Basic Terminology (more details in §1-3)

**Heating** is the transfer of heat to a space or to air supplied to the space by virtue of a difference in temperature between the source and the space or air. Heat transfer, which results in a change in the air temperature, is called *sensible heat transfer*, $\dot{q}_s = \dot{m} c_p (t_e - t_i) = \dfrac{\dot{Q} c_p}{v} (t_e - t_i)$.

**Humidifying** is the transfer of water vapor to air. The heat transfer associated with the mass transfer process, which results in an increase in the concentration of water in the air-water vapor mixture, is called *latent heat transfer*, $\dot{q}_l = \dot{m}_w i_{fg} = \dot{m}_a (W_e - W_i) i_{fg} = \dfrac{\dot{Q}_a}{v_a} (W_e - W_i) i_{fg}$.

**Cooling** is the transfer of heat from the space or air supplied to the space by virtue of a difference in temperature between the source and the space or air. Cooling usually denotes sensible heat transfer, with a decrease in the air temperature.

**Dehumidifying** is the transfer of water vapor from air. Latent heat transfer is associated with this process. The transfer of energy is from the air; as a consequence, the concentration of water vapor in the air-water vapor mixture is lowered.

**Cleaning** of air usually implies filtering; additionally it may be necessary to remove contaminant gases from the air. In combination with the introduction of outdoor air (or called ventilation), source reduction, and good air distribution, cleaning, or filtration of the recirculated air can often provide a cost-effective approach to the control of indoor air quality.

**Air motion** in the vicinity of the occupant should be sufficiently strong to remove energy generated by the body but gentle enough to be unnoticed. The importance of air motion especially where occupant comfort is required cannot be underestimated.

**Noise** produced by the fan, the air-distribution system and the air diffuser can be annoying to the occupants of the conditioned space. The activity within the space is a major consideration in determining an acceptable noise level.

Units

Both SI and US conventional units will be used, for examples:

| | SI | US conventional |
|---|---|---|
| Mass flow rate $(\dot{m})$ | kg/s or kg/h | lbm/s or lbm/hr |
| Diameter $(D)$ or length $(L)$ | m | ft |
| Liquid volume flow rate $(\dot{Q})$ | $m^3/s$ | gal/min (gpm) |
| Air capacity or volume flow rate $(\dot{Q})$ | $m^3/s$ | $ft^3/min$ (cfm) |
| Air pressure loss $(\Delta P)$ | Pa | in. wg |
| Cooling load or capacity $(\dot{q})$ | W or kW | Btu/hr or ton (1 ton = 12,000 Btu/hr) |
| Heating load $(\dot{q})$ | W or kW | Btu/hr |
| Heat transfer per unit mass $(q)$ | J/kg or kJ/kg | Btu/lbm |
| Power $(\dot{W})$ | W or kW | hp |
| Energy | kWh | Btu or ton-hr |
| Temperature $(t)$ or $(T)$ | °C or K | °F or °R |