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Heat transfer enhancement of shell-and-coiled tube heat exchanger utilizing helical wire turbulator

Davood Panahi, Kamiar Zamzamian

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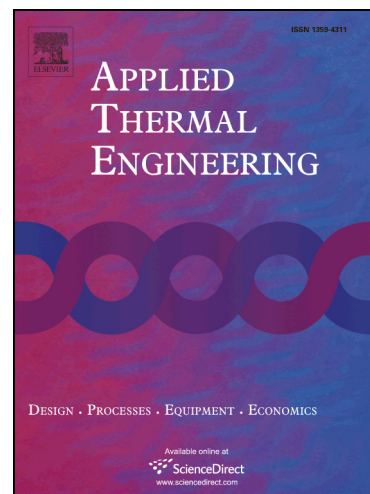
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1 Heat transfer enhancement of shell-and-coiled tube heat exchanger utilizing helical
2 wire turbulator

3 Davood Panahi ^a
4 Davoodp20@yahoo.com
5 Kamiar Zamzamian ^{a*}

6 *Corresponding Author Email, Zamzamian@iaut.ac.ir

7 ^a Department of Mechanical Engineering, Tabriz Branch, Islamic Azad University, Tabriz, Iran

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9 **Abstract:** In present study, a shell and coiled tube heat exchanger is experimentally
10 studied in which a helical wire has been placed inside the helically coiled tube as a
11 turbulator. The fabrication method of helically coiled tube which contains turbulator and
12 also the effects of turbulator on thermal and frictional characteristics of heat exchanger are
13 presented in this paper. Experiments were performed in two main modes. In first mode, the
14 fluid of coiled tube was water and in second mode the fluid of coiled tube was air. Each
15 mode was studied for both empty coiled tube (without turbulator) and with turbulator under
16 different fluid flow rates. The fluid of shell side was hot water for all cases. Findings
17 showed that this type of turbulator can be employed in coiled tubes which significantly
18 increased the overall heat transfer coefficient and obviously pressure drop. Overall heat
19 transfer coefficient, pressure drop, effectiveness and NTU are evaluated and discussed.

20 **Keywords:** shell-coiled tube heat exchanger, experimental investigation, pressure drop,
21 turbulator, heat transfer coefficient

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