

## Accepted Manuscript

Title: Numerical investigation on optimal number of longitudinal fins in horizontal annular phase change unit at different wall temperatures

Authors: Xiaoling Cao, Yanping Yuan, Bo Xiang, Liangliang Sun, Zhang Xingxing



PII: S0378-7788(17)30939-8  
DOI: <https://doi.org/10.1016/j.enbuild.2017.10.029>  
Reference: ENB 8048

To appear in: *ENB*

Received date: 21-3-2017  
Revised date: 22-9-2017  
Accepted date: 5-10-2017

Please cite this article as: Xiaoling Cao, Yanping Yuan, Bo Xiang, Liangliang Sun, Zhang Xingxing, Numerical investigation on optimal number of longitudinal fins in horizontal annular phase change unit at different wall temperatures, Energy and Buildings <https://doi.org/10.1016/j.enbuild.2017.10.029>

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.

**Numerical investigation on optimal number of longitudinal fins in horizontal annular  
phase change unit at different wall temperatures**

Xiaoling Cao<sup>a</sup>, Yanping Yuan<sup>a,\*</sup>, Bo Xiang<sup>a</sup>, Liangliang Sun<sup>a</sup>, Zhang Xingxing<sup>b</sup>

<sup>a</sup> School of Mechanical Engineering, Southwest Jiaotong University, 610031, Chengdu, P. R.

China

<sup>b</sup> School of Industrial Technology and Business Studies, Dalarna University, SE-79188, Falun,

Sweden

\* Corresponding author, Phone: +86 13880871068, Fax: +86 2887634937,

E-mail: ypyuan@home.swjtu.edu.cn.

### **Highlights**

- The fin number has an optimal value for a specific boundary temperature.
- The heat transfer enhancement is more effective under a lower wall temperature.
- Number of fins beyond a value result in the decrease of heat transfer rate.
- The optimal number of fins is 10 in this study.

**Abstract:** The number, shape, and size of the fins utilized in a phase change unit form the key parameters affecting the heat transfer process in the unit. To the best of our knowledge, there are no relevant literature reports on the optimal number of fins in a horizontal annular phase change unit for different wall temperatures. To investigate the correlation between the number of fins and the wall temperature, in this study, based on a numerical simulation using the enthalpy-porosity model, we examine the phase-change material (PCM) melt with different numbers of installed fins ( $n = 4, 6, 8, 10, 12$ ) at five different constant wall temperatures. The

Download English Version:

<https://daneshyari.com/en/article/6729412>

Download Persian Version:

<https://daneshyari.com/article/6729412>

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