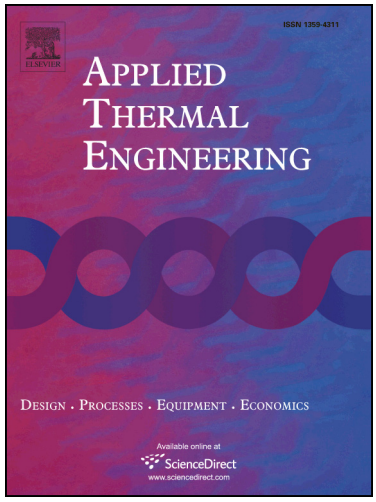

Research Paper

Enhance heat transfer for phase-change materials in triplex tube heat exchanger with selected arrangements of fins

H. Eslamnezhad, Asghar B. Rahimi

PII: S1359-4311(16)33158-1
DOI: http://dx.doi.org/10.1016/j.applthermaleng.2016.11.067
Reference: ATE 9478

To appear in: *Applied Thermal Engineering*

Received Date: 27 August 2016
Revised Date: 13 October 2016
Accepted Date: 8 November 2016

Please cite this article as: H. Eslamnezhad, A.B. Rahimi, Enhance heat transfer for phase-change materials in triplex tube heat exchanger with selected arrangements of fins, *Applied Thermal Engineering* (2016), doi: http://dx.doi.org/10.1016/j.applthermaleng.2016.11.067

Enhance heat transfer for phase-change materials in triplex tube heat exchanger with selected arrangements of fins

H. Eslamnezhad [1] Asghar B. Rahimi [2]

1. Graduate student, Ferdowsi University of Mashhad, P.O. Box No. 91775-1111, Mashhad, Iran
2. Professor, Ferdowsi University of Mashhad, P.O. Box No. 91775-1111, Mashhad, Iran (Corresponding Author: E-mail: rahimiab@um.ac.ir)

ABSTRACT

The use of new energy resources and inventing new methods for the sake of decline of energy usage are always important. The use of energy storage systems not only reduces energy consumption but also enhances system performance as well. One of the new and efficient methods in the field of thermal energy storage is use of phase-change materials that have high latent heat. In this paper, enhancement of heat transfer method using rectangular fin to melt the phase-change material in a triplex tube heat exchanger has been investigated numerically. A two-dimensional numerical model using fluent software is chosen and conduction and natural convection are taken into account in this simulation. The arrangement of the rectangular fins along the triplex tube heat exchanger is one of the most influential factors in the process of melting which has been studied and also the best type of this arrangement to increase efficiency of heat exchanger and reduce the time of melting of the phase-change material have been suggested in the form of different proposed models.

Key words: phase-change materials melting, heat exchanger, rectangular fins, heat transfer enhancement.

NAMENCLATURES:

Symbol	Name	Unit
C	Porous section constant	$kg / m^3 s$
c_p	Specific heat	$^{j}/_{Kg\,°C}$
g	Gravity	$^{m}/_{s^2}$