National Aeronautics and Space Administration

Infrared Light Reflectors Developed by NASA

… reject solar radiation so it does not become heat.

In the 1950s, when Clark E. Beck, PE, of Wright-Patterson Air Force Base discovered and pioneered the development of infrared light reflectors for NASA and the space program, he couldn't have envisioned the wide variety of future applications for reflective insulation materials. Today, aluminized infrared reflecting materials are used in energy-conserving building insulation, agricultural insulation, automobile insulation, protective clothing for firemen, and many others.

Fifty years ago, NASA was trying to find a way to protect astronauts from infrared energy radiating from the sun, which, if adsorbed, generates extreme temperatures. They calculated that a space suit would require seven-feet of conventional insulation, which works by slowing conduction and convection - both methods of heat flow. Obviously, this approach was out of the question.

They turned to reflecting infrared light back into space before it entered the suit, and thus avoided all of the problems posed after radiant energy converts to heat. They experimented with gold and silver, both good reflectors, but discovered that very thin layers of much less expensive aluminum foil worked as well.

Aluminum foil keeps the sun-drenched side of an astronaut cool because it reflects nearly all infrared radiation away from the suit. Aluminum foil keeps the dark side of an astronaut warm because it reflects nearly all infrared radiation emitted by his body heat back to him. Modern aluminized fabrics, weighing about ¼ oz. / sq. ft., maintain comfortable temperatures inside space suits. Aluminum foil, a prime ingredient in NASA's environmental control systems, allows astronauts to work in shirt sleeves.

Since the Gemini and Apollo missions, radiant barriers have been used on virtually all spacecraft, including unmanned missions where delicate instruments required protection from infrared light.