



REACH *barrier*™

Radiant Barrier  Proudly Made in the U.S.A.

Why Radiant Barriers & Reflective Insulation don't have R Values

An R-Value is a measurement of how effective a conventional insulation product is at *reducing* the transfer of heat, and the higher the R-Value, the better when comparing products.

However, what an R-Value measures is still a mystery to many people and therefore, causes confusion when discussing radiant barriers and how they reduce heat transfer.

Heat ALWAYS moves from a warm area to a cooler area and it does so using three different transfer methods:

- Conductive heat transfer – the transfer of heat through a substance or to another touching substance.
- Convective heat transfer – the transfer of heat through a fluid or gas such as heated air rising from a boiling pot of water.
- Radiant heat transfer – the transfer of heat across an air space (or vacuum).

An R-Value is the measurement of a material's ability to impede the transfer of heat and is based on product thickness and elapsed time for the heat to transfer from one side through to the other. Radiant barriers reflect radiant heat and therefore, R-Value tests are not applicable to radiant barriers per the Federal Trade Commission (FTC). Radiant barriers undergo reflectivity and emissivity testing instead.

Short history lesson on R-Values:

Up to 1945, an insulation materials resistance to heat flow was determined by calculating what is called the U-Factor. The *smaller* the U-Factor, the more effective the insulation was at resisting the transfer of heat. In 1945, the director of Penn State's Building Research Institute, Everett Shuman, proposed the R-Value, the opposite of U-Factor. The higher the R-Value of a product means a *greater* resistance to heat flows. Consumers better understand the concept that higher R-Values mean better resistance.

In the mid 1970's, as oil and gas prices were skyrocketing during what we now call the Energy Crisis of the 70's, there was a huge spike in the demand for residential insulation products to help control rising utility bills. As a result of this increased demand in insulation, many new manufacturers entered the marketplace in hopes of capitalizing on this booming economic trend.

With the increased number of competing insulation products and manufacturers making inflated and even fraudulent claims on the effectiveness of their insulation products, consumers were having a difficult time determining which products would be the most effective for their needs. Therefore, in 1979, the FTC intervened creating a "rule" that manufacturers, resellers, home builders and installers must follow when reporting the performance of their insulation products. This ruling was passed in

1980 and became known as the “R-Value Rule.” It also mandates the specific American Society of Testing Materials (ASTM) testing methods that must be followed to evaluate product R-Values.

Per the FTC ruling, “all types of insulation *except aluminum foil*” must be evaluated under specific ASTM testing methods to determine R-Values. Aluminum foil products (radiant barrier) are to be evaluated under reflectivity/emissivity ASTM testing. R-Values don’t exist for radiant barriers and therefore, are not subjected to the testing. They have reflectivity and emissivity values.

How R-Values Are Measured?

An R-Value is the measurement of how long it takes heat to transfer through a material from one side to the other. R-Values are evaluated for insulation materials in a controlled environment under the following conditions:

- 75 degrees F
- 50% relative humidity

The higher the R-Value, the better the insulation product is at *slowing down* the transfer of heat. However, it’s important to keep in mind that the insulation *doesn’t STOP* the transfer of heat – it only slows it down. The heat absorbed will eventually transfer through to the other side and into living spaces. And, as the temperature *or humidity* level increases, the *R-Value of a product decreases*, meaning it’s less effective at slowing down the transfer of heat. *The performance of radiant barriers is not affected by temperature or humidity*; they will always reflect the same amount of radiant heat regardless of temperature or humidity level.

While the standardization of an R-Value Rule by the FTC is widely considered a very important consumer protection regulation enacted by government, it is evaluated in a controlled laboratory and only for products that absorb/slow down the transfer of heat. Therefore, it isn’t the end-all to determining which product is the best for your application or how well it will perform in your specific home or building.

Radiant Barriers INCREASE the R-Value of Existing Insulation

Radiant barriers REFLECT radiant heat transfer, something that conventional insulation products don’t effectively deal with, and since studies have shown that a majority of heat gain/loss in a living space is due to radiant heat transfer (up to 93% in the summer and 75% in the winter), the addition of a radiant barrier to your home is a very wise decision; R-Value or not.

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However, while radiant barriers have no R-Value themselves, they DO actually increase the overall R-Value of other products when used in conjunction with them. Studies performed by the Tennessee Valley Authority found that a radiant barrier used with an R-11 insulation is the equivalent of having an R-19 insulation alone and that when used with an R-19 insulation, the radiant barrier improves the R-Value of the insulation to an R-30!

An even more impressive study conducted by the Florida Solar Energy Center found that adding a radiant barrier to an R-19 insulation actually produced a lower annual energy consumption than an R-30 alone.