

**U.S. Department of Energy - Energy Efficiency and Renewable Energy**  
**A Consumer's Guide to Energy Efficiency and Renewable Energy**

**How Insulation Works**

You need insulation in your home to provide 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 the winter, this heat flow moves directly from all heated living spaces to adjacent unheated attics, garages, basements, and even to the outdoors. Heat flow can also move indirectly through interior ceilings, walls, and floors—wherever there is a difference in temperature. During the cooling season, heat flows from the outdoors to the interior of a house.

To maintain comfort, the heat lost in the winter must be replaced by your heating system and the heat gained in the summer must be removed by your cooling system. Properly insulating your home will decrease this heat flow by providing an effective resistance to the flow of heat.

An insulation's resistance to heat flow is measured or rated in terms of its thermal resistance or R-value.