The Benefits Of Installing Radiant Barriers

The Oak Ridge National Laboratory estimates that installing radiant barriers can save about $150 a year in hot climates and $40 in cold climates.

To ask a question, write to **James Dulley**, Energy Report, 6906 Royalgreen Dr., Cincinnati, Ohio 45244, or check his Web page, **www.dulley.com**.

***Q**: My air conditioning costs were high last summer and we still felt too warm at times. I heard that radiant barriers save a lot of money. How does a radiant barrier work, will it save much and how much does it cost?*

A: Many people have read ads or received sales calls about the huge energy savings from installing attic radiant barriers. The savings claimed are often the maximum possible and are exaggerated for typical retrofit installation. However, proper installation in a specific house can yield a reasonable payback and more comfort.

The savings from installing a radiant barrier in the attic vary considerably depending on your climate and your house, orientation to the sun, etc. The Oak Ridge National Laboratory estimates air conditioning cost savings can range from about $150 annually for hot climates to $40 for cold climates.

Attic radiant barriers provide little positive or negative effect during heating seasons. If your electric utility offers time-of-use rates, the savings may be somewhat higher.

It is important to understand the basics of heat transfer—or how a house loses and gains heat—so you can evaluate whether your home is a candidate for radiant barriers. The most important thing to know is that the rate at which heat flows from a hot area to a cold one is a function of the temperature difference between the two spaces.

Conduction is heat flow through a solid object or several objects touching one another. This is how the handle on an iron skillet gets hot on the stove. The walls and ceiling of a house also lose or gain heat this way because building materials are nailed together.

Convection is where heat flows through a moving fluid or gas. This generally increases the rate of heat flow compared to plain conduction through a solid.

Radiation is heat flow directly from one object to another through a vacuum, air, glass, etc. It does not depend on touching or fluid flow.

Radiant energy is more affected by temperature difference than other types of heat flow. For conduction and convection, if the temperature difference between indoors and outdoors doubles, heat flow also doubles. With radiation, the heat flow is 16 times greater when the temperature difference doubles.

This is why radiant barriers are most often used in the attic to block heat flow through the roof. On a hot summer afternoon, the temperature of a dark shingle roof can easily reach 150 degrees. The hot roof conducts heat to the roof sheathing. From there, conduction takes over the heat radiant and carries it down through the insulation, to your ceiling and into your house.

Radiant barriers require an air gap to prevent them from touching the hot surface. Otherwise, they become a conductor like any other building material. Reinforced aluminum foil was typically used as the radiant barrier, but now many barriers use plastic films with reflective surfaces.

In addition to reflectivity, emittance is a property of radiant barriers. It should be lower than 0.25—25 percent—to be an effective barrier. Aluminum foil is well below the 0.25 level. Reflective paints also can be sprayed underneath the roof sheathing. Check the emittance spec before signing any contract.

To get a good payback from energy savings, install the radiant barrier yourself. Companies sell double-sided reflective foil for about $130 for a 4x250-foot roll. Invest in a hand construction stapler, a utility knife and a long straight edge, and you are ready to install it.

The easiest method to install the radiant barrier is to cut it into lengths and staple it underneath the roof rafters. It is not important how neatly it is installed, but it is important to have adequate attic ventilation, preferably a combination of soffit and a ridge vent. When installing single-sided foil, face the reflective side down to take advantage of its low emittance. ■