# Heat / Transfer Energy

Heat / energy transfer occurs by three methods; conduction, convection, and radiation.

Conduction is the transfer of energy from one molecule to another molecule. A simple example is the transfer of heat from a stove to a pan. Heat transfers from hot surfaces to cold surfaces.

Convection is the transfer of heat by moving the molecules from one place to another. A simple example would be hot air rising.

Radiation is the transfer of heat through space via electromagnetic waves. An example is the sun's rays.

"R" is the resistance to heat flow. The higher the R-value, the greater the resistance to heat flow. U-factor or U-value is the measure of heat flow or the inverse of R. U = 1 / R.

Many factors affect the energy efficiencies of a buildings thermal envelope. The thermal envelope is the perimeter of the structure that is heated or cooled. These factors include the total R-value of all system components, air infiltration due to leakage in gaps in the thermal envelope, convective air flow within insulated systems, thermal bridging across the building envelope, and thermal mass of the building components.