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ENERGY SAVING SOLUTIONS

GREEN BUILDING MATERIALS AND PRODUCTS

FAQS About LOW-E® Insulation

Low-E® Reflective Insulation & Why It Works

The laws of physics tell us that there are three forms of heat transfer. They are convection, conduction and radiation. Convection is the movement of air upwards or sideways carrying heat toward a cooler point. Convection is visible as wavy lines above a hot road. In buildings, convection currents are more of a concern in the winter because we heat the interiors. During winter months convection can account for up to 45% of heat transfer, but almost nothing in the summer. Conduction occurs when heat travels to cold. It carries energy when two building materials come in contact. The roof is connected to the trusses, the trusses are connected to the drywall, etc. Conduction only accounts for between 5% and 7% of the heat transfer into a building. Radiation is electromagnetic waves that can only be seen as part of a rainbow. It travels at 186,000 miles per second. It's infrared frequencies travel in all directions seeking a cooler object to strike and then that object generates heat. Microwave ovens work on the same principle in that they heat the object not the sir. Radiant energy passes through most standard building materials including metal, wood, asphalt and fiberglass. Radiant energy is responsible for between 45% and 93% of the heat transfer in to, or out of a building.

What else should I know?

Before we talk about Low-E® Reflective Insulation we need to define two thermal values. The first being "R" the second being "E". An "R" value is technically described as resistance to conductive heat flow. Remember that conduction only accounts for up to 7% of the heat transfer. "R" values play such a small part in stopping the heat that is transferred into your building, maybe we should ask ourselves why we put so much importance on high "R" values. The "E" in Low-E® stands for a specification known as emissivity. Simply put, emissivity is the ability of a material to take energy applied to one side and re-radiate it off another. If you heat the inside of a cast iron radiator you can feel the heat come off the outside. Iron has an emissivity of approximately 85%. So 85% of the inside temperature is

transferred to the outside. The emissivity of wood is approximately 92%. The emissivity of steel is approximately 80%. The emissivity of asphalt is approximately 98%. The emissivity of glass, the most popular insulating material, is approximately 95%. It is easy to conclude that we have a major problem here. We can even make matters worse by throwing moisture into the mix. If these materials become wet from condensation or exterior leakage, conductive transfer of heat or cold can become accelerated and further reduce insulation performance.

Is there a solution?

If you remove a cooked turkey covered with an aluminum foil tent from the oven and place your hand directly over the foil; you notice very little heat. If you were to put your hand inside where the turkey is, the temperature would be at least 350 degrees and you would severely bum your hand. Pretty neat stuff that aluminum foil. You might ask yourself, "why doesn't someone make a building insulation that can stop heat transfer like the aluminum foil over my turkey?"

And then Low-E® Reflective Insulation was created

The primary function of Low-E® Reflective Insulation is to reduce the transfer of radiant energy. The materials that Low-E® Reflective Insulation is made from are polyethylene and aluminum. Our standard product consists of a 1/4" thick extruded, micro-cell polyethylene core that is waterproof, flexible and strong. The exterior surfaces are covered with polished reinforced aluminum. Our patented Low-E® Reflective Insulation does have a tested "R" value of 10.74, but more importantly, it's aluminum surfaces have an emissivity of 3%, which means that 97% of radiant heat frequencies are stopped and reflected back to their source. Most common or conventional insulations do their best to slow down the heat transfer, but no matter how thick they are, they have almost no ability to reflect radiant energy. In fact, they act like a battery, storing heat, then re-radiating it. Mass insulations can also store moisture which further reduces their capabilities to resist the transfer of thermal energy. For these reasons, by mid afternoon in the summer, buildings using only mass type insulation can become unbearably hot. Even large air conditioning units battle against the odds all day and put a serious drain on utility companies not to mention your wallet. By addressing only `R" values, manufacturers and consumers

have ignored the major problem facing insulation today. You guessed it, ...radiant heat transfer. By using Low-E® Reflective Insulation, you can reflect the heat back to the source. Therefore, buildings become more temperature consistent and more economical to operate, no matter what the season

What sizes does Low-E® Reflective Insulation come in?

Low-E® Insulation is produced in roll form and comes in widths from 16 inches to 6 feet. The average roll covers 500 square feet and weighs under 24 pounds. It is designed to be easy to handle and install. It also comes in several different thickness' ranging from 1/8 inch to 1/2 inch. The facings can be both sides foil or one side foil with the other side white polyethylene film. We also have an extended staple flange option that is useful in certain installations.

Does Low-E® Reflective Insulation do anything else?

Because Low-E® Insulation also acts as a vapor barrier, moisture problems are all but eliminated. Insects, birds and other vermin won't find it to be a suitable habitat, and it is completely safe to work with. There are no fibers to stick in your skin or eyes, and no carcinogens to inhale. Because of it's construction, it will also seal around screws or nails that puncture it during installation. Low-E® Insulation also has sound deadening characteristics similar to mass insulation. Besides roofs and walls, Low-E® Reflective Insulation can be used to insulate pipes, ducts, cars, and trucks. Water heaters, crawl spaces, water beds, boats, basements, and foundations. Low-E® Insulation can be used under concrete, in radiant floors and wall heating applications, planes, buses and trains. The possibilities are endless, most of us here cut some for inside our snow boots in the winter. Oh, I almost forgot! Low-E® Reflective Insulation all but stops conductive and convective heat transfer also.

How do you install it?

A staple gun and utility knife are the only tools required for frame installation. Standard speed fasteners and tape are generally used in steel construction. Low-E® Reflective Insulation is being used as a stand alone

insulation and is being installed along with mass insulation. Because of its obvious advantages, Low-E® Reflective Insulation is rapidly becoming the preferred choice of top builders today.

Facts About Low-E® Reflective Insulation

Low-E® Reflective Insulation products do have a tested R-Value. The R-Value tests are the same ASTM standards that fiberglass products are tested by.

The 10. 75 (average R-11) R- Value was obtained by testing Low-E® draped, with a. 75" air space between the Low-E® Reflective Insulation and the metal roof panel.

Based on the ASHRAE 90.1 energy code standard in almost 1/3 of the United States an average installed R-Value of R-11 is acceptable.

NAIMA (North American Insulation Manufacturers Association) states that the installed R-Value for an R-19 of metal building fiberglass insulation run over the purlins and compressed is an R-11.

Based on research done in 1995 by the Florida Solar Energy Center, the Tennessee Valley Authority, the Oak Ridge National Laboratory, Texas A &M and several others showed that a properly installed (reflective) radiant barrier system with R-19 produced a lower annual energy consumption than R-30 alone in climates similar to Austin, TX. This research proves that fiberglass isn't the answer to stopping the tremendous amount of heat gain in tile hotter climates.

Even when outside temperatures exceed 100 degrees the Low-E® Reflective Insulation averages an internal building temperature of 80 degrees or less reducing heat stress on the workers or materials being stored in the building. The pure aluminum surfaces reflect heat away in the summer and keep it inside the building or fiberglass in the winter.

The performances of fiberglass insulation is greatly reduced in hotter humid climates because of the radiant heat gain and the moisture it absorbs. This moisture can damage the underside of a metal roof panel.

Every metal roof manufacturers specifications recommend a moisture barrier under their metal roof panel.

Low-E® Reflective Insulation has a perm rating of .008 and is truly effective in protecting the underside of a metal roof panel against moisture from condensation and wicking.

The micro-cell foam core won't wick moisture and is bird, mice and insect resistant.

Low-E® Reflective Insulation is also effective in cold climates. One layer of Low-E® and 1 layer of fiberglass will provide more overall thermal protection than 2 layers of fiberglass metal building insulation, while still meeting the building code R-Value requirements.

Low-E® Reflective Insulation can be installed alone and replace up to 3" of fiberglass insulation or in a combination system (between the fiberglass and the metal roof panel) to obtain higher R-Values and better performance. The Low-E® Insulation reflects the heat back into the fiberglass so the, fiberglass doesn't cool off and keep absorbing heat from the building, reducing heating bills in the winter.

When installing Low-E® Reflective Insulation alone you don't need to specify the pinch bars necessary to compress the fiberglass and when installed it won't cause the metal to oilcan.

Low-E® Reflective Insulation is a suitable substitute for vinyl-backed insulation in that it is comparable in both price and R-Value and it performs in a more acceptable manner.