

Investigation of Rate of Heat Transfer of Water for various Concentrations of Nanoparticles for Plate Heat Exchanger

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Abstract: The statement describes a study conducted to enhance the heat transfer efficiency of water in a compact heat exchanger, specifically a corrugated plate heat exchanger. The objective is to overcome the limitation of conventional plate heat exchangers, which become bulky when the heat transfer area is increased. To achieve this, the researchers propose two approaches: adding nanoparticles to the base fluid (creating a Nano fluid) and incorporating corrugations on the plates. The addition of nanoparticles is expected to increase the heat transfer coefficient of the base fluid, while the corrugations enhance the effectiveness of the heat exchanger. The study examines both parallel flow and counter flow arrangements for different mass flow rates of the hot fluid. The results indicate that the effectiveness of the heat exchanger varies depending on the heat capacity ratio. The effectiveness values range from 0.66 to 0.80 for water as the working fluid and from 0.70 to 0.82 for Nano fluids. The slight drop in effectiveness with an increase in heat capacity ratio suggests that the performance of the heat exchanger is affected by the characteristics of the working fluid.

Keywords: Corrugated PHE, Counter flow, Effectiveness, Nano Fluids, Sizing etc. Corrugated PHE, counter flow, Effectiveness, Sizing etc.

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