عنوان مقاله:

Numerical study of the effects of velocity and temperature in a vertical shell and tube energy storage system in a discharging process

نویسندگان:

Mansoor Shademan - *Department of Mechanical Engineering, University of Sistan and Baluchestan, Zahedan, Iran*

Alireza Hossein Nezhad - *Department of Mechanical Engineering, University of Sistan and Baluchestan, Zahedan, Iran*

خلاصه مقاله:

Using thermal energy storage systems (TESS) containing phase change materials (PCMs) is one of the productive strategies to store and/or release and reduce wasting energy. By using these strategies, in the critical conditions of energy producing systems, a balance between supply and demand is obtained. PCMs have the capability to store and/or release a large amount of thermal energy due to their high latent heat. In the present study, the effects of the heat transfer fluid (HTF) inlet temperature and velocity on the discharged energy and the discharging time in a vertically three-dimensional finned-tube and shell are studied numerically using the enthalpy-porosity technique and the Finite Volume Method (FVM). The results show that increasing the inlet temperature from ۲۸۳ [K] to ۲۹۳ [K] results in decreasing the discharged energy from the PCM by ۴.۷۴% and increasing the discharging time about ۲۵.۶۶%. Increasing the HTF inlet velocity from ۰.۰۵ [m/s] to ۰.۲ [m/s] results in decreasing the discharging time up to a maximum of ۴.۱۷%. With increasing the inlet velocity from ۰.۰۵ [m/s] to ۰.۲ [m/s], the discharged energy of the PCM is grown up to a maximum value of ۰.۳۳%.

کلمات کلیدی:

PCM, Fin, Shell and tube, Energy storage system, Discharging, Numerical

لینک ثابت مقاله در پایگاه سیویلیکا:

https://civilica.com/doc/1257081