



## Construction - Insulation

### Properties and Applications of Cross-Linked Polyethylene Foam materials

The term **thermal insulation** can refer to materials used to reduce the rate of heat transfer, or the methods and processes used to reduce heat transfer. **Heat transfer** is the passage of thermal energy from a hot to a colder body

Heat energy can be transferred by conduction, convection, radiation or when undergoing a phase change.

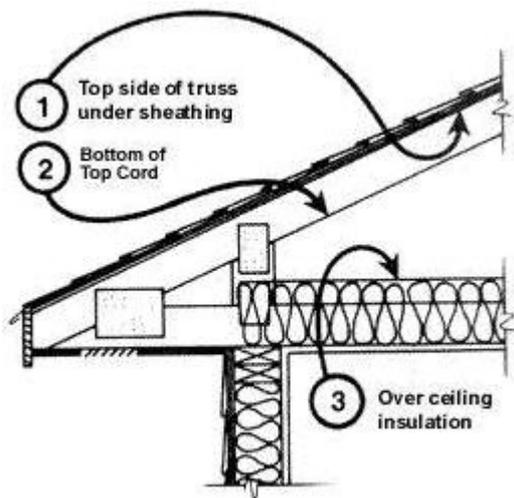
The flow of heat can be delayed by addressing one or more of these mechanisms and is dependent on the physical properties of the material employed to do this.

Other "Insulations" provided by Palziv Crosslinked Polyethylene foam products are Acoustic and Anti-Vibration insulation/dampening.



### Attics - Hot climates (1+2)

On a sunny summer day, solar energy is absorbed by a roof, heating the roof sheathing and causing the underside of the sheathing and the roof framing to radiate heat downward toward the attic floor. When a radiant barrier is placed directly underneath the roofing material incorporating an air gap, much of the heat radiated from the hot roof is reflected back toward the roof and the low emissivity of the underside of the radiant barrier means very little radiant heat is emitted downwards. This makes the top surface of the insulation cooler than it would have been without a radiant barrier and thus reduces the amount of heat that moves through the insulation into the rooms below the ceiling.



### Thermal conduction and conductive barriers

Conduction occurs when heat travels through a medium. The rate at which this occurs is proportional to the thickness of the material, the cross-sectional area over which it travels the temperature gradients between its surfaces and its thermal conductivity.

Most gases including air are poor conductors and good insulators.

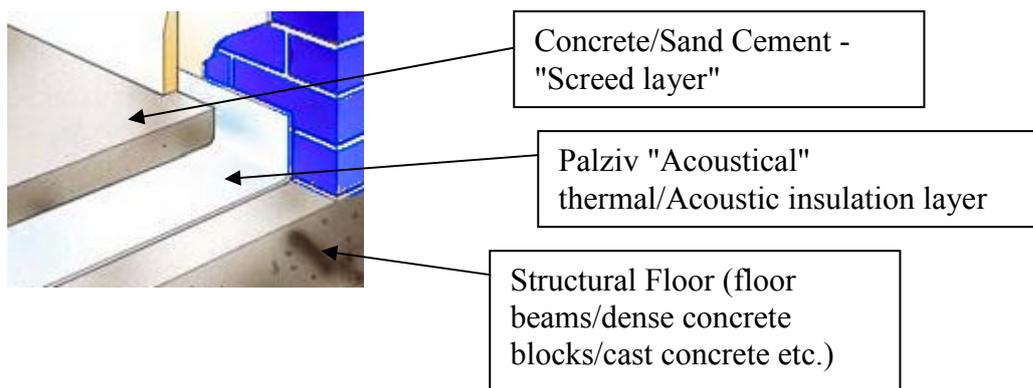
Conductive barriers often incorporate a layer or pockets of air to reduce heat transfer. Examples include XLPE foam and double glazed windows. Conductive heat transfer is largely reduced by the presence of the air-filled spaces (which has low thermal conductivity) rather than by the material itself. Metals exhibit high thermal conductivity and allow heat conduction to occur readily.

The effectiveness of a radiant barrier is negated if it abuts any material with high thermal conductivity. For instance reflective foil needs to be provided an adequate air gap to function adequately.

### **Ceilings - Thermal (and Acoustic) Insulation (3)**

Palziv's "**ACOUSTICAL**" product provides both a thermal and acoustic insulation answer between floors. The use of both Concrete and Sand with XLPE foam in-between improves the reduction of heat transfer between floors as well as the impact noise transferred to the lower floor stemming from movement on the upper floor.

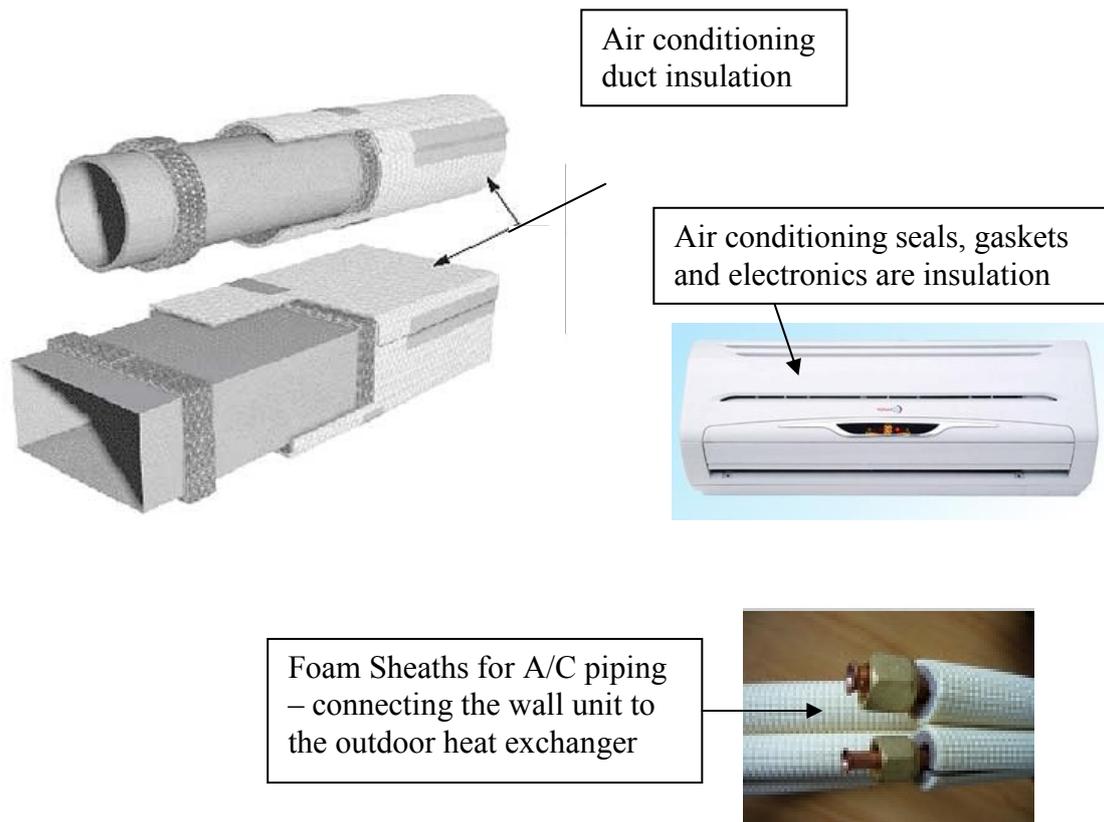
5-10mm of material can dramatically lessen the mass of concrete and sand used.



## Air Conditioning Insulation (4+5)

Cross Linked, Polyethylene Foam materials as produced by Palziv are regularly used by industry leaders for air-conditioning applications, including:

- Air duct insulation
- Compressor and electronics area insulation
- Parts, Seals and Gaskets



Fire retardant grades (ASTM E84 CLASS A , M1 (France), etc.) with added adhesives and release tapes allow the attaching of the XLPE foams to A/C ducting and within the wall units.

Ultra low water and humidity absorption rates, lowers the possibility of bacterial and fungal growth within the A/C unit.

Other uses of XLPE foam in pipe applications:

- 1) Heat insulation of pipe work in heating systems and plumbing installations
- 2) Acoustic insulation of sewage and drainage pipes
- 3) Anti Vibration insulation when there is a pulsed flow through the piping.



Piping, produced by heat welding XLPE foam sheet, has a variety of uses.

### **Garage door – Thermal insulation (7)**

XLPE foam adhered to a Metal garage door on the inside will give above average sound and thermal insulation.

