

Accepted Manuscript

Unsteady Heat Transfer from a Reservoir Fluid by Employing Metal Foam Tube, Helically Tube and Straight Tube: A Comparative Experimental Study

M. Nazari, N. Babazadeh baie, M. Ashouri, M.M. Shahmardan, A. Tamayol

PII: S1359-4311(16)31340-0
DOI: <http://dx.doi.org/10.1016/j.applthermaleng.2016.07.195>
Reference: ATE 8793

To appear in: *Applied Thermal Engineering*

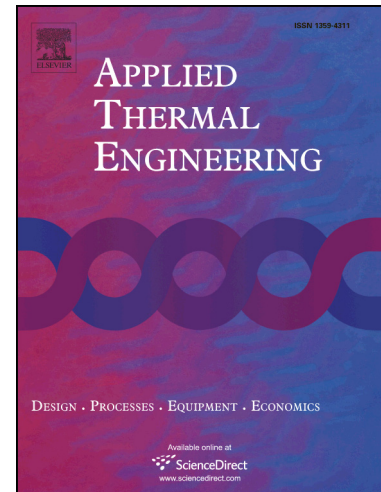
Received Date: 5 November 2015

Revised Date: 10 July 2016

Accepted Date: 30 July 2016

Please cite this article as: M. Nazari, N. Babazadeh baie, M. Ashouri, M.M. Shahmardan, A. Tamayol, Unsteady Heat Transfer from a Reservoir Fluid by Employing Metal Foam Tube, Helically Tube and Straight Tube: A Comparative Experimental Study, *Applied Thermal Engineering* (2016), doi: <http://dx.doi.org/10.1016/j.applthermaleng.2016.07.195>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Unsteady Heat Transfer from a Reservoir Fluid by Employing Metal Foam Tube, Helically Tube and Straight Tube: A Comparative Experimental Study

M. Nazari^a, N. Babazadeh baie^a, M. Ashouri^a, M.M. Shahmardan^a, A. Tamayol^{b*}

^a Department of Mechanical Engineering, Shahrood University of Technology, Iran;

^b Department of Medicine, Brigham and Women's Hospital, Harvard Medical School, Cambridge, MA 02139, USA.

*Corresponding Author, E-mail Address: atamayol@partners.org

Abstract. The main purpose of this study is to experimentally investigate the transient heat transfer from a fluid stored inside a closed reservoir. Different cooling methods, i.e. the use of metal foam embedded tube, helical tube, and a straight tube, are used and compared for heat transfer from the fluid reservoir. CuO/Water nanofluid in various volume fractions in the range of 0 to 0.2 (w/v) are also employed as cooling fluid. The experimental data shows a heat transfer enhancement of 42% and 45% for helical tube and metal foam tube respectively, as compared with the straight tube by using 0.2% (w/v) CuO/Water nanofluid. The experiments indicate that combination of the two presenting methods (metal foam /helical shape and nanofluids) has a significant capability to enhance the heat transfer rate. Finally, two correlations between Rayleigh number and non-dimensional heat flux are presented for the straight and porous tubes.

1. Introduction

Improvement of thermal performance of transient heat transfer in closed reservoirs is an important goal in various industrial applications such as food processing, heat recovery system, chemical processing [1] and solar water heating systems [2]. The convective heat

Download English Version:

<https://daneshyari.com/en/article/4992093>

Download Persian Version:

<https://daneshyari.com/article/4992093>

[Daneshyari.com](https://daneshyari.com)