

Accepted Manuscript

Research Paper

Experimental investigation of R410A and R32 falling film evaporation on horizontal enhanced tubes

Pu-Hang Jin, Chuang-Yao Zhao, Wen-Tao Ji, Wen-Quan Tao

PII: S1359-4311(17)36032-5

DOI: <https://doi.org/10.1016/j.applthermaleng.2018.03.060>

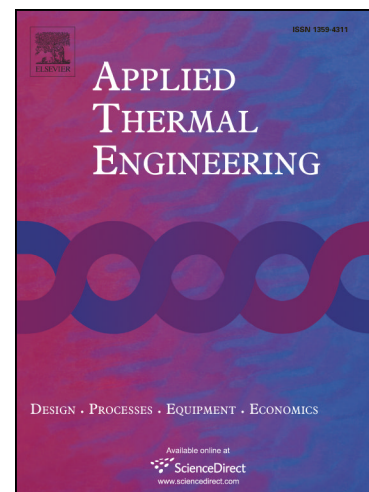
Reference: ATE 11948

To appear in: *Applied Thermal Engineering*

Received Date: 18 September 2017

Revised Date: 17 March 2018

Accepted Date: 20 March 2018



Please cite this article as: P-H. Jin, C-Y. Zhao, W-T. Ji, W-Q. Tao, Experimental investigation of R410A and R32 falling film evaporation on horizontal enhanced tubes, *Applied Thermal Engineering* (2018), doi: <https://doi.org/10.1016/j.applthermaleng.2018.03.060>

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.

Experimental investigation of R410A and R32 falling film evaporation on horizontal enhanced tubes

Pu-Hang Jin, Chuang-Yao Zhao, Wen-Tao Ji, Wen-Quan Tao*

Key Laboratory of Thermo-Fluid Science and Engineering, Ministry of education, School of Energy and Power Engineering, Xi'an Jiaotong University, Xi'an 710049, P. R. China

* Correspondent author, Tel: +86-29-82669106, Email: wqtao@mail.xjtu.edu.cn

Abstract

In this study, heat transfer performance on horizontal copper tubes of high pressure refrigerants R32 and R410A was investigated. An integrated fin (condensation enhanced) tube and three boiling enhanced tubes with 3-D different enhancement structures were tested. A plain tube was also tested for comparison. Effects of film flow rate, saturation temperature and heat flux on the falling film heat transfer coefficients were investigated. A tube bundle comprised of 6 enhanced boiling tubes was also tested to find the bundle effect. Experiments were carried out at saturation temperatures of 6, 10 and 16°C, heat fluxes from 20 to 150 kW·m⁻² and film flow rates from 0.01kg·m⁻¹·s⁻¹ to 0.14kg·m⁻¹·s⁻¹. It is found that the effect of film Reynolds number on HTC of enhanced tubes can be separated into two regimes, a quasi-plateau regime and a sharp decrease regime. HTCs increase with heat flux. Increase of saturation temperature has negligible effect on enhanced tubes as well as the tube bundle. The integrated fin tube performs best among the tubes tested. As a whole, R410A is inferior than R32. Tubes positioned below the top row possess the similar variation trend of HTCs with that of the first row but suffer an earlier dryout.

Key words: falling film evaporation, plain tube, enhanced tubes, nucleate boiling heat transfer, R410A, R32

Download English Version:

<https://daneshyari.com/en/article/7045501>

Download Persian Version:

<https://daneshyari.com/article/7045501>

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