

Change of the Thermal Conductivity of Polystyrene Insulation in term of Temperature at the Mid Thickness of the Insulation Material: Impact on the Cooling Load

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Abstract : Accurate prediction of the cooling/heating load and consequently, the sizing of the heating, ventilating, and air-conditioning equipment require precise calculation of the heat transfer mainly by conduction through envelope components of a building. The thermal resistance of most thermal insulation materials depends on the operating temperature. The temperature to which the insulation materials are exposed varies, depending on the thermal resistance of the materials, the location of the insulation layer within the assembly system, and the effective temperature which depends on the amount of solar radiation received on the surface of the assembly. The main objective of this paper is to investigate the change of the thermal conductivity of polystyrene insulation material in terms of the temperature at the mid-thickness of the material and its effect on the cooling load required by the building.

Keywords : operating temperature, polystyrene insulation, thermal conductivity, cooling load

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