

[Keynote Talk]: Thermal Performance of Common Building Insulation Materials: Operating Temperature and Moisture Effect

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Abstract : An accurate prediction of the heat transfer through the envelope components of building is required to achieve an accurate cooling/heating load calculation which leads to precise sizing of the hvac equipment. This also depends on the accuracy of the thermal conductivity of the building insulation material. The proper use of thermal insulation in buildings (k-value) contribute significantly to reducing the HVAC size and consequently the annual energy cost. The first part of this paper presents an overview of building thermal insulation and their applications. The second part presents some results related to the change of the polystyrene insulation thermal conductivity with the change of the operating temperature and the moisture. Best-fit linear relationship of the k-value in term of the operating temperatures and different percentage of moisture content by weight has been established. The thermal conductivity of the polystyrene insulation material increases with the increase of both operating temperature and humidity content.

Keywords : building insulation material, moisture content, operating temperature, thermal conductivity

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