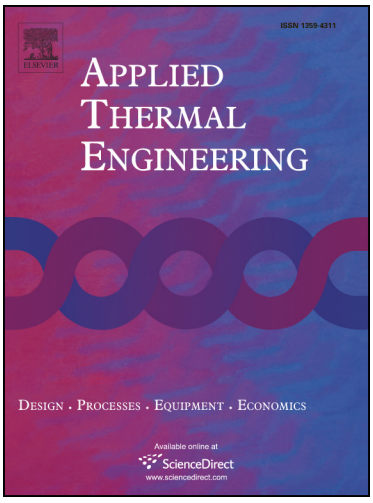

Numerical investigation of heat and mass transfer in partially blocked membrane based heat exchanger: effects of obstacles forms

S. Sabek, F. Tiss, R. Chouikh, A. Guizani

PII: S1359-4311(17)33014-4
DOI: https://doi.org/10.1016/j.applthermaleng.2017.11.019
Reference: ATE 11389

To appear in: *Applied Thermal Engineering*

Received Date: 3 May 2017
Revised Date: 24 September 2017
Accepted Date: 4 November 2017

Please cite this article as: S. Sabek, F. Tiss, R. Chouikh, A. Guizani, Numerical investigation of heat and mass transfer in partially blocked membrane based heat exchanger: effects of obstacles forms, *Applied Thermal Engineering* (2017), doi: https://doi.org/10.1016/j.applthermaleng.2017.11.019

Numerical investigation of heat and mass transfer in partially blocked membrane based heat exchanger: effects of obstacles forms

S. Sabek[1ab], F. Tiss[b], R. Chouikh[ab], A. Guizani[b]

(a) King Khalid University, Faculty of Science, Physics Department

P. O. Box 9004, Abha 61413, Saudi Arabia

(b) Thermal Process Laboratory Research and Technologies Center of Energy, Borj-Cedria Science and Technologies Park, BP 95, 2050 Hammam-lif, Tunisia

Abstract

The membrane based heat exchangers are a promising technology in air conditioning and energy recovery domains, in which they recover both sensible heat and moisture. In this paper, a comparison between different forms of obstacles (rectangular, triangular and circular), inserted in the geometry of the proposed membrane based heat exchanger, is presented. In order to evaluate their impacts on the heat and mass transfer distributions, a numerical model including the momentum, heat and mass transport equations is solved. The impacts of height channels ratio (R_H) on heat and mass transfer rates are also mentioned. The results show that the benefit of circular obstacles form is more important than that of other ones. In addition, a high height channels ratio (R_H) leads to a large air temperature and humidity ratio values in the outlet fresh channel. Also, the three dimensional model of the membrane

[1] Corresponding author. Tel.: + 216 22 734 582; fax: + 216 79 325 825.

E-mail address: seifennasr.sabek@gmail.com (S. Sabek).