

## Accepted Manuscript

Heat transfer characteristics of a novel closed-loop pulsating heat pipe with a check valve

Chen Feng, Zhenping Wan, Haijun Mo, Heng Tang, Longsheng Lu, Yong Tang

PII: S1359-4311(18)30274-6  
DOI: <https://doi.org/10.1016/j.applthermaleng.2018.06.010>  
Reference: ATE 12281

To appear in: *Applied Thermal Engineering*

Received Date: 13 January 2018  
Revised Date: 6 May 2018  
Accepted Date: 3 June 2018

Please cite this article as: C. Feng, Z. Wan, H. Mo, H. Tang, L. Lu, Y. Tang, Heat transfer characteristics of a novel closed-loop pulsating heat pipe with a check valve, *Applied Thermal Engineering* (2018), doi: <https://doi.org/10.1016/j.applthermaleng.2018.06.010>

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.



# Heat transfer characteristics of a novel closed-loop pulsating heat pipe with a check valve

Chen Feng, Zhenping Wan\*, Haijun Mo, Heng Tang, Longsheng Lu, Yong Tang

*School of Mechanical and Automotive Engineering, South China University of Technology, Guangzhou 510640, PR China*

*Email address of the corresponding author: [zhpwan@scut.edu.cn](mailto:zhpwan@scut.edu.cn)*

## **Abstract**

A spring-loaded check valve controlling the one-way circulatory flow of the working fluid was integrated into an initial closed-loop pulsating heat pipe (CLPHP) to improve the thermal performance. The thermal performance of the CLPHP with a spring-loaded check valve (CLPHP/CV) was experimentally investigated and compared to the initial CLPHP. The initial CLPHP was made of a copper capillary tube with an inner diameter of 3 mm and ten spiral loops. The spring-loaded check valve was integrated into two locations in the initial CLPHP: between the two heating (CLPHP/CV<sub>h</sub>) sections and the two cooling (CLPHP/CV<sub>c</sub>) sections. Tests were conducted under three orientations: bottom, horizontal, and top heating modes. The CLPHP was charged with deionized water as the working fluid with a filling ratio of 60% by volume. The experimental results show that the check valve creates a one-way circulatory flow of the working fluid and facilitates the start-up of the CLPHP. A 25% decrease in thermal resistance of the CLPHP/CV is achieved compared with the initial CLPHP under top heating mode at a low heating load. Moreover, the check valve decreases the sensitivity of the CLPHP to its orientation, particularly when the check valve is integrated between the two heating sections.

**Keywords:** Pulsating heat pipe; Check valve; One-way circulatory flow; Heat transfer characteristic

Download English Version:

<https://daneshyari.com/en/article/7044970>

Download Persian Version:

<https://daneshyari.com/article/7044970>

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