COST EFFECTIVE

REFLECTS 97% RADIANT HEAT

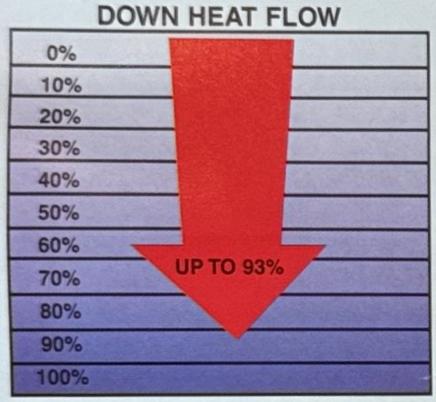
EFFICIENT

* THE NUMBER 1 CHOICE OF INNOVATIVE ENERGY CONSCIOUS BUILDERS !

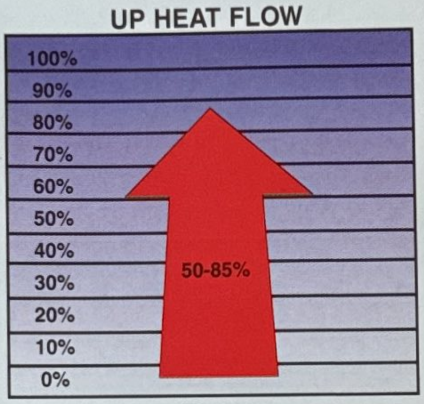
RADIANT BARRIER INSULATION SYSTEM FACTS

- PRODEX is an incredibly effective multilayer reflective insulation product that reflects 97% of radiant heat, the primary source of heat flow. Mass building insulation products are inferior in that they absorb and hold radiant heat.
- Reflective insulation is most effective when incorporated with at least a 3/4" airspace between the insulation and any adjacent materials. The R value of the system will vary dependent on the airspace size and the direction of heat flow, and the conductive and convective properties of surrounding materials.

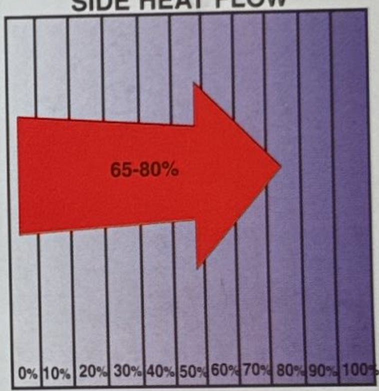
DOWN HEAT FLOW



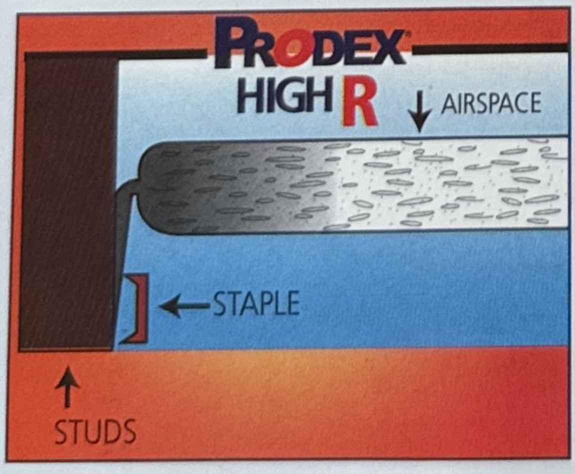
UP HEAT FLOW



SIDE HEAT FLOW



- PRODEX is waterproof and non-absorbent
- PRODEX provides Class A/Class 1 fire rated protection
- PRODEX provides 19 DB Soundproofing
- PRODEX does not mildew or promote fungus growth
- PRODEX does not provide nesting for birds, rodents or insects
- PRODEX is safe for workers to use as there are no fibers to breath or cause skin irritation
- PRODEX has more insulation value than 10" of common mass insulation products
- PRODEX can be stapled, nailed, glued or screwed



Easy to Use Staple Tabs

Easy to install

One Energy Place
Pensacola, Florida 32520

850.444.6111

GULF POWER
A SOUTHERN COMPANY

Consumer Information on Radiant Barriers

Glenn Langan
Gulf Power Mass Market

New Products (Prodex Radiant Barrier Test)

Prodex is a product that has emerged in the building community as a "new" radiant barrier with many uses. It is being promoted for use in the walls and attic. Prodex has been installed in the walls and attic of a home built by Wyatt, Inc. in Ft. Walton Beach FL.

Data loggers were placed in this test house as well as a second control house. The two houses of similar size were built using vinyl siding with R-13 fiberglass batts in the walls and R-38 blown fiberglass in the attic. The test house used Prodex High R Insulation in addition to the standard insulation package and was applied both in the walls as a house wrap (in lieu of Tyvek) and under the rafters as an attic radiant barrier.

The air-conditioners were set at 72 degrees in both houses and all other appliances were turned off. Electric meter readings were taken to measure energy used by each house. The 17-day test time frame was very short, and the weather was unfortunately mild with daily highs and lows ranging from 84 degrees to 46 degrees. The average temperature was 66 degrees.

The Prodex house maintained an average temperature of 69.8 degrees and 49.8 relative humidity. The control house maintained an average temperature of 69.2 degrees and 40.2 relative humidity. The house with Prodex High R Insulation had power usage of 130 Kilowatt-hours, while the control house had usage of 283 kilowatt-hours over the same17-day test period. Although the conditions for testing were not ideal and far from the normal scientific methodology, the results appear to be in line with other radiant barrier tests.

While Gulf Power does not endorse any particular brand of radiant barrier material, we do recognize the potential energy saving benefits of radiant barrier systems in Northwest Florida. We suggest that you look for a few common-sense characteristics when comparing different radiant barrier brands:

- Emissivity (the lower the better)
- Fire rating (as required by building codes)
- Ease of handling
- Strength of reinforcement
- Width appropriate for installation

"R" Fairy Tale

The Myth of Insulation Values

by David B. South

One of the fairy tales of our time is the "R-value." The "R-value" is touted to the American consumer to the point where it has taken a "chiseled in stone" status. The saddest part of the fairy tale is the R-value by itself is almost a worthless number.

It is impossible to define an insulation with a single number. It is imperative we know more than a single "R" number. So why do we allow the R-value fairy tale to be perpetuated? I don't know. I don't know if anybody knows. It obviously favors fiber insulation. Consider the R-value of an insulation after it has been submersed in water or with a 20 mile per hour wind blowing through it. Obviously the R-value of fiber insulations would go to zero. Under the same conditions, the solid insulations would be largely unaffected. Again R-value numbers are "funny" numbers. They are meaningless unless we know other characteristics.

None of us would ever buy a piece of property if we knew only one dimension. Suppose someone offered a property for $10,000 and told you it was a seven. You would instantly wonder if that meant seven acres, seven square feet, seven miles square, or what. You would want to know where it was -- in a swamp, on a mountain, in downtown Dallas. In other words, one number cannot accurately describe anything. The use of an R-value alone is absolutely ridiculous. Yet we have Code bodies mandating R-values of 20's or 30's or 40's. A fiber insulation having an R-value of 25 placed in a house not properly sealed will allow the wind to blow through it as if there were no insulation. Maybe the R-value is accurate in the tested material in the lab, but it is not even remotely part of the real world. We must start asking for some additional dimensions to our insulation. We need to know its resistance to air penetration, to free water, and to vapor drive. What is the R-value after it is subjected to real world conditions?

The R-value is a fictitious number supposed to indicate a material's ability to resist heat loss. It is derived by taking the "k" value of a product and dividing it into the number one. The "k" value is the actual measurement of heat transferred through a specific material.

Test to Determine the R-Value

The test used to produce the "k" value is an ASTM test. This ASTM test was designed by a committee to give us measurement values that hopefully would be meaningful. A major part of the problem lies in the design of the test. The test favors the fiber insulations -- fiberglass, rock wool, and cellulose fiber. Very little input went into the test for the solid insulations, such as foam glass, cork, expanded polystyrene or urethane foam.

The test does not account for air movement (wind) or any amount of moisture (water vapor). In other words, the test used to create the R-value is a test in non-real-world conditions. For instance, fiberglass is generally assigned an R-value of approximately 3.5. It will only achieve that R-value if tested in an absolute zero wind and zero moisture environment. **Zero wind and zero moisture are not real-world.** Our houses leak air, all our buildings leak air, and they often leak water. Water vapor from the atmosphere, showers, cooking, breathing, etc. constantly moves back and forth through the walls and ceilings. If an attic is not properly ventilated, the water vapor from inside a house will very quickly semi-saturate the insulation above the ceiling. Even small amounts of moisture will cause a dramatic drop in fiber insulation's R-value -- as much as 50 percent or more.

Vapor Barriers

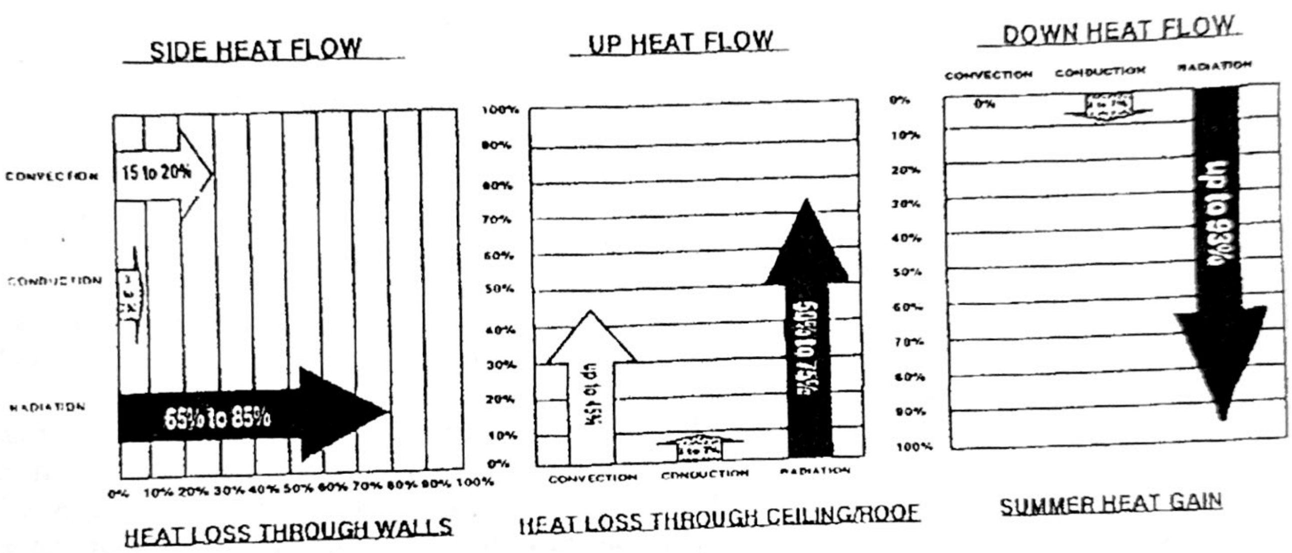
We are told, with very good reason, that insulation should have a vapor barrier on the warm side. Which is the warm side of the wall of a house? Obviously, it changes from summer to winter -- even from day to night. If it is 20 F below zero outside, the inside of an occupied house is certainly the warm side. During the summer months, when the sun is shining, very obviously the warm side is the outside. Sometimes the novice will try to put vapor barriers on both sides of the insulation. Vapor barriers on both sides of fiber insulation generally prove to be disastrous. It seems the vapor barriers will stop most of the moisture but not all. Small amounts of moisture will move into the fiber insulation between the two vapor barriers and be trapped. It will accumulate as the temperature swings back and forth. This accumulation can become a huge problem. We have re-insulated a number of potato storages which originally were insulated with fiberglass having a vapor barrier on both sides. Within a year or two the insulation would completely fail to insulate. The moisture would get trapped between the vapor barriers and saturate the fiberglass insulation to the point of holding buckets of water. Fiber insulation needs ventilation on one side; therefore, the vapor barrier should go on the side where it will do the most good.

PHYSICS OF FOIL
HEAT GAIN/LOSS IN BUILDINGS

There are three modes of heat transfer: CONDUCTION, CONVECTION, and RADIATION (INFRA-RED). Of the three, radiation is the primary mode; conduction and convection are secondary and come into play only as matter interrupts or interferes with radiant heat transfer. As the matter absorbs radiant energy, it is heated, develops a difference in temperature, and results in molecular motion (conduction in solids) or mass motion (convection in liquids and gas).

All substances, including air spaces, building materials, such as wood, glass and plaster, and insulation, obey the same laws of nature, and TRANSFER heat. Solid materials differ only in the rate of heat transfer which is mainly affected by differences in: density, weight, shape, permeability and molecular structure. Materials which transfer heat slowly can be said to RESIST heat flow.

Direction of heat transfer is an important consideration. Heat is radiated and conducted in all directions, but convected primarily upward. The figures below show modes of heat loss by houses. In all cases, radiation is the dominant mode.



CONDUCTION is direct heat flow through matter (molecular motion). It results from actual PHYSICAL CONTACT of one part of the same body with another part, or of one body with another. For instance, if one end of an iron rod is heated, the heat travels by conduction through the metal to the other end; it also travels to the surface and is conducted to the surrounding air which is another, but less dense, body. An example of conduction through contact between two solids is a cooking pot on the solid surface of a hot stove. The greatest flow of heat possible between materials is where there is direct conduction between solids. Heat is always conducted from warm to cold; never from cold to warm, and always moves via the shortest and easiest route.

In general, the denser a substance, the better conductor it is. Solid rock, glass and aluminum, being very dense are good conductors of heat. Reducing their density by mixing air into the mass and conductivity is also reduced. Because air has low density, the percentage of heat transferred by conduction through air is comparatively small. Two thin sheets of aluminum foil with about one inch of air space in between weigh less than one ounce per square foot. The ratio is approximately 1 of mass to

100 of air, most important in reducing heat flow by conduction. The less dense the mass, the less will be the flow of heat by conduction.

CONVECTION is the transport of heat within a gas or liquid, caused by the actual flow of the material itself (mass motion). In building spaces, natural convection heat flow is largely upward, somewhat sideways, and not downwards. This is called "free convection".

For instance, a warm stove, person, floor, wall, etc., loses heat by conduction to the cooler air in contact with it. This added heat activates (warms) the molecules of the air which expand, becoming less dense, and rise. Cooler, heavier air rushes in from the side and below to replace it. The popular expression "hot air rises" is exemplified by smoke rising from a chimney or a cigarette. The motion is turbulently upward, with a component of sideways motion.Convection may also be mechanically induced, as by a fan. This is called "forced convection".

RADIATION is the transmission of electromagnetic rays through space. Radiation, like radio waves, is invisible. Infrared rays occur between light and radar waves, (between the 3 - 15 micron portions of the spectrum.) Henceforth, when we speak of radiation, we refer only to infrared rays. Each material whose temperature is above absolute zero (-459.7 F.) emits infrared radiation, including: the sun, icebergs, stoves or radiators, humans, animals, furniture, ceilings, walls, floors, etc.

All objects radiate infrared rays from their surfaces in all directions, in a straight line, until they are reflected or absorbed by another object. Traveling at the speed of light, these rays are invisible, and they have NO TERMPERATURE, only ENERGY. Heating an object excites the surface molecules, causing them to give off infrared radiation. When these infrared rays strike the surface of another object, the rays are absorbed, and only then is heat produced in the object. This heat spreads throughout the mass by conduction. The heated object then transmits infrared rays from exposed surfaces by radiation, if these surfaces are exposed directly to an air space.

The amount of radiation emitted is a function of the EMISSIVITY factor of the source's surface. EMISSIVITY is the rate at which radiation (EMISSION) is given off. Absorption of radiation by an object is proportional to the absorptivity factor of its surface which is the reciprocal of its emissivity.

Although two objects may be identical, if the surface of one were covered with a material of 90% emissivity, and the surface of the other with a material of 5% emissivity, there would result a drastic difference in the rate of radiation flow from these two objects. This is demonstrated by comparison of four identical, equally heated iron radiators covered with different materials. Paint one with aluminum paint and another with ordinary enamel. Cover the third with asbestos and the fourth with aluminum foil. Although all have the same temperature, the one covered with aluminum foil would radiate the least [lowest (5%) emissivity]. The radiators covered with ordinary paint or asbestos would radiate most, because they have the highest emissivity, (even higher than the original iron.) Painting over the aluminum paint or foil with ordinary paint changes the surface to 90% emissivity.

Materials whose surfaces do not appreciably reflect infrared rays, for example: paper, asphalt, wood, glass and rock, have absorption and emissivity rates ranging from 80% to 93%. Most materials used in building construction - - regardless of their color, absorb infrared radiation at about 90%. It is interesting to note that a mirror of glass is an excellent reflector of light but a very poor reflector of infrared radiation. Mirrors have about the same reflectivity for infrared as a heavy coating of black paint.

The surface of aluminum has the ability NOT TO ABSORB, but REFLECT, 95% of the infrared rays which strikes it. Since aluminum foil has such a low mass to air ratio, very little conduction can take place, particularly when only 5% of the rays are absorbed.

TRY THIS EXPERIMENT: Hold a sample of FOIL INSULATION close to your face, without touching: Soon you will feel the warmth of your infrared rays bouncing back from the SURFACE. The explanation: The emissivity of heat radiation of the surface of your face is 99%. The absorption of aluminum is only 5%. It sends back 95% of the rays. The absorption rate of your face is 99%. The net result is that you feel the warmth of your face reflected.

REFECTIVITY AND AIR SPACES

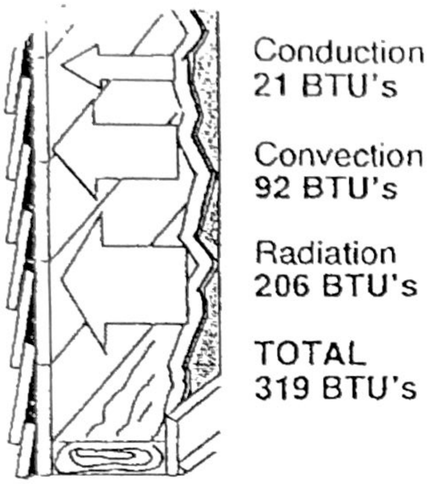
In order to retard heat flow by conduction, walls and roofs are built with internal air spaces.

Conduction and convection through these air spaces combined represent on 20% to 35% of the heat which pass through them.

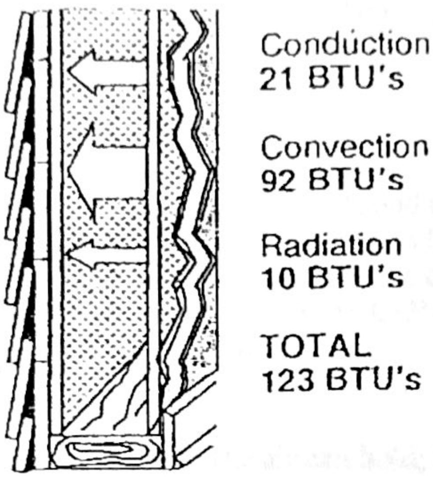
In both winter and summer, 65% to 80% of the heat that passes from a warm wall to a colder wall or through a ventilated attic does so by radiation.

The value of air spaces as thermal insulation must include the character of the enclosing surfaces. The surfaces greatly affect the amount of energy transferred by radiation, depending, on the material's absoptivity and emissivity, and are the only way of modifying the total heat transferred across a given space. The importance of radiation cannot be overlooked in problems involving ordinary room temperatures.

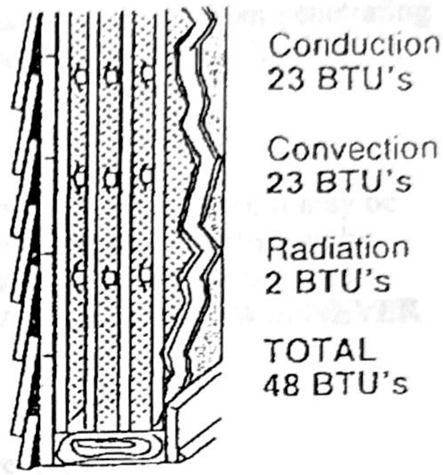
The following test results illustrate how heat transfer across a given air space may be modified. The distance between the hot and cold walls is 1½" and the temperatures of the hot and cold surfaces are 212° and 32°, respectively. In CASE 1, the enclosing walls are paper, wood, asbestos or other similar material. In CASE 2, the walls are lined with aluminum foil. In CASE 3, two sheets of aluminum foil are used to divide the enclosure into three ½" spaces.



Case 1. Uninsulated Wall Space. The surfaces of ordinary building materials including ordinary bulk insulation have a radiation or emissivity rate of about 90%, a heat ray absorption rate of over 90%. Air has low density so conduction is slight (only 21 BTU's). Convection currents transfer 92 BTU's



Case 2. The Same Wall Space Except that the inner surfaces were lined with sheets of aluminum foil of 5% emissivity and absorptivity. • Note the drastic drop in heat flow by radiation from 206 BTU's to 10 BTU's. Conduction and convection are unchanged. The original total heat loss of 319 BTU's drops to 123 BTU's.



Case 3. Two Sheets of 5% Emissive Aluminum Foil divide the wall space into 3 reflective compartments. Heat loss by radiation drops 94% from case 1. The 2 interior sheets retard covection so that its flow falls 75%. Conduction rises only 2 BTU's, from 21 BTU's to 23 BTU's. The total heat loss drops 85% from case 1.

Reflection and emissivity by surfaces can ONLY occur in SPACE. The ideal space is any dimension ¾" or more. Smaller spaces are also effective, but decreasingly so. **Where there is no air space, we have conduction through solids**. When a reflective surface of a material is attached to a ceiling, floor or wall, that particular surface ceases to have radiant insulation value at the points in contact. Therefore, care must be exercised, when installing FOIL INSULATION, that it be stretched sufficiently to insure that any inner air spaces are properly opened up and that metal does not touch metal. Otherwise, conduction through solids will result at the point of contact.

Heat control with aluminum foil is made possible by taking advantage of its low thermal emissivity and the low thermal conductivity of air. It is possible with layered foil and air to practically eliminate heat transfer by radiation and convection: a fact employed regularly by the NASA space program. In the space vehicle Columbia, ceramic tiles are imbedded with aluminum bits which reflect heat before it can be absorbed. "Moon suits" are made of reflective foil surfaces surrounding trapped air for major temperature modification.

HEAT LOSS THROUGH AIR

There is no such thing as a "dead" air space as far as heat transfer is concerned, even in the case of a perfectly air-tight compartment such as a thermos bottle. Convection currents are inevitable with differences in temperature between surfaces, if air or some other gas is present inside. Since air has some density, there will be some heat transfer by conduction if any surface of a so called "dead" air space is heated. Finally, radiation, which accounts for 50% to 80% of all heat transfer, will pass though air (or a vacuum) with ease, just as radiation travels the many million miles that separate the earth from the sun. Aluminum Foil, with its reflective surface can block the flow of radiation. Some foils have higher absorption and emissivity qualities than others. These variations run from 2% to 72%, a differential of over 2000%. Most aluminum insulation has only a 5% absorption and emissivity ratio. It is impervious to water vapor and convection currents, and reflects 95% of all radiant energy which strikes its air-bounded surfaces.

The performance of most aluminum insulation is unsurpassed for upward winter heat and it has an added efficiency for downward summer heat because of the absence of convection currents. **

HEAT LOSS THROUGH FLOORS

Heat is lost through floors primarily by radiation (up to 93%). When ALUMINUM insulation is installed in the ground floors and crawl spaces of cold building, it prevents the heat rays from penetrating down; reflecting the heat back into the building, thereby warming the floor surfaces. Since aluminum is non-permeable, it is unaffected by ground vapors.

CONDENSATION

Water vapor is the gas phase of water. As a gas, it will expand or contract to fill any space it may be in. In a given space, with the air at a given temperature, there is a limited amount of vapor that can be suspended. Any excess will turn into water. The point just before condensation commences is called 100% saturation. The condensation point is called dew point. CONDENSATION FORMS WHENEVER AND WHEREVER VAPOR REACHES DEW-POINT.

VAPOR LAWS

1. The higher the temperature, the more vapor the air can hold; the lower the temperature, the less vapor.
2. The larger the space, the more vapor it can hold; the smaller the space, the less vapor it can hold.
3. The more vapor in a given space, the greater will be its density.
4. Vapor will flow from areas of greater vapor density to those of lower vapor density.
5. Permeability of insulation is a prerequisite for vapor transmission; the less permeable, the less vapor transfer.

The average water vapor saturation is about 65%. If a room were vapor-proofed, and the temperature were gradually lowered, the percentage of saturation would rise until it reached 100%, although the amount of vapor would remain the same. If the temperature were further lowered, the excess amount of the vapor for that temperature in that amount of space would fall out in the form of condensation. This principle is visibly demonstrated when we breathe in cold places. The warm air in our lungs and mouth can support the vapor, but the quantity is too much for the colder air, and so the excess vapor for that temperature condenses and the small particles of water become visible.

In conduction, heat flows to cold. The under surface of a roof, when cold in the winter, extracts heat out of the air with which it is in immediate contact. As a result, that air drops in temperature condenses and the small particles of water become visible.

Water vapor is able to penetrate plaster and wood readily. When the vapor comes in contact with materials within those walls having a temperature below the dew point of the vapor, they form moisture or frost within the walls. This moisture tends to accumulate over long periods of time without being noticed, which in time can cause building damage.

To prevent condensation, a large space is needed between outer walls and any insulation which permits vapor to flow through. Reducing the space or the temperature converts vapor to moisture which is then retained. The use of separate vapor barriers or insulation that is also a vapor barrier are alternative methods to deal with this problem.

Aluminum is impervious to water vapor and with the trapped air space is immune to vapor condensation.

TESTING THERMAL VALUES

U FACTOR is the rate of heat flow in BTU's in one hour through one sq. ft. area of ceilings, roofs, walls or floors, including insulation (if any) resulting from a 1° F. temperature difference between the air inside and the air outside.

MEMORY JOGGER: U = BTU's flowing in ONE hour, through ONE sq. ft. for ONE degree change.

R FACTOR or RESISTANCE to heat flow is the reciprocal of U; in other words, 1/U. The smaller the U factor fraction, the larger the R factor, the better the insulation's ability to stop conductive heat flow. Note: neither of these factors includes radiation of convection flow.

There are at present two kinds of techniques generally used by accepted laboratories to measure thermal values: The guarded hot plate and the hot box methods. The results obtained seem to vary between the two methods. Neither technique simulates heat flow through insulation in actual everyday usage. Thermal conductivity measurements as made in the completely dry state in the laboratory will not match the performance of those same insulations under actual field conditions. Most mass type insulating materials become better conductors of heat when the relative humidity increases because of the absorption of moisture by the insulator. (Try keeping your feet warm in a pair of wet socks.) Therefore, mass insulations, which normally contain at least the average amount of moisture which is in the air, are first completely dried out before testing. In aluminum insulations, there is no moisture problem. **Aluminum foil is one of the few insulating materials that is not affected by humidity and, consequently, its insulating value remains unchanged from the 'bone dry' state to very high humidity conditions. The R Value of a mass type insulation is reduced by over 35% with only a 1½% moisture content. (i.e. From R13 to R8.3). The moisture content of insulation materials in homes typically exceeds 1½%!**

In spite of the advances made by space technology in insulation systems based on understanding and modifying the effects of radiation, no universally accepted laboratory method has yet been devised to measure and report the resistance to heat flow of multi-layer foil. Until such a method that will satisfy rigorous laboratory demands is devised, we must be content to make our judgments on the basis of common sense and experience.

There are many different types, grades, and qualities of aluminum foil insulation designed for a variety of applications. Matching the correct foil product to the specific job is extremely important to maximize final performance.

FLORIDA DREAMS EXTERIOR DESIGN

447C SOUTH CENTRAL DRIVE
FORT WALTON BEACH, FL 32547
850-864-1898(OFFICE) 850-864-5121(FAX)

TO MY FELLOW VINYL SIDING DISTRIBUTORS

My name is Dick M. Franks and I have been in the vinyl business for almost 30 years. The last 20 plus have been for myself with a company know as Florida Dreams Exterior Design in the panhandle of Florida. Over the years my company has put its products and/or services on over 17,000 job sites. Recently I came across the **Prodex High R Insulation Wrap** & was personally very impressed with the product & the applications I had seen it used for.

For this reason I made the decision to use Prodex as a direct sales feature to compliment the advantages of vinyl siding in the remodel market. To date I must say I have never used a product to enhance the sales price of a vinyl siding remodel job to a greater benefit for myself as well as the customer.

I have been extremely happy with **Prodex High R Insulation Wrap** in all aspects of my work from sales to the ease of application for installers but most importantly the benefits to the homeowner, which has lead to the word of mouth advertisement and many more jobs.

As one vinyl siding distributor to another I would highly suggest including **Prodex High R Insulation Wrap** to any vinyl siding job. The results will speak for their self.

Florida Dreams Exterior Design

Dick M. Franks
Owner

CROWN BUILDERS & DEVELOPMENT, INC.

September 20, 2001

Georgia Energy Conservation, Inc.
3385 Wellbrook Dr.
Loganville, Ga. 30052

Dear Mr. Williams:

I have recently finished a 4000 square foot commercial building in Grayson, Georgia for Mr. and Mrs. John Nash. The initial calculations for the HVAC was for 12 tons of air conditioning. After the prodex was added to the construction requirements and the 14.5 R value added to the wall calc. it was determined that the building could be cooled with only 9 tons. This significant savings more than paid for the cost of prodex and the installation costs.

I thought you would like to hear about this cost savings related to your new product.

Sincerely,

Jimmy R. Johnson

copy: Elmer Cook
Ft. Walton Beach, Florida

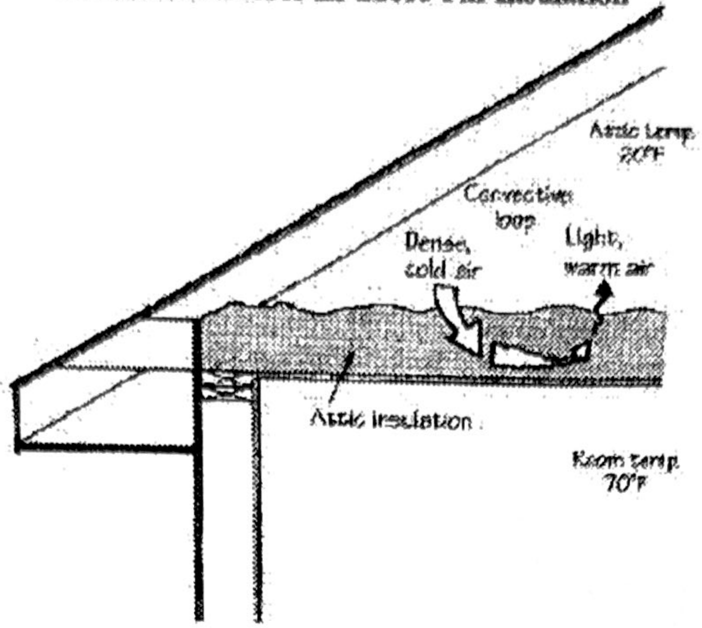
1988-B Dogwood Road • Snellville, GA 30278 • 770-921-1000

NATIONWIDE HOMES

At very cold temperatures, when the temperature difference across the attic insulation reaches a certain critical point, convection within the insulation can reduce R-value.

Nisson, J.D. Ned, JLC, "Attic Insulation Problems In Cold Climates" March 1992, pp. 42-43

Convection Losses In Loose-Fill Insulation



We understand air penetration through the wall of the house. In some homes when the wind blows, we often can feel it. But what most people, including many engineers, do not realize is that there are very serious convection currents that occur within the fiber insulations. These convection currents rotate vast amounts of air. The air currents are not fast enough to feel or even measure with any but the most sensitive instruments. Nevertheless, the air is constantly carrying heat from the underside of the pile of fibers to the top side, letting it escape. If we seal off the air movement, we generally seal in water vapor. The additional water often will condense (this now becomes a source of water for rotting of the structure). The water, as a vapor or condensation, will seriously decrease the insulation value -- the R-value. The only way to deal with a fiber insulation is to ventilate. But to ventilate means moving air which also decreases the R-value.

What is the R-value of a furnace filter?

The filter medium for most furnace filters is fiberglass -- the same spun fiberglass used as insulation. Fiberglass is used for an air filter because it has less impedance to the air flow, and it is cheap. In other words, the air flows through it very readily. It is ironic how we wrap our house in a furnace filter that will strain the bugs out of the wind as it blows through the house. There are tremendous air currents that blow through the walls of a typical home. As a demonstration, hold a lit candle near an electrical outlet on an outside wall when the wind is blowing. The average home with all its doors and windows closed has a combination of air leaks equal to the size of an open door. Even if we do a perfect job of installing the fiber insulation in our house and bring the air infiltration very close to zero from one side of the wall to the other, we still do not stop the air from moving through the insulation itself vertically both in the ceiling and the walls.