

DOE/CE-0335P
June 1991



Department of Energy
Assistant Secretary
Energy Efficiency and
Renewable Energy



Contents:

[Introduction](#)

[Effect of Radiant Barrier on Heating and Cooling Bills](#)

[Important Non-Energy Considerations](#)

[Installation Procedures](#)

[Appendix](#)

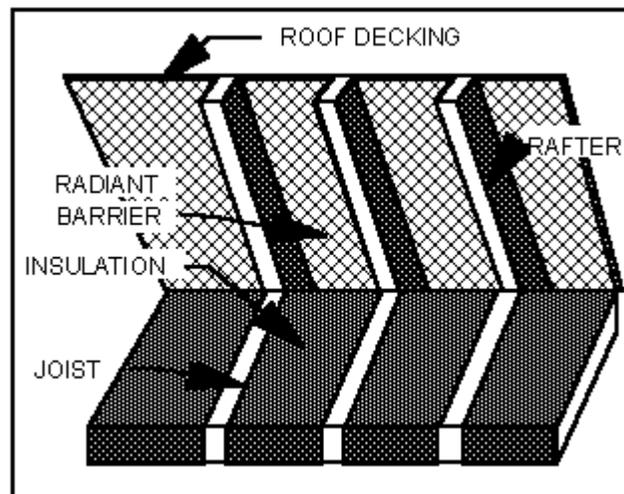
[Key to Abbreviations](#)

[Information Services](#)

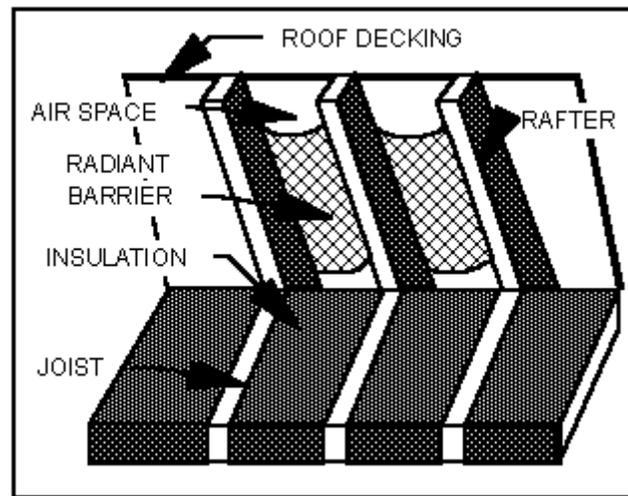
[About This Fact Sheet](#)

Installation Procedures

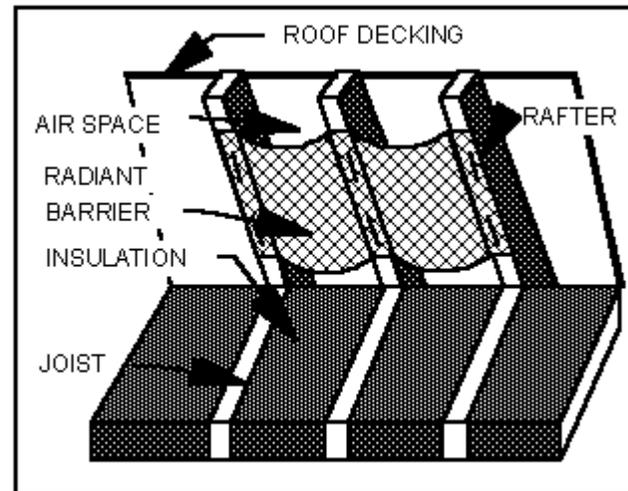
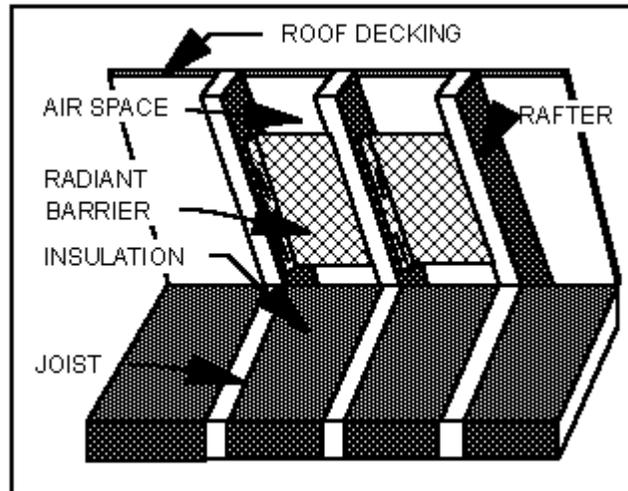
Most residential roofs provide some type of attic or airspace that can accommodate an effective radiant barrier system. In new residential construction, it is fairly easy to install a radiant barrier system. The following images show five possible locations for the installation of an attic radiant barrier system.



Location 1 is a relatively new application, where the radiant barrier material is attached directly to the underside of the roof deck.

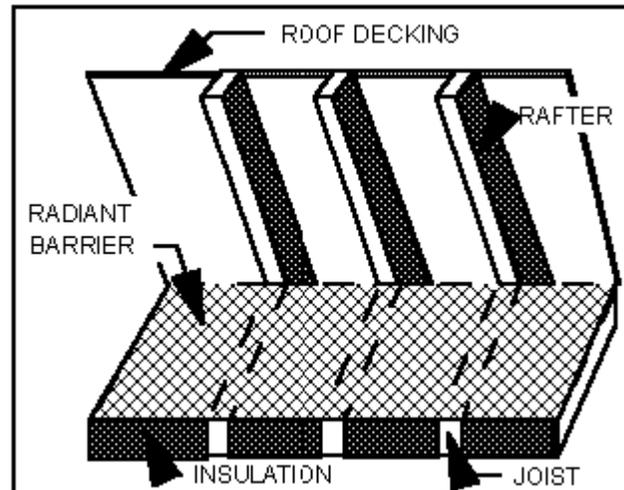


Location 2 may offer advantages to the builder during construction of a new house. Before the roof sheathing is applied, the radiant barrier is draped over the rafters or trusses in a way that allows the product to droop 1-1/2 to 3 inches between each rafter.



In Locations 3 and 4, the radiant barrier is attached to either the faces or bottoms of the rafters or top chords of the roof trusses. Locations 3 and 4 may be used with either new construction, or with retrofit of an existing house. With either Location 2, 3 or 4, the space between the roof sheathing and the radiant barrier provides a

channel through which warm air can move freely, as shown in [Figure 2](#).



In Location 5, the radiant barrier is laid out on the attic floor over the top of existing attic insulation. As discussed previously, this location is susceptible to the effects of dust accumulation. This location is not appropriate when a large part of the attic is used for storage, since the radiant barrier surface must be exposed to the attic space. Also, kitchen and bathroom vents and recessed lights should not be covered with the radiant barrier.

To obtain the best performance with radiant barriers installed in Locations 1 through 4, radiant barrier material should also be installed over the gable ends. For attics that are open to the space over garages or carports, the radiant barrier should extend eight feet or more into the garage or carport to achieve the same effect as installing a radiant barrier on the gable ends. It is not necessary to cover the gable ends with Location 5.

Radiant barriers that are reflective on one or both sides may be used with any of these locations. However, if the radiant barrier is reflective on only one side, the reflective side must face toward the main attic space for Locations 1 and 5. Since a surface facing downwards is less likely to have dust settle on it, it is also recommended that the reflective side face downwards toward the main attic space for Locations 2, 3, and 4.

Since proper attic venting is important to obtain the best performance of the radiant barrier, some modification in the attic vents may be required to achieve expected performance. Where no ridge or gable vents exist, it is recommended that one or the other be installed. Always check existing ridge vent systems to ensure that roofing paper is not blocking the vent opening, and check the soffit vents to ensure that they have not been covered with insulation.

When installing a radiant barrier, care should be taken not to compress existing insulation present in the attic. The effectiveness of the existing insulation is dependent upon its thickness, so if it is compressed, its R-value is decreased. For instance, an R-19 batt compressed to 3-1/2 inches (to top of 2X4 attic floor joists) would now be approximately an R-13 batt.

Safety considerations

- The installer should wear proper clothing and equipment as recommended by the radiant barrier manufacturer. Handling conventional insulation may cause skin, eye, and respiratory system irritation. If in doubt about the effects of the insulation, protective clothing, gloves, eye protection, and breathing protection should be worn.
- Be especially careful with electrical wiring, particularly around junction boxes and old wiring. Never staple through, near, or over electrical wiring. Repair any obvious frayed or defective wiring in advance of radiant barrier installation.
- Work in the attic only when temperatures are reasonable.
- Work with a partner. Not only does it make the job go faster, it also means that you'll have assistance should a problem occur.
- If the attic is unfinished, watch where you walk. If you step in the wrong place, you could fall through the ceiling. Step and stand only on the attic joists or trusses or the center of a strong moveable working surface.
- Watch your head. In most attics, roofing nails penetrate through the underside of the roof. A hard hat may be of some use.
- Make sure that the attic space is well ventilated and lighted.
- Do not cover any recessed lights or vents with radiant barrier material (attic floor application).

[Previous Section - Important Non-Energy Considerations](#)

[Next Section - Appendix](#)

[Building Envelope Research](#) [Oak Ridge National Laboratory](#)

For more information, contact the program manager for Building Envelope Research:

André O. Desjarlais
Oak Ridge National Laboratory
P. O. Box 2008, MS 6070
Oak Ridge, TN 37831-6070

E-mail [Andre Desjarlais](mailto:Andre.Desjarlais)

Revised: June 27, 2001 by Diane McKnight