

Accepted Manuscript

Title: Study on the effect of refrigerant distributing nonuniformity on the performance of falling-film evaporator with liquid recirculation system

Author: YingLin Li, Ke Wang, Wei Wu, XueYing Xia, BaoLian Niu, ZhongBin Zhang

PII: S0140-7007(17)30232-3

DOI: <http://dx.doi.org/doi: 10.1016/j.ijrefrig.2017.05.032>

Reference: IJR 3663

To appear in: *International Journal of Refrigeration*

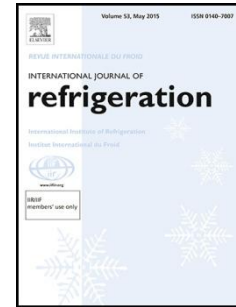
Received date: 18-9-2016

Revised date: 4-5-2017

Accepted date: 31-5-2017

Please cite this article as: YingLin Li, Ke Wang, Wei Wu, XueYing Xia, BaoLian Niu, ZhongBin Zhang, Study on the effect of refrigerant distributing nonuniformity on the performance of falling-film evaporator with liquid recirculation system, *International Journal of Refrigeration* (2017), <http://dx.doi.org/doi: 10.1016/j.ijrefrig.2017.05.032>.

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.



Study on the effect of refrigerant distributing nonuniformity on the performance of falling-film evaporator with liquid recirculation system

YingLin Li , Ke Wang, Wei Wu, XueYing Xia, BaoLian Niu, ZhongBin Zhang

(Engineering Laboratory for Energy System Process Conversion & Emission Control Technology of

Jiangsu Province , Nanjing Normal University, Nanjing, 210042, China)

*Corresponding author: Tel.: +86 025 85481140.

E-mail address: ylli@njnu.edu.cn (Y.L. Li).

Highlights

- A test facility of horizontal-tube falling-film water chiller is presented.
- New method of dividing liquid distributor into subzones is employed.
- Model of liquid distributing nonuniformity is proposed.
- Integrated falling-film factor to evaluate heat transfer is presented and analyzed.
- Liquid distributing nonuniformity coefficient is defined and discussed.

ABSTRACT

To investigate the effect of liquid distributing nonuniformity on the heat transfer of horizontal-tube falling film, a horizontal-tube falling-film air-cooled water chiller with an ejector liquid recirculation system (LRS) is presented, and then the finite difference model of the horizontal-tube falling-film evaporator is given. Also a new method of dividing the liquid refrigerant distributor into several subzones is proposed as well as the model of liquid refrigerant distributing nonuniformity established. The analysis results show that increasing the liquid spraying flowrate in a certain range is obviously valid for enhancing the evaporator capacity, and the suitable of R_1 is about 1.2, the corresponding value of φ is about 0.85. The analysis results also suggest that the higher the liquid recirculating ratio, the more the turning point of nonuniformity coefficient, and the turning point of nonuniformity coefficient is 0.1483 when the liquid recirculating ratio equals to 1.21. The performance of falling-film heat transfer is more sensitive to the number of subzones under the condition of higher nonuniformity coefficient, and a suggested optimal number of partitioned subzones is 4.

Download English Version:

<https://daneshyari.com/en/article/5017001>

Download Persian Version:

<https://daneshyari.com/article/5017001>

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