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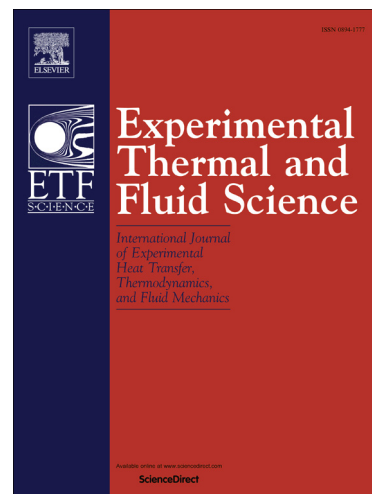
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A comprehensive second law analysis for tube-in-tube helically coiled heat exchangers

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Abstract: Despite the importance of exergy concept and also the wide applications of TTHC heat exchangers, no explicit-experimental exergy analysis has been performed for TTHC heat exchangers. Hence, in this paper the effects of flow, thermodynamic and geometrical parameters on exergetic characteristics (exergy loss, dimensionless exergy loss and second law efficiency) are experimentally investigated for these types of heat exchangers. Also, the first step of this paper presents the method which was employed to fabricate a TTHC heat exchanger for present study. Findings showed that, enhancement of hot or cold water flow rates, hot water inlet temperature and coil diameter increase the amount of exergy loss. Maximum augmentation of exergy loss is occurred in parallel flow configuration. The effect of coil pitch on exergy loss is negligible. The curve behavior of dimensionless exergy loss (e) is different from exergy loss (E). Higher hot water flow rate with lower inlet temperature and also lower cold water flow rate with higher inlet temperature can enhance the second law efficiency of heat exchanger.

Keywords: Exergy loss, Exergetic effectiveness, TTHC heat exchanger, thermodynamic parameters, geometrical parameters, flow parameters

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