

THE HOMEOWNERS JOURNAL

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THE DIFFERENCE BETWEEN HIGH PERFORMANCE AND GREEN HOMES

By **STEPHANIE EDWARDS-MUSA**

As Green Building begins to reach out and grasp the attention of consumers, builders, lenders, etc. The terms commonly used appear to be getting used interchangeably. I think this is creating confusion and misunderstanding. **It is very important to under-**

stand the marketing behind the words.

I was speaking with a builder earlier today about residential construction in the Green Community and we were talking about the differences between certain products. I thought it would be a good topic to write on. Here are the items that jumped out at me.

When Green Building first started it brought together many topics. Environmentally friendly, energy efficient, recycled products, low toxin and other products that are considered to make a healthier environment. Now that the number of products available grows, we are seeing various new categories develop:

- Energy-efficient - a good example would be [Energy Star](#)
- High performance - a good example would be one built with Insulated Concrete Forms or [ICF's](#)
- Green- built with a variety of products

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RADIANT BARRIER ATTIC FACT SHEET

US Department of Energy

What is a radiant barrier?

Radiant barriers are materials that are installed in buildings to reduce summer heat gain and winter heat loss, and hence to reduce building heating and cooling energy usage. The potential benefit of attic radiant barriers is primarily in reducing air-conditioning cooling loads in warm or hot climates. Radiant barriers usually consist of a thin sheet or coating of a highly reflective material, usually aluminum, applied to one or both sides of a number of substrate materials. These substrates include kraft paper, plastic

films, cardboard, plywood sheathing, and air infiltration barrier material. Some products are fiber reinforced to increase the durability and ease of handling.

Radiant barriers can be used in residential, commercial, and industrial buildings. However, this fact sheet was developed only for applications of radiant barriers in ventilated attics of residential buildings. For information on other applications, see the references at the end of the Fact Sheet.

How are radiant barriers installed in a residential attic?

Radiant barriers may be installed in at-

tics in several configurations. The simplest is to lay the radiant barrier directly on top of existing attic insulation, with the reflective side up. This is often called the attic floor application. Another way to install a radiant barrier is to attach it near the roof. The roof application has several variations. One variation is to attach the radiant barrier to the bottom surfaces of the attic truss chords or rafter framing. Another is to drape the radiant barrier over the tops of the rafters before the roof deck is applied. Still another variation is to attach the radiant barrier

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THE FURNACE GUY DOESN'T CLEAN YOUR CHIMNEY, AVOIDING A SOOTY PROBLEM.

By James Quarello
ASHI Certified Home Inspector

If I had a dollar for every time I heard the remark; I thought the furnace guy cleaned the chimney; well I'd be retiring sooner. The fact is the "furnace guy" cleans the furnace, boiler and or water heater, he never touches the chimney. That's a job for a chimney sweep.

The picture at the right is the chimney cleanout on a 1950s ranch style home. When looking at the chimney from the exterior during the beginning of the home inspection, there was a good amount of soot staining near the upper portion of the chimney. I remarked to my client this could be due to a dirty chimney or other causes. I explained I would put the pieces together once I got to the basement and checked the boiler and chimney on the interior.

As is clear from the picture the chimney was packed with years and years of soot accumulation. The flue may in fact be choked down to just a few inches from the soot buildup. This can cause the unit to run inefficiently and poorly vent the combustion gases. The possibility of combustion gases (CO) entering the house when the chimney is in this condition also increases. In extreme cases the

soot can build up to the point where it begins to block off the furnace flue entering the chimney.

The chimney flue that vents an oil fired appliance such as a water heater or heating unit should be cleaned about every 5-7 years. It is part of regular home maintenance and should not be neglected. The cost for cleaning a chimney is about \$125-\$150 per flue. Not a large expense since it is only necessary every few years.



Cleaning your chimney regularly will avoid a sooty mess, keep you and your family safe from combustion gases, and help the heating system run more efficiently.

radiation.

A closely related material property is the "reflectivity" (also called the "reflectance"). This is a measure of how much radiant heat is reflected by a material. The reflectivity is also a number between 0 and 1 (sometimes, it is given as a percentage, and then it is between 0 and 100%). For a material that is opaque (that is, it does not allow radiation to pass directly through it), when the emissivity and reflectivity are added together, the sum is one (1). Hence, a material with a high reflectivity has a low emissivity, and vice versa. Radiant barrier materials must have high reflectivity (usually 0.9, or 90%, or more) and low emissivity (usually 0.1 or less), and must face an open air space to perform prop-

erly.

On a sunny summer day, solar energy is absorbed by the roof, heating the roof sheathing and causing the underside of the sheathing and the roof framing to radiate heat downward toward the attic floor. When a radiant barrier is placed on the attic floor, much of the heat radiated from the hot roof is reflected back toward the roof. This makes the top surface of the insulation cooler than it would have been without a radiant barrier and thus reduces the amount of heat that moves through the insulation into the rooms below the ceiling.

Under the same conditions, a roof mounted radiant barrier works by reducing the amount of radiation incident on the insulation. Since the amount of radiation striking the top of the insulation is less than it would have been without a radiant barrier, the insulation surface temperature is lower and the heat flow through the insulation is reduced.

Radiant barriers can also reduce indoor heat losses through the ceiling in the winter. Radiant barriers reduce the amount of energy radiated from the top surface of the insulation, but can also reduce beneficial heat gains due to solar heating of the roof. The net benefits of radiant barriers for reducing winter heat losses are still being studied.

How does a radiant barrier differ from conventional attic insulation?

Radiant barriers perform a function that is similar to that of conventional

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RADIANT

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directly to the underside of the roof deck.

How do radiant barriers work?

Radiant barriers work by reducing heat transfer by thermal radiation across the air space between the roof deck and the attic floor, where conventional insulation is usually placed. All materials give off, or emit, energy by thermal radiation as a result of their temperature. The amount of energy emitted depends on the surface temperature and a property called the "emissivity" (also called the "emittance"). The emissivity is a number between zero (0) and one (1). The higher the emissivity, the greater the emitted



Radiant barrier installed onto under side of roof.

GREEN**From page 1**

• Homes with a mix of these. One example would be [LEED](#) where it starts with design like a high performance home and can use green products such as low VOC paints, recycled flooring, solar tube, solar panels, etc. Follow the link above to learn more about LEED Certified homes.

Now, for the difference between a High Performance Home and a Green Home. Can a home be both of these, absolutely, and often times they are. The purpose of this article is to be able to understand what the difference is between a home marketed as a High Performance Home and Green Home.

Jane Anne Narrin of EcoSteward Realty in North Carolina wrote an excellent article on High Performance Homes. To summarize, the High Performance Home starts with design. These homes are going to be a very tight construction called the "envelope". Due to the tight "envelope" the home will need more attention to air circulation and transfer of indoor/outdoor air. Indoor Air Quality (IAQ).

Here are some of the key points for a High Performance Home:

- Energy Efficiency
- Water Efficiency
- Indoor Air Quality Efficiency
- Site Planning and Lot Development
- Homeowner Education

These homes are what I would call, with my slang, an Ultra Efficient Home. You will see a difference in your Utility Savings and there should be a significant reduction in allergy and asthma symptoms. Believe it or not High Performance Homes built with Insulated Concrete Forms have shown that the larger the home, the more efficient it is. Typically these will not have Wood Framing which also makes the Fire Rating of these homes amazing.

Now, a Green Home. We have gone in past years from Green being only environmentally safe products, then Green was affected some by [Greenwashing](#), and now Green Products are even more environmentally

safe than typical products (i.e. recycled, less wasteful manufacturing, etc) and we are finding they are better for us too. Thus making the difference between a **High Performance Home and a Green Home**.

Here are some things you might find on/in a Green Home:

- Some WILL have wood framing
- Bamboo or recycled flooring
- Perhaps recycled insulation
- Grey water system (capturing rain water for household use)
- Geo-thermal technology
- Special roofing materials

This is just a short list. But you will see that a green home uses materials that are really green, like the recycled products. These will also be energy efficient while utilizing environmentally friendly products.

As I said earlier, there will be homes that combine features from both systems. I hope that I have cleared up some of the confusion so that now when you see High Performance Home or Green Built Home, hopefully you will have some ideas on what to look for. If you are wanting to build, pick out the aspects that are most important to you. It doesn't have to be one or the other. It could be [Hybrid](#) so to speak.

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insulation, in that they reduce the amount of heat that is transferred from the attic into the house. They differ in the way they reduce the heat flow. A radiant barrier reduces the amount of heat radiated across an air space that is adjacent to the radiant barrier. The primary function of conventional insulation is to trap still air within the insulation, and hence reduce heat transfer by air movement (convection). The insulation fibers or particles also partially block

radiation heat transfer through the space occupied by the insulation.

Conventional insulations are usually rated by their R-value. Since the performance of radiant barriers depends on many variables, simple R-value ratings have not been developed for them.

What are the characteristics of a radiant barrier?

All radiant barriers have at least one reflective (or low emissivity) surface, usually a sheet or coating of aluminum. Some radiant barriers have a reflective surface on both sides. Both types work about equally well, but if a one-sided radiant barrier is used, the reflective surface must face the open air space. For example, if a one-sided radiant barrier is laid on top of the insulation with the reflective side facing down and touching the insulation, the radiant barrier will lose most of its effectiveness in reducing heating and cooling loads.

Emissivity is the property that determines how well a radiant barrier will perform. This property is a number between 0 and 1, with lower numbers indicating better potential for performance. The emissivity of typical, clean, unperforated radiant barriers is about 0.03 to 0.05. Hence they will have a reflectivity of 95 to 97 percent. Some materials may have higher emissivities. It is not always possible to judge the emissivity just by visual appearance. Measured emissivity values should be part of the information provided by the manufacturer.

A radiant barrier used in the attic floor application must allow water vapor to pass through it. This is necessary because, during the winter, if there is no effective vapor retarder at the ceiling, water vapor from the living space may condense and even freeze on the underside of a radiant barrier lying on the attic floor. In extremely cold climates or during prolonged periods of cold weather, a layer of condensed water could build up. In more moderate climates, the condensed water could evaporate and pass through the radiant barrier into the attic space. While most uniform aluminum coatings do not allow water vapor to pass through them, many radiant barrier materials do allow passage of water

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RADIANT**From page 3**

vapor. Some allow water vapor passage through holes or perforations, while others have substrates that naturally allow water vapor passage without requiring holes. However, excessively large holes will increase the emissivity and cause a reduction in the radiant barrier performance. The ability to allow water vapor to pass through radiant barrier materials is not needed for the roof applications.

What should a radiant barrier installation cost?

Costs for an attic radiant barrier will depend on several factors, including the following:

- Whether the radiant barrier is installed by the homeowner or by a contractor.
- Whether the radiant barrier will be installed in a new home (low cost) or in an existing home (possibly higher cost if done by a contractor).
- What extra "features" are desired; e.g., a radiant barrier with perforations and reinforcements may be more expensive than a "basic" radiant barrier.
- Any necessary retrofit measures such as adding venting (soffit, ridge, etc.)

Whether the radiant barrier is installed on the attic floor or on the rafters.

Radiant barrier costs vary widely. As with most purchases, some comparison shopping can save you money. A survey of nine radiant barrier manufacturers and contractors representing 14 products, taken by the Reflective Insulation Manufacturers Association (RIMA) in 1989, shows the installed costs of radiant barriers to range as shown in [Table 1](#).

In some cases, radiant barriers are included in a package of energy saving features sold to homeowners. When considering a "package deal", you may want to ask for an itemized list that includes material and installation costs for all measures included. Then shop around to see what each item would cost if purchased individually before you make a decision.

What should conventional insulation

Escaping a Fire

By: BRUCE IRVING

To keep your family safe in case of fire, follow these tips to create an escape plan:

1. With your family, draw a diagram of your home. Mark all windows and doors and plan two escape routes from each room, one of which should be a door. If the edges, knob or hinges of a door feel warm against the back of your hand, use your alternate escape route.
2. Escape from a fire first and then dial 911 (or call the fire department) from a neighbor's house.
3. Pick an outdoor meeting place that is in view of the front door and at a safe distance from your home. Family members should know to head for the spot immediately and never go back inside for any reason.
4. Every home needs working smoke alarms on each floor and near each sleeping area. Test them each month and replace batteries at least once a year. Install new smoke alarms every five years. Push a test button to sound a smoke alarm so your family is familiar with the way it sounds.

cost?

Heating and cooling bills can also be reduced by adding conventional attic insulation. So that you can have some basis for comparison shopping, typical installed costs for adding various levels of insulation are given in [Table 2](#). These costs are typical for insulation installed by contractors. Actual insulation costs will vary from region to region of the country, will vary with the type of insulation selected (blown, or loose-fill, insulation is usually lower in price than "batt" insulation), and may vary from one local contractor to another. You can expect to deduct 20% to 50% for a do-it-yourself application.

You should always check with your local or state energy office or building code department for current insulation recommendations.



5. Check all windows to be sure they open easily. Security bar or safety guards should have quick release mechanisms that everyone in the house knows how to operate. Replace double-key deadbolts with locks that open from the inside without a key.

6. If your family sleeps on the house's second floor, consider purchasing escape ladders to provide additional exit routes. Many children over age five can use an escape ladder. If you can get to your children during a fire and need to use an escape ladder, help them out of the window first; carry very young children down with you.

7. Practice crawling during drills. In a real fire, the clearest air will be near the ground. Show children how to crawl on their hands and knees, keeping their heads 12 to 24 inches off the floor.

8. Teach children not to hide in a closet or under a bed. Tell them they cannot hide from fire and their number-one job is to get out of the house.

9. The ASPCA advises to keep updated stickers on your doors that let police and the fire department know that there are animals in the house in case you are out of the house when a fire starts, especially if your pets are confined to a crate during the day.

10. Practice the escape route every six months and correct any problems you encounter. Do at least one drill after everyone has gone to bed; the majority of home fire deaths occur between 10 PM and 8 AM.