

Thermal Insulator

Through experiments, man has succeeded to develop materials used in constructing houses, residential complexes, etc .. He also managed to achieve the optimal use of these materials and to maximize its effectiveness.

Example: the rapid loss of room low temperature produced by the A/C just after switching it off in summer happens mostly through walls, ceilings and floors where outside temperature is higher than inside. Heat is usually transmitted from hot to cold surfaces. The completely opposite happens in winter since heat moves from inside the house after using the fireplace to low temperature outside leaving us feeling very cold and in dire need for heating.

Therefore, the solution is to prevent or reduce loss of heat through the development of a barrier which is the thermal insulator.

It is used in buildings causing less use of A/C in summer and fireplace in winter as it slows down the transmission of heat to and from the house.

For such advantages, we recommend the use of the thermal insulator.

First: What is Thermal Insulation?

It refers to a mixture of substances manufactured solely in different forms that resist heat transfer (known as thermal resistance) and as such, there won't be a need to produce a large amount of heat inside the house and thus saving energy.

Take, for instance, a thermally-insulated house to compare with a same non-insulated one, the first requires only half the energy consumed in the non- insulated house, because the heat produced from the internal sources of heating or ventilation remains without bulk loss through the non-insulated walls, apertures, and ceilings.

In other words, it takes for some people just half an hour to cool the house during summer while it may require for others three or more hours to cool the same area.

Second: The Advantages of the Thermal Insulator:

- Saves about 40% of the electric power consumed within a building.
- Protects the building materials against temperature inversion and thus prolongs building life time.
- Protects furniture against summer heat .
- Insulates the outside noise.
- Reduces demand on electricity especially during summer.
- Reduces electricity interruption rate.
- Fireproof.
- Environment friendly.



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Third: What are the Standards of Insulation Materials?

It should enjoy:

- Low heat conduction.
- Cohesive cells of a homogeneous composition.
- High resistance of water and vapor absorption.
- High resistance of rapid temperature inversion stress.
- High mechanical characteristics (i.e resisting of compression, bending, and break to be optimally used).
- Anti bacteria, mould, acids and other elements insulator might be exposed to where it is used.
- Fireproof.
- Reasonable cost.

Fourth: Methods of Building Thermal Insulation:

- The insulated bricks: ordinary brick with the insulation material at the center.
- Building two walls where the insulator is in between.
- Interior insulation: fixing the insulation material on walls from inside.
- The double wall: building two walls with the insulator in between
- The red insulator brick.

The following table displays a comparison between thermally insulated and non-insulated buildings during Summer:

Insulated Building	Non-insulated Building
The temperature of wall surfaces are almost like that of the room.	The temperature of wall surfaces are higher than that of the room by 8' °C.
Heat isn't transferred inside, thus people feel comfortable.	Heat is transferred inside to increase temperature
Ceiling temperature is about 27' °C	Ceiling temperature is about 32' °C
The AC compressor is not under a high load as the average of heat penetration inside the house is very low.	The AC compressor works at full capacity to compensate heat penetration.

Fifth: Insulating Glass:

The insulating glass plays a vital role in electricity conservation as it prevents heat from transferring inside the building.

A. Insulating glass in buildings:

1. View:

Some people looks for the visibility while others prefer to have an aesthetic decorative view using specific types of glass.

2. Lighting:

Among the advantages of the Insulating glass is the natural lightening it provides, and thus it saves electricity and the high



temperature ensued.

3. Screening from harmful rays:

Including ultraviolet and infrared rays.

4. Thermal insulation:

Using U-Value glass that reduces AC load and thus the electricity consumed.

5- Other purposes:

Such as lowering the outside noise, and preventing vapor condensation.

B. Rays types and the importance of the insulating glass:

1. Visual light rays:

The white or any other light that people usually prefer to enjoy the natural light through the window to reduce electricity consumption.

2. Ultraviolet rays:

Affects furniture colors and cause some health troubles so it's preferable to keep away or be screened from.

3. Infrared rays:

Raise temperature indoors and thus increases AC loads. It is recommended to be screened especially during Summer.

C. Selecting the insulating glass is determined according to:

- Visual light rate penetrating the room through the glass, windows should be high to reduce electric light dependency.
- Shading coefficient: should be low
The above items affect heat moves inside the room.
- Solidity: some types of glass are unbreakable and shockproof.
- Vapor condensation on glass can blur vision, so it needs cleansing
- Lowering outside noise to keep the calmness inside the building.
- Glass decorative aesthetic view, color, and shading.

Sixth: Thermal Insulation Cost:

Unfortunately, some people believe that thermal insulation costs much, and therefore they refrain from using it due to their financial inability.

On the contrary, studies on specific models of energy-saving buildings systems have found that the excess cost of thermal insulation may be recovered in a period of one up to four years at most as a result of saving fuel and electricity consumption. This significantly proves that the initial higher cost is nothing compared with the continuous cost paid for a comfortable life.

Also, this initial cost appears much less when compared with the other benefits one gets including both the comfortable life and work environments, and thus a higher productivity and lack of illness.



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