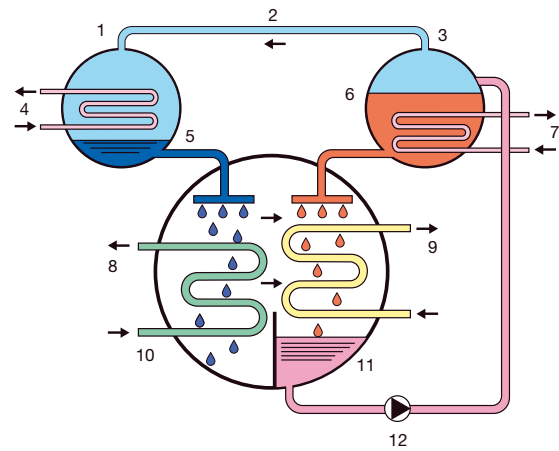


# The absorption cycle

The absorption cooling cycle, like the mechanical vapour compression refrigeration cycle, utilizes the latent heat of evaporation of a refrigerant to remove heat from the entering chilled water. Vapour compression refrigeration systems use a chlorine-based refrigerant and a compressor to transport the refrigerant vapour to be condensed in the condenser. The absorption cycle, however, uses water as the refrigerant and an absorbent lithium bromide solution to absorb the vaporized refrigerant. Heat is then applied to the solution to release the refrigerant vapour from the absorbent. The refrigerant vapour is then condensed in the condenser.

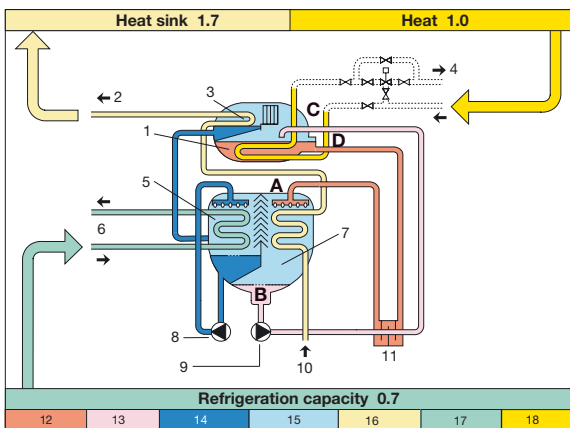
The basic single-effect absorption cycle (see Figure 1) includes generator, condenser, evaporator and absorber with refrigerant (liquid) and lithium bromide as the working solutions. The generator utilizes a heat source (burner, steam or hot water) to vaporize the diluted lithium bromide solution. The water vapour that is released travels to the condenser where it is condensed back into a liquid, transferring the heat to the cooling tower water. Once condensed, the liquid refrigerant is distributed over the evaporator tubes, removing the heat from the chilled water and vaporizing the liquid refrigerant. The concentrated lithium bromide solution from the generator passes into the absorber, absorbs the refrigerant vapour solution from the evaporator and dilutes itself. The diluted lithium bromide solution is then pumped back to the generator where the cycle is started again.

Figure 1 - Simplified absorption cycle



- Legend**
1. Condenser
  2. Refrigerant vapour
  3. Generator
  4. Cooling water
  5. Liquid refrigerant
  6. Concentrated solution
  7. Heat source
  8. Chilled water
  9. Cooling water
  10. Evaporator
  11. Absorber
  12. Absorbent pump

## Cooling cycle schematic



- Legend**
1. Generator
  2. Cooling water
  3. Condenser
  4. Hot water
  5. Evaporator
  6. Chilled water
  7. Absorber
  8. Refrigerant pump
  9. Absorbent pump
  10. Heat exchanger
  11. Cooling water
  12. Concentrated solution
  13. Diluted solution
  14. Liquid solution
  15. Refrigerant vapour
  16. Cooling water
  17. Chilled water
  18. Hot water

