Supreme's Reflective Insulation Solutions

The radiant heat is invisible and has no temperature, just energy. When this energy strikes another surface, it is absorbed and increases the temperature of that surface. In summer, radiation from the sun strikes the outer surfaces of walls and ceilings and is absorbed causing the surface to heat up. This heat flows from the outer wall to the inner wall through conduction which is then radiated again, through the air spaces in the building, to other surfaces within the building. Radiation between surfaces is through invisible, infra-red heat rays.

Mr. Atul Khanna, General Manager - Thermal Insulation Division, The Supreme Industries Ltd.

Different types of insulation products reduce the heat transferred by conduction, convection and radiation to varying degrees. As a result, each provides different thermal performance and corresponding "R" values. The primary function of reflective insulation is to reduce radiant heat transfer across open spaces, which is a significant contributor to heat gain in summer and heat loss in winter.

There are many types of materials that reduce heat gain and heat loss. Some materials provide greater resistance than others, depending on the mode of heat transfer: convection, conduction or radiation. Most insulation materials work on the principle of trapped air gas being a good insulator. Mass insulation like, 'INSUshield'- closed cell, FR crosslinked polyethylene foam, use cellular walls of plastics, Fibre glass wool uses glass fibers to reduce convection thereby decreasing the transfer of heat. These materials also reduce heat transfer by conduction due to the presence of trapped air. However, these products, like most building materials, have very high radiant transfer rates. Most building materials, including fiberglass, foam and cellulose have "E" values in excess of 0.70.

Reflective insulation typically has "E" values of 0.03 (again, the lower the better). Therefore, reflective insulation is superior to other types of insulating materials in reducing heat flow by radiation.

When reflective insulation is installed in building cavities, it traps air (like other insulation materials) and therefore reduces heat flow by convection thus addressing all three modes of heat transfer.

In all cases, the reflective material must be adjacent to an air space. Aluminum, when sandwiched between two pieces of plywood or between two concrete layers for example, will conduct heat at a high rate. The conductive insulation material should always be in contact with the substrate for better insulation.

Understanding a Reflective Insulation System (RIS)

A reflective insulation system is typically formed by layers of aluminum or a low emittance material and enclosed air spaces which in turn provide highly reflective or low emittance cavities (Air bubble film) adjacent to a heated region.

The performance of the system is determined by the emittance of the material(s), the lower the better, and the size of the enclosed air spaces. The smaller the air space, the less heat will transfer by convection. Therefore, to lessen heat flow by convection, a reflective insulation,

with its multiple layers of aluminum and enclosed air space(INSUreflector), is positioned in a building cavity (stud wall, furred-out masonry wall, floor joist, ceiling joist, etc.) to divide the larger cavity (3/4" furring, 2" x 4", 2" x 6", etc.) into smaller air spaces. These smaller trapped air spaces reduce convective heat flow.

Reflective insulation differs from conventional mass insulation in the following:

1. Reflective insulation has very low emittance values "E-values" (typically 0.03 compared to 0.90 for most insulation) which significantly reduce heat transfer by radiation
2. A reflective insulation does not have significant mass to absorb and retain heat
3. Reflective insulation has lower moisture transfer and absorption rates, in most cases
4. Reflective insulation traps air with layers of aluminum & Air bubble film plastic as opposed to mass insulation which uses fibers of glass, particles of foam, or ground up paper
5. Reflective insulation does not irritate the skin, eyes, or throat and contains no substances which will out-gas
6. The change in thermal performance due to compaction or moisture absorption, a common concern with mass insulation, is not an issue with reflective insulation.

Supreme's Thermal Insulation Division offers solutions in the following areas:

- Ducting insulation in hospitals, shopping malls, airports, PEBs, IT/BPO etc.
- Pipe insulation for split AC tubings, chiller piping, drain pipes, chilled water lines etc.
- Floor insulation in server rooms, data centres, medical and diagnostic centres, and control rooms for petrochemicals.
- Underdeck insulation in PEBs, textile units, malls, airports etc.
- Overdeck and wall insulation in commercial buildings, residential buildings, cold storages etc.

'INSUreflector' offered by Supreme is made of polyethylene Air bubble film (ABF) laminated with aluminum foil on one or both sides. The bright surface of the aluminum foil reflects 96 to 99 per cent infra-red radiation received by the surface of a heated slate roof. It protects the building from undesirable heat gain. The thin reflective foil having low emissivity and high reflectivity when installed with an air space restricts the transfer of far-infrared radiation making it an ideal material to be used for underdeck application.

'INSUshield' is a non-fibrous, fire retardant, closed cell, tri dimensional chemically crosslinked polyethylene foam XLPE. An ideal environment friendly insulation material, with a perfect solution for all your insulation needs for ducts, roofs, pipes, vessels, etc. The divergent advantages of 'INSUshield' are ease of installation, low thermal conductivity and good moisture and vapors resistance preventing microbial growth and optimum condensation protection.

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