

# The Effectiveness of Thermal Insulation in Different Types of Buildings in Hot Climates

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(Received January 18, 2003)

**ABSTRACT:** Buildings are large consumers of energy in all countries. In harsh climatic conditions, a substantial share of energy goes to the air-conditioning of buildings. This air-conditioning load can be reduced through many means; notable among them is the proper design and selection of building envelope and its components.

The use of thermal insulation in building walls and roof does not only contribute in reducing the required air-conditioning system size but also in reducing the annual energy cost. Additionally, it helps in extending the periods of thermal comfort without reliance on mechanical air-conditioning especially during interseasons periods. Therefore, proper use of thermal insulation in buildings enhances thermal comfort at less operating cost. However, the magnitude of energy savings as a result of using thermal insulation vary according to the building type, the climatic conditions at which the building is located as well as the type, thickness, and location of the insulating material used. The question now is no longer should insulation be used but rather which type and how much.

The objective of this paper is to address the impact of building envelope thermal design on the effectiveness of thermal performance of buildings in hot climates. It emphasizes the role of proper material selection in achieving the desired objectives as a function of building type and climatic conditions.

**KEY WORDS:** building envelope, thermal insulation, building type, hot climate.