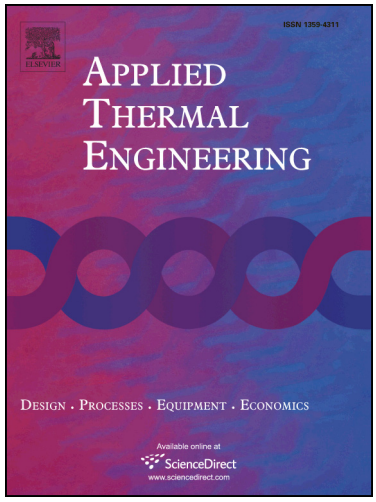

Research Paper

Fabrication method and thermal-frictional behavior of a tube-in-tube helically coiled heat exchanger which contains turbulator

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Fabrication method and thermal-frictional behavior of a tube-in-tube helically coiled heat exchanger which contains turbulator

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Abstract: No type of turbulator was used for tube-in-tube helically coiled (TTHC) heat exchangers in previous academic investigations or industrial applications. It seems that, the first challenge is related to the manufacture method of TTHC heat exchanger which contains turbulator. Hence, the first step of this paper presents a technique which was used to fabricate a TTHC heat exchanger with and without turbulator for this study. And then, the effects of aforesaid turbulator on thermal and frictional characteristics are experimentally investigated. Hot water was employed for outer tube of heat exchanger for all experiments in this research; and cold air flow or cold water flow were utilized as working fluids of inner tube. Memorable results were obtained in this study. Findings showed that, the use of turbulator only for outer tube (hot water side) increases the air side Nusselt number (inner tube) around 8-32%. The employment of turbulator only for inner tube (air side) enhances the Nusselt number around 52-81%. Utilization of turbulator for air side marginalizes the effect of water side turbulator and it has no longer tangible effect.

***Keywords*:** tube-in-tube helically coiled heat exchanger, experimental investigation, Nusselt number, friction factor, turbulator