

Influence of Percentage and Melting Temperature of Phase Change Material on the Thermal Behavior of a Hollow-Brick

Authors : Zakaria Aketouane, Mustapha Malha, Abdellah Bah, Omar Ansari, Mohamed Asbik

Abstract : The present paper deals with the thermal performance of a hollow-brick filled with Phase Change Material (PCM). The main objective is to study the effect of percentage and melting temperature of the PCM on the thermal inertia and internal surface temperature of the hollow-brick. A numerical model based on the heat transfer equation and the apparent heat capacity method has been validated using experimental study from the literature. The results show that increasing the percentage of the PCM has a significant effect on time lag and decrement factor that define the thermal inertia; the internal temperature is reduced by 1.36°C to 5.39°C for a percentage from 11% to 71% in comparison to a brick without PCM. In addition, an appropriate melting temperature of 37°C has been deduced for the horizontal wall orientation in Rabat in comparison to 27°C and 47°C.

Keywords : appropriate melting temperature, decrement factor, phase change material, thermal inertia, time lag

Conference Title : ICEERET 2018 : International Conference on Energy Efficiency and Renewable Energy

Conference Location : Paris, France

Conference Dates : March 15-16, 2018