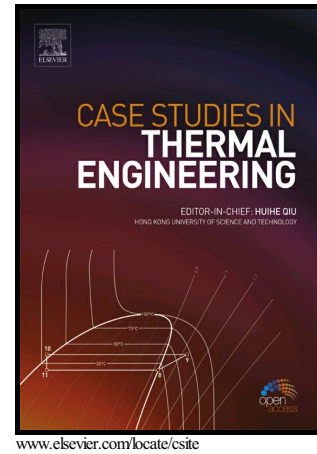


# Author's Accepted Manuscript

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PII: S2214-157X(17)30210-1  
DOI: <https://doi.org/10.1016/j.csité.2017.10.003>  
Reference: CSITE221

To appear in: *Case Studies in Thermal Engineering*

Received date: 24 August 2017  
Revised date: 5 October 2017  
Accepted date: 6 October 2017

Cite this article as: Muhammad Imran, Nugroho Agung Pambudi and Muhammad Faroq, Thermal and hydraulic optimization of plate heat exchanger using multi objective genetic algorithm, *Case Studies in Thermal Engineering*, <https://doi.org/10.1016/j.csité.2017.10.003>

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## Thermal and hydraulic optimization of plate heat exchanger using multi objective genetic algorithm

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### Abstract

In this paper thermal and hydraulic optimization of water to water chevron type plate heat exchanger is presented. The optimization is performed using the multi objective genetic algorithm in MATLAB optimization environment. Constrains matrix is a set of different geometrical parameters of plate heat exchanger within the logical bounds. The two objective functions are pressure drop of hot side and heat transfer. Due to conflicting nature of these objective functions, no single solution can satisfy both of the objective function simultaneously. The increase in heat transfer will result in increase in pressure drop, therefore, optimization results are presented as Pareto Front. Multi objective genetic algorithm tool was employed to find a set of optimum solution which was trade-off between pressure drop and heat transfer. At the end, sensitivity analysis was performed to analyse the effect of geometrical parameters of heat exchanger on thermal and hydraulic performance. The sensitivity results show that the heat transfer and pressure drop are greatly affected by the vertical port centre distance, plate spacing and number of thermal plates.

**Keywords:** Thermal optimization, hydraulic optimization, plate heat exchanger, multi objective genetic algorithm, heat transfer, pressure drop

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