

Accepted Manuscript

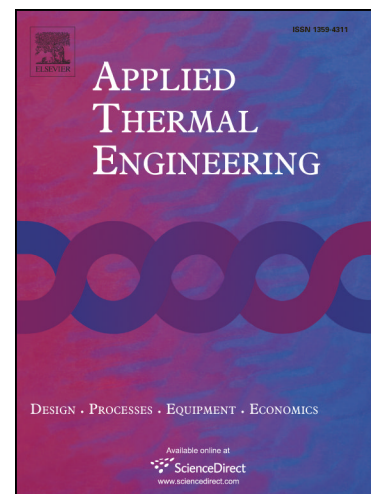
Simulation of Working Fluid Mass Distribution in Small-scale Organic Rankine Cycle System under Sub-critical Conditions

Yu Pan, Liuchen Liu, Tong Zhu

PII: S1359-4311(17)35832-5
DOI: <https://doi.org/10.1016/j.applthermaleng.2017.12.017>
Reference: ATE 11538

To appear in: *Applied Thermal Engineering*

Received Date: 11 September 2017
Revised Date: 9 November 2017
Accepted Date: 3 December 2017



Please cite this article as: Y. Pan, L. Liu, T. Zhu, Simulation of Working Fluid Mass Distribution in Small-scale Organic Rankine Cycle System under Sub-critical Conditions, *Applied Thermal Engineering* (2017), doi: <https://doi.org/10.1016/j.applthermaleng.2017.12.017>

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.

Simulation of Working Fluid Mass Distribution in Small-scale Organic Rankine Cycle System under Sub-critical Conditions

Yu Pan, Liuchen Liu, Tong Zhu*

School of Mechanical and Energy Engineering, Tongji University, Shanghai 201804, China.

*Corresponding author: Tel: +86 13816387430, E-mail addresses: zhu_tong@tongji.edu.cn, ztcfd@163.com.

Abstract

Distribution of working fluid mass will significantly impact off-design performance of the Organic Rankine Cycle. In this paper, both the evaporator and the condenser are divided into three different zones, and the impact of heat transfer correlations and void fraction models selection on the working fluid mass calculation results have been discussed. Afterwards, impact of evaporation and condensation temperatures on working fluid mass distribution in each zone calculated by proposed correlations and models have been evaluated. Four common working fluids which feature different physical properties are taken into account. Results indicate that the selection of heat transfer correlations and void fraction models shows great importance for the calculation of working fluid mass in condenser but rarely affects the calculation results in evaporator. Accordingly, condensation correlation of Shah (1979) and void fraction model of Premoli (1971) is proposed for the discussed system. Furthermore, in condenser the working fluid mass monotonically decreases as the condensation temperature increases, while in evaporator the working fluid mass firstly rises and then falls when the evaporation temperature increases. It can be found that the relevant evaporation temperature at which the largest working fluid mass occurs is related to critical temperatures of the employed working fluids.

KEYWORDS: Organic Rankine Cycle, working fluid mass, heat transfer correlation, void fraction model

Download English Version:

<https://daneshyari.com/en/article/7046290>

Download Persian Version:

<https://daneshyari.com/article/7046290>

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