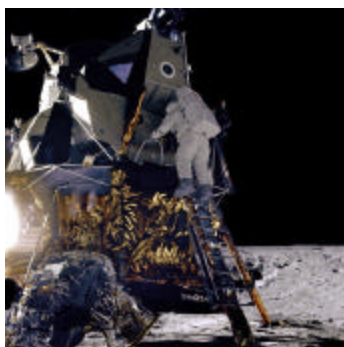


PACIFIC SOLAR TECHNOLOGIES

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K-SHIELD TECH BRIEF

In the mid-1950s, when Clark E. Beck, PE, of Wright-Patterson Air Force Base discovered and pioneered the development of radiant barrier technology for NASA and the space program, he couldn't have envisioned the variety of applications for which the insulation material would someday be used. But today, radiant barrier technology has been spun-off into products as diverse as energy-saving home insulation, candy wrappings, footwear inserts, and protective clothing.



The radiation barrier has been in use by NASA since the Gemini and Apollo missions. The insulation was the prime element of the environmental control system that allowed Apollo astronauts to work inside the Command Module

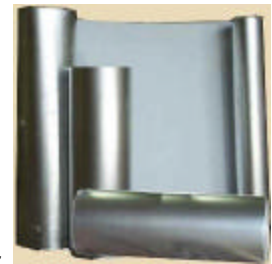
in short sleeves, rather than in bulky space suits. The material maintained constant, comfortable temperatures inside the spacecraft, while temperatures outside fluctuated from -273 degrees Celsius to +238 degrees Celsius. Made of aluminized polymer film, the material provided a reflective surface that kept more than 95 percent of the radiant energy from reaching the interior of the spacecraft.

In addition, the radiant barrier was used to reduce the required thickness of the astronauts' space suits. If it had not been for this barrier technology, the U.S. space suits would have been seven foot thick. Since the Gemini and Apollo missions, the

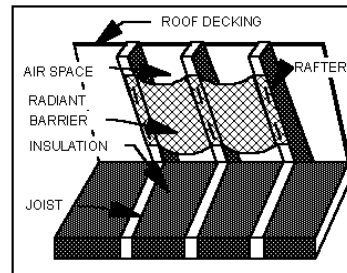
radiant barrier has been used on virtually all spacecraft, including unmanned missions where instruments require thermal protection. It is used in the current fleet of space shuttles to protect the onboard computers.

The material, called K-Shield, is made of 99 percent pure aluminum with a fire-resistant single or double-faced aluminum foil with a reinforcement of PE woven fabric to enhance tensile strength, tear resistant, and durability

All objects radiate heat - from wood to glass, and even ice. K-Shield works by reflecting 95-97 percent of radiant energy, which is the flow of invisible infrared rays from an object's surface. When installed in an attic, for example, it helps keep a building warmer in the winter and cooler in the summer, and is more environmentally friendly than traditional insulation such as fiberglass.



In new construction, the radiant barrier is placed between the wall studs and the exterior facing prior to the addition of aluminum, vinyl, or wood siding. In new roof installation, it is placed be-



tween the roof supports and the roof sheathing. When remodeling, the radiant barrier is stapled to the underside of the roof rafters or in some cases on top of insulation blankets

on the attic floor to reflect energy. Lowering attic temperatures—which can easily reach 160°F on a sunny day—reduces heat penetration into the living space below and is also a very cost-effective measure to lower air conditioning bills.

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Other Terrestrial Uses for Space Technology



Inside a structure, the material can be used to wrap hot water pipes or tanks, insulate and provide a vapor barrier for steam baths or saunas; insulate steam pipes, refrigerant lines, heating, ventilating, or air conditioning ducts; line refrigerated holds on fishing vessels or in food-transport trailers; and insulate boats and aircraft.

On farms, the material protects livestock in stalls and stables, and insulates poultry and rabbit facilities. It also may have application as liners beneath the pavement to bridges in areas where cold weather causes them to freeze over, and beneath golf courses and parks to wrap sprinkler pipes.

K-Shield has found uses for insulation in automobiles and trucks to protect passengers from engine, solar, and exhaust heat. NASCAR drivers use it to help protect them from the extremely high temperatures encountered in the vehicles' cockpits.

K-Shield has been used to help cure concrete as it prevents the surface of the concrete from drying out too soon.

The potential applications of this material are just beginning to be realized. Clothing can be made with the material as an insulator; fire fighters' protective suits incorporate K-Shield, as do subzero liners for sleeping bags and emergency care thermal blankets. In the food transportation and storage field, K-Shield is used in



refrigerated vans, railroad cars, picnic coolers, and pizza delivery bags. Seafood companies are using it to insulate bags and to line bulk containers. Shopping bags can be made out of it to transport grocery items such as chicken, pork, dairy products, etc that need to remain cold.

Sun Screens for cars are used to reduce the heat gain through the front windshield. It can also be draped in front of a large picture window of a house to block the sun in the late afternoon.

Campers can use it to reduce the amount of heat passing through their tents or tarps.

BUT by far the most wide use of Reflective Foil Radiant Barrier is in the construction and building industry. K-Shield comes in rolls that are 48" wide by 250 feet long or enough to cover 1000 square feet. It is both tear-proof and fire resistant. It also comes in either a solid or perforated rolls.



In order to see the difference call for an appointment and we will show you a hot box demo that clearly shows the difference with and without K-Shield. Our Energy Analysts can guide you as to the best application of K-Shield as well as other products that can reduce the heat gain in your home.

Call for a FREE ESTIMATE and cool your house while saving on utilities.

Pacific Solar Technologies

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