Heating, Ventilation and Air Conditioning Systems

Mechanical services (i.e. heating, ventilation, and air conditioning – commonly known as HVAC) are a fundamental consideration in the design and operation of buildings. The efficient design of HVAC services not only increases the occupants' sense of well-being; it can also create considerable savings in building operation costs and is a key factor in carbon emission.

The basic principles of standard air conditioning systems are quite straightforward. Warm air from the space to be conditioned is sucked in through a grille. The air flows over chiller pipes through which a coolant fluid is circulating. This cools down the incoming air and a dehumidifier removes any excess moisture.

The air then flows over a heating element (similar to the one in a fan heater). On a hot day, this part of the unit may be turned right up so the HVAC works as a heater. A fan at the top blasts the air back through another grille. If the heating element is turned down, the air re-entering the room is much cooler, so the room gradually cools down.

Meanwhile, coolant (a volatile liquid that evaporates easily) flows through the chiller pipes, turns from a cool liquid into a cool gas, and carries the heat from inside the room to the outside of the building. Just like in a refrigerator, the coolant flows through a compressor unit and some condensing pipes and turns back into a cool liquid ready to cycle round the loop again

In the unit outside the building, there are lots of metal plates that dissipate the heat to the atmosphere. An electric fan blows air past them to accelerate the process. Over time, the heat inside the building gradually pumps away into the outside air.

The Heating and Ventilation Contractors Association (HVCA) has a comprehensive HVAC bookstore at www.hvcapublications.co.uk