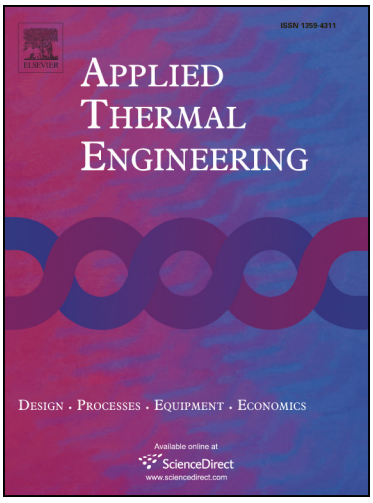

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PII: S1359-4311(17)36306-8
DOI: https://doi.org/10.1016/j.applthermaleng.2018.01.062
Reference: ATE 11716

To appear in: *Applied Thermal Engineering*

Received Date: 29 September 2017
Revised Date: 28 November 2017
Accepted Date: 18 January 2018

Please cite this article as: M. Samadifar, D. Toghraie, Numerical simulation of heat transfer enhancement in a plate-fin heat exchanger using a new type of vortex generators, *Applied Thermal Engineering* (2018), doi: https://doi.org/10.1016/j.applthermaleng.2018.01.062

Numerical simulation of heat transfer enhancement in a plate-fin heat exchanger using a new type of vortex generators

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Abstract

In this work, the effect of different vortex generators on fin-plate heat exchanger performance with a triangular channel cross-section is examined. The analysis is done using finite volume method. The effects of vortex generators in a channel are investigated by consideration of channel temperature and heat transfer coefficient. Six different vortex generators including a simple rectangular vortex generator (SRW), rectangular trapezius vortex generator (RTW), angular rectangular vortex generator (ARW), Wishbone vortex generators (WW), intended vortex generator (IVG) and wavy vortex generator (WVG) have been investigated. The observations suggest that simple rectangular vortex generator increases the heat transfer of fin-plate heat exchanger more than other models. This vortex generator increases heat transfer in the heat exchanger by 7%. However, vortex generators increase the pressure drop in heat exchanger. In addition, by increasing the height of the vortex generators the heat transfer rate is increased and the best angle of attack for the installation of vortex generator is 45^{o}.

Keywords: Heat exchanger, Fin-plate, Vortex generator, Heat transfer, Performance.