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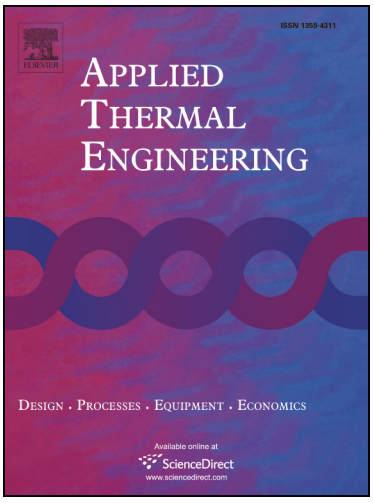


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PII: S1359-4311(17)36108-2
DOI: https://doi.org/10.1016/j.applthermaleng.2017.12.080
Reference: ATE 11601

To appear in: *Applied Thermal Engineering*

Received Date: 21 September 2017
Revised Date: 6 November 2017
Accepted Date: 21 December 2017

Please cite this article as: W. Wang, Y. Zhang, Y. Li, H. Han, B. Li, Multi-objective optimization of turbulent heat transfer flow in novel outward helically corrugated tubes, *Applied Thermal Engineering* (2017), doi: https://doi.org/10.1016/j.applthermaleng.2017.12.080

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# Multi-objective optimization of turbulent heat transfer flow in novel outward helically corrugated tubes

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## Abstract

This paper reports a triple-objective optimization of a novel outward helically corrugated tube to obtain the equilibrium performance for heat transfer, pressure drop, and energy benefit. The response surface method is employed to design the numerical work with three objective functions and three factors. Variance analysis and sensitivity analysis are performed to ensure the regression model and clarify the effect of each factor on the responses. The results show that the regression model obtained after removing the insignificant terms shows good agreement with the numerical data and the error is within ±10%. The Reynolds number (Re) has the most effect on Nusselt number (Nu), and its sensitivity coefficient is five times higher than that for corrugation pitch-to-diameter ratio ($pl/D$) and corrugation height-to-diameter ratio ($Hl/D$). The Pareto optimal solution is obtained by the multi-objective genetic algorithm (MOGA), which can be selected by the designer according to the operation

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