

# NORTHCOAST ENERGY MASTERS

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## The Second Law of Thermodynamics

The second law of thermodynamics is a profound principle of nature which affects the way energy can be used.

Heat can never pass spontaneously from a colder to a hotter body. As a result of this fact, natural processes that involve energy transfer must have one direction, and all natural processes are irreversible. Whenever there is a difference in heat between one place and another, heat will flow from warm to cold.

### ***The Second Law of Thermodynamics Application to Insulation and Insulating***

Fiberglass batting and blown-in blankets are notoriously unable to prevent air circulation within wall cavities. Tyvek and other "vapor-barrier" technologies were developed specifically to address this shortcoming of fiberglass insulation.

Insulating the walls and attic typically results in a 20-30% savings on home heating costs. Cellulose has an R-value of 3.75 per inch. Fiberglass (2.8 per inch) loses R-value at cold temperatures due to convection: (i.e., heat transfer caused by the circulation of currents from a warm region to a colder region)

Cellulose insulation has especially been recognized as useful in combating SBS (Sick Building Syndrome) because it contains boric acid as a fire retardant. Boric Acid has several appealing characteristics: it is non-toxic, it is used in eye drops, cosmetics, and many other consumer goods.



1999, 2000, 2001, 2002, 2003, 2004 & 2005

