

# Energy Efficiency – Proper Insulation

One of the simplest ways to reduce your home's heating and cooling costs—and improve comfort—involves installing proper insulation. Doing so provides resistance to heat flow. The more heat flow resistance your insulation provides, the lower your heating and cooling costs.

Heat flows naturally from a warmer to a cooler space. In winter, heat moves directly from heated living spaces to adjacent unheated attics, garages, basements, and even outdoors. It can also travel indirectly through interior ceilings, walls, and floors—wherever there is a difference in temperature.

During the summer cooling season, the reverse takes place. Heat flows from the outdoors to the interior of a house.

To maintain comfort, heat lost in the winter must be replaced by your heating system. In summer, heat gained must be removed by your cooling system. Proper insulation, though, decreases heat flow.

Heat flow resistance is measured or rated in terms of its R-value. The higher the R-value, the greater the insulation's effectiveness.

When calculating the R-value of a multilayered installation, add R-values of individual layers. Installing more insulation in your home increases the R-value.

Insulation effectiveness also depends on how and where it's installed. For example, insulation that gets compressed will not provide its full rated R-value. The overall R-value of a wall or ceiling will be somewhat different from the R-value of the insulation because some heat flows around the insulation through studs and joists. Therefore, it's important to properly install your insulation to achieve the maximum R-value.



*Insulation inspection - photo courtesy of Certain Teed Corporation*



*Attic insulation - photo courtesy of Certain Teed Corporation*

For more information, visit [www.eere.energy.gov](http://www.eere.energy.gov)

Source: U.S. Department of Energy Office of Energy Efficiency and Renewable Energy