

## Improving Existing Homes:

# Installing a Radiant Barrier in the Attic

**BUILDING AMERICA  
ENERGY PERFORMANCE BRIEF**



In hot climates, radiant barriers can cut cooling costs 8% to 12%. In this house, a flexible radiant barrier material was draped over the rafters before installation of the roof deck. The material also can be stapled to rafters from the underside (Photo Source: Universal Forest Products).

### When to Do This

When replacing the roof; any time you want to reduce energy bills and heat gain from the attic.

### Climate Essentials

Hot-dry and Hot-humid climates:  
reduces air conditioning costs.  
Cold and Marine climates:  
seldom cost-effective.

In hot climates, the sun's heat can push roof surface temperatures over 160°F. The roof's heat can radiate to the attic insulation and heat up the ceiling and living space below. This heat transfer can be reduced significantly by a radiant barrier, a foil-faced material installed under the roof that stops the transfer of heat.

If your home is in a hot-dry or hot-humid climate and has a roof that receives direct sunlight in summer, adding a radiant barrier can be cost-effective. Studies show that radiant barriers can cut cooling costs between 8% and 12% in hot climates (Melody 2005). However, radiant barriers are seldom cost-effective in marine climates, which have moderate temperatures, or in cold climates, where thick attic insulation already minimizes heat transfer. To estimate the benefit for your attic, see the U.S. Department of Energy's savings calculator at [http://www.ornl.gov/sci/ees/etsd/btrc/RadiantBarrier/rb\\_calc.shtml](http://www.ornl.gov/sci/ees/etsd/btrc/RadiantBarrier/rb_calc.shtml)

Building America scientists recommend two types of radiant barriers for existing homes. If a re-roofing project includes replacement of the roof deck, you can choose OSB sheathing with a foil underside. Your roofer should install it with the foil side facing down. If you are not replacing your roof deck, perforated radiant barrier sheeting can be attached to the truss chords or rafters in one of the two ways described below.

The radiant barrier material comes in rolls with a variety of tear-resistant backings. Products have foil on one or both sides; double-sided foil may offer little advantage over single-sided products. Be sure to buy a perforated product; it is less likely to trap vapor and cause moisture problems.

The effectiveness of a radiant barrier depends on proper installation, so it's best to use a certified installer. Your contractor should NOT install a radiant barrier in contact with attic floor insulation. Moisture will be trapped under the barrier, creating a risk of mold and wood rot.

## Durability & Health

A radiant barrier increases occupant comfort by cutting the amount of heat entering a home through the attic. It increases the durability of the air conditioner by reducing the cooling load.

## 2009 IECC

### Code Requirement for New Construction and Additions

The IECC has no code requirements for radiant barriers, but products should meet ASTM Standard C1313. Installing a radiant barrier does not change the amount of attic insulation required to meet codes.

In California, a radiant barrier can be one component of meeting the prescriptive requirements for cool roofs under Title 24, Section 152(f).

## References

Melody, Ingrid. 2005. (FSEC) *Radiant Barriers: A Question and Answer Primer*. <http://www.fsec.ucf.edu/en/publications/html/FSEC-EN-15/>

Southface Energy Institute. 2004. *Home Energy Projects*. <http://www.southface.org/ez/media/homeenergyprojects.pdf>

U.S. Department of Energy. 2011. *Energy Savers: Radiant Barriers*. [http://www.energysavers.gov/your\\_home/insulation\\_airsealing/index.cfm/mytopic=11680](http://www.energysavers.gov/your_home/insulation_airsealing/index.cfm/mytopic=11680)

U.S. Department of Energy. Accessed 9-8-11. *Radiant Barrier Fact Sheet: Installation Options*. Prepared by Oak Ridge National Laboratory. <http://www.ornl.gov/sci/ees/etsd/btrc/RadiantBarrier/rb4a.shtml>

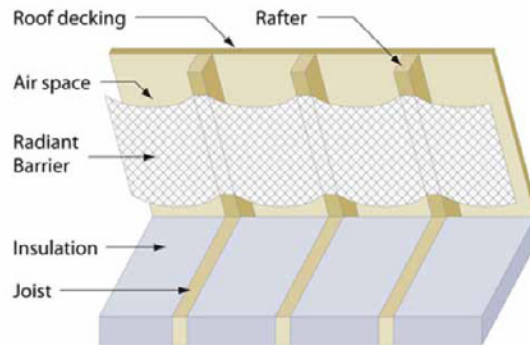
## For More Information

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 EERE Information Center  
 1-877-EERE-INF (1-877-337-3463)  
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## HOW TO INSTALL A RADIANT BARRIER: OPTION A

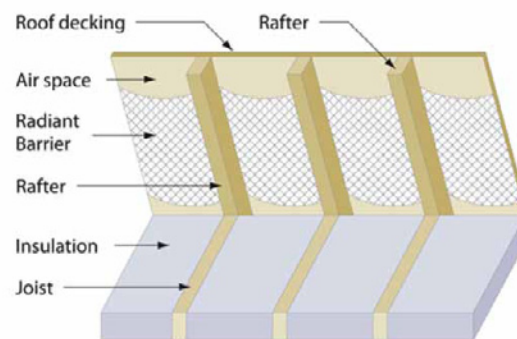
- 1 Staple the radiant barrier material, shiny side down, to the bottom of the rafters.
- 2 Follow the installation guidelines below.



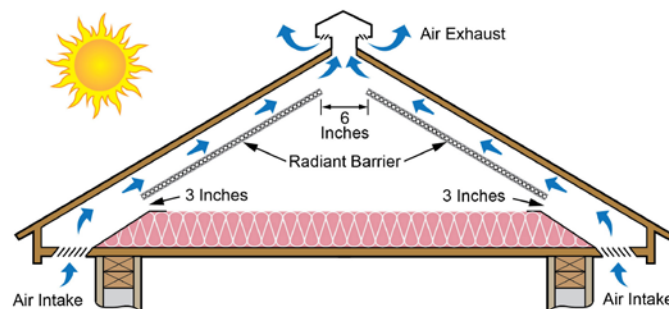
## HOW TO INSTALL A RADIANT BARRIER: OPTION B

This approach can be used only when the roof deck is being replaced.

- 1 Drape the material over the rafters, shiny side down.
- 2 Let the material droop between rafters to create a 3-inch space between the material and the roof deck.
- 3 Staple the material to the top of the rafters to keep it in place.
- 4 Follow the installation guidelines below.



## INSTALLATION GUIDELINES



To prevent moisture problems when installing a radiant barrier, leave adequate gaps for air flow above, below, and behind the barrier material.

- Leave a 1½-inch airspace between the radiant barrier material and the roof deck.
- Leave a minimum gap of 6 inches (measured horizontally) between sections of material at the roof peak.
- Keep the material at least 3 inches above the insulation on the attic floor.
- Do not cover any vents.
- Cut and patch around obstructions, maintaining a 3-inch distance from any hot surface, such as a chimney, furnace, or flue pipe.
- Overlap the seams by 2 inches. The seams do not need to be sealed.
- Cover the gable ends of the attic as well as the roof deck.