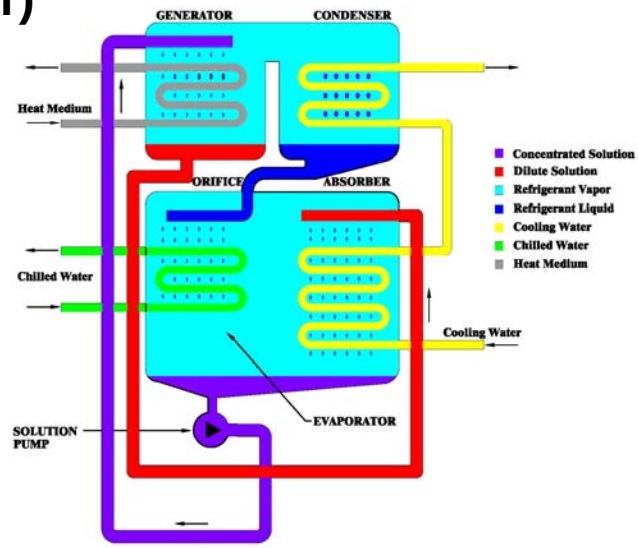
TECHNOLOGY DEVELOPMENT PROJECT FACT SHEET

RT010: Absorption Chiller Technology (Ammonia/Water)



Unlike an electric chiller which uses a compressor to ***push**** a refrigerant from a region of high pressure to a region of low pressure to create the cooling effect, an absorption chiller uses a vacuum to ***pull**** a refrigerant from a region of high pressure to a region of low pressure to create the cooling effect.
There are four main process areas in an absorption chiller - The GENERATOR, the CONDENSER, the EVAPORATOR and the ABSORBER.

In an ammonia/water absorption chiller, ammonia is the refrigerant and water is the absorbent.

1. The chilling process begins in the GENERATOR where a heat source boils a concentrated solution of ammonia and water. Some of the ammonia boils off leaving a dilute ammonia solution which is pumped to the ABSORBER where it will be reunited with the separated ammonia later on in the cycle.
2. The separated ammonia vapor moves to the CONDENSER where cool water from a cooling tower condenses the vapor back to a liquid.
3. The liquid ammonia is channeled via an orifice into the EVAPORATOR where, due to the influence of the ABSORBER, the ammonia encounters a significantly reduced pressure and evaporates thus producing the refrigeration effect.
4. The evaporated ammonia encounters a spray of dilute ammonia solution in the ABSORBER and the ammonia vapor is absorbed by the spray solution. Removing the vapor from the ABSORBER in this way creates the vacuum that enables the evaporation/refrigeration phase.

The resulting concentrated solution of ammonia and water is re-circulated back to the GENERATOR where the whole process is repeated.
(Another popular absorption chiller cycle uses water as the refrigerant and lithium bromide as the absorbent)

* The terms ***push*** and ***pull*** are used here descriptively to help visualize the mechanical difference between a conventional electric chiller and the absorption chiller. The reason for the physical movement of the refrigerant through the orifice is the same in both types of chiller and is simply caused by a differential pressure across the orifice

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