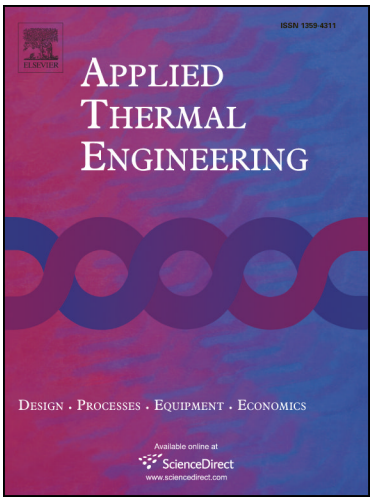

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Performance Evaluation and Exergy Analysis of a Double Pipe Heat Exchanger under Air Bubble Injection

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Abstract

One of the most commonly used devices in thermal energy transfer is heat exchanger. Increasing the efficiency of heat exchangers by increasing its heat transfer rate has been the subject of study by many researchers. Heat transfer can be increased through two main kinds of methods, i.e. active methods and passive methods. The active methods require external power while in passive methods there is no need for external force to continue the durability of heat transfer enhancement mechanism. In this paper, an experimental study on the effect of air bubble injection as an active method in thermal performance of a double pipe heat exchanger is conducted. Air bubbles are injected into annulus side through different injectors. Experimental data are collected for different tube and annulus side flow rates. The effects of air flow rate and the angle of heat exchanger positioning on its thermal performance are investigated along with exergetic analysis. Obtained results show that the overall heat transfer coefficient can be improved through air bubble injection by 10.3% to 149.5%.

***Keywords*:** Experimental Study, Heat Transfer Enhancement, Air bubble injection, Effectiveness, Number of transfer units (NTU), Exergy

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