

Accepted Manuscript

Research Paper

Test method for evaluating and predicting thermal performance of thermosyphon solar domestic hot water system

Weiqliang Kong, Zhifeng Wang, Xing Li, Guofeng Yuan, Jianhua Fan, Bengt Perers, Simon Furbo

PII: S1359-4311(18)33836-5

DOI: <https://doi.org/10.1016/j.applthermaleng.2018.09.086>

Reference: ATE 12695

To appear in: *Applied Thermal Engineering*

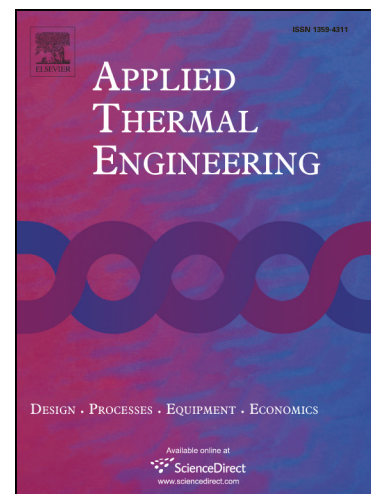
Received Date: 20 June 2018

Revised Date: 14 September 2018

Accepted Date: 21 September 2018

Please cite this article as: W. Kong, Z. Wang, X. Li, G. Yuan, J. Fan, B. Perers, S. Furbo, Test method for evaluating and predicting thermal performance of thermosyphon solar domestic hot water system, *Applied Thermal Engineering* (2018), doi: <https://doi.org/10.1016/j.applthermaleng.2018.09.086>

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.



Test method for evaluating and predicting thermal performance of thermosyphon solar domestic hot water system

Weiqiang Kong^{a*}, Zhifeng Wang^b, Xing Li^b, Guofeng Yuan^b, Jianhua Fan^a, Bengt Perers^a and Simon Furbo^a

^a *Department of Civil Engineering, Technical University of Denmark, Brovej, DK-2880 Kgs. Lyngby, Denmark*

^b *Key Laboratory of Solar Thermal Energy and Photovoltaic System, Institute of Electrical Engineering,*

Chinese Academy of Sciences, Beijing 100190, China

**Corresponding author: Weiqiang Kong*

Abstract

A test method for evaluating and predicting the thermal performance of thermosyphon Solar Domestic Hot Water (SDHW) system was proposed. The evaluating mathematical model of SDHW system was developed based on the two-node theory - a SDHW system was divided into the solid part and the fluid part. By combining the dynamic energy conservation equations of the solid part and the fluid part, the evaluating mathematical model of SDHW system was derived. The model parameters have clear physical meaning which can be used to evaluate the SDHW systems. The evaluating mathematical model was further processed by using the Laplace transformation technique and the predicting mathematical model was then derived. The predicting model can be used to predict the thermal performance of SDHW system for short and long term period with flexible draw off load conditions. The experimental method was designed and experiments were carried out to validate the test method. The measured mean fluid temperature in the storage tank was compared to the predicted mean fluid temperature. The annual thermal performance prediction of the system with two draw off load conditions at different daily hot water consumptions was also carried out.

Key words: solar domestic hot water system; thermal performance prediction; Laplace transformation method; thermosyphon solar water heater

Download English Version:

<https://daneshyari.com/en/article/11020796>

Download Persian Version:

<https://daneshyari.com/article/11020796>

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