



## THE HOME BUILDERS' DIFFERENTIAL INSULATION OF THE 90's AND BEYOND RADIANT BARRIER AND REFLECTIVE INSULATION

Many homeowners today are concerned with the energy efficiency of their homes as well as saving money. The hot summers and cold winters offer quite a challenge to technology, but there is a simple answer: **Radiant Barrier and Reflective Insulation!**

**What is Radiant Barrier?** Let's look at the reflective lining in a thermos bottle. When you put hot soup or coffee in a thermos it stays hot. When you put in cold milk or juice it stays cold. The temperature of the liquid is actually reflecting off of the lining to keep it hot or cold. An insulating foil material was also the choice for astronauts' suits to protect against severe heat and cold. Radiant Barriers are also used by firefighters to protect them against the brutally hot temperatures they encounter in the line of duty.

Now that we know a little about what radiant barriers are let's talk about how heat is conducted. There are three ways: by conduction, by convection and by radiation. Conduction refers to the transmission of heat by the passage of energy from particle to particle – they way heat is transferred directly as from a burner to a cooking pot. Convected heat refers to the transference of heat by movement of upward air current, such as the rising of heat. **Radiant heat** is gained by energy traveling in waves through the air in any direction, such as the sun shining down on a rooftop in hot summer months.

**Radiant heat accounts for up to 93% of the heat transfer in the summer and for as much as 50 – 75% even in the winter.**

Simply put, **Radiant Barrier and Reflective Insulation** reflect radiant heat flowing from any source that generated heat: fire, radiators and the **SUN**. In the summer, the sun will heat up the roof, and this energy will then radiate down through the attic space, through the mass insulation (which can only slow down the transfer of this heat, not stop it) and finally into your home.

This is what causes "hot spots" as well as home becoming hotter hours after the peak heat of the day has passed. However, with a Radiant Barrier System installed in the attic, 95 – 97% of this radiant heat can't get through to the interior.

Using **Radiant Barrier and Reflective Insulation** along with R-19 insulation you will definitely save energy, anywhere from 10 – 30% depending on the application and placement. Since **Radiant Barriers and Reflective Insulations** block heat in the summer, hot spots are virtually eliminated in the home, making it instantly more comfortable even at a higher thermostat setting. Since the heat is being blocked, the air conditioning unit will cycle less often, saving wear and tear as well as energy. In the winter, since up to 75% of the heat loss is radiant, a substantial reduction in heat loss will occur along with enhanced comfort.

Two prominent groups researched this information about Radiant Barriers. Studies by the Tennessee Valley Authority state that combined radiant barrier material with R-11 insulation has the same effect as R-19 insulation alone, and by adding radiant barrier to R-19 insulation it is the equivalent to having R-30 insulation alone. Florida Solar Energy Center specialist Philip Fairey states that the results from the studies performed on radiant barriers show that Radiant Barrier Systems can substantially improve the thermal integrity of attic spaces, and that a properly installed Radiant Barrier System with R-19 produced a lower annual energy consumption than R-30 alone.

The radiant barrier industry has grown significantly, but still has gained just a small fraction of acceptance in respect to the overall insulation industry. What holds the key to broad acceptance is awareness of "E-value," which measures the effectiveness of radiant heat transfer resistance – the emissivity, or ability to reflect radiant heat. For example, an E-value of .03 means that 97% of radiant heat is reflected. The industry hopes for a government rating system showing both R and E-values in the future and also that mortgage companies may get involved in recognizing and making allowances for utility efficiency.

Builders today must find differentials to aid in the selling of their homes. It seems much easier to sell the differentials rather than dealing directly with the selling price alone. The homeowner of the 90's wants to be energy efficient and save money on monthly utility bills. They want to enjoy greater comfort in their homes as well as reduce the amount of investment collars needed for heating and cooling equipment. This is a product that provides no nest support for rodent or insect pests, does not promote the growth of fungi or bacteria and meets all the fire and smoke safety requirements of most Federal, State and Local building codes.

Builders benefit from using **Radiant Barriers and Reflective Insulation** by handling a non-toxic and a non-carcinogenic product, which is clean, lightweight and easy to handle. No special tools, protective mask or clothing is required in the installation. Radiant Barrier products, created from reinforced aluminum foil, do not replace conventional insulation, but rather work together with it for superior energy savings. You would still need a good insulation barrier against noise, but you may be able to use less insulation to gain the same effective R-value. The reflecting properties of the radiant barrier conduct significantly less heat inside in the summer and allow less outside in the winter, thus less need for protection against conducted or convected heat. In summer, the reflective material radiates heat away from the attic or walls, and in winter it reflects heat back into living areas.

**Radiant Barrier and Reflective Insulations** are simple to install. It can be stapled to the roof rafters before building the roof decking. It can be laid over the mass insulation, wrapped around the exterior walls or used as a water heater jacket. It is important to have an adjacent air space for the radiant barrier to work effectively, preferable a  $\frac{3}{4}$ " space. (In all applications of **Radiant Barrier Systems**, it should be understood the foil must face an air space in order to perform properly. Without an air space, heat is transferred by conduction.) **Radiant Barrier** material comes perforated or non-perforated, and which to use depends on whether or not you want a vapor barrier.

The cost of **Radiant Barrier** material is nominal. Trade outs, however, make it a no cost addition – HVAC units may be downsized, other insulation may be reduced, and utility savings alone recoup the investment quickly.

America is driven by marketing, and the astute builder will recognize that spending a little extra in one area to save in another, and to ultimately pass on a benefit that will help the home buyer save every single day he lives in his house, is worth the investment. In a competitive industry, the homeowner being able to boast about lower monthly bills and greater comfort is sure to be a worthwhile word of mouth advertisement for the builder.