

Abstract Submitted  
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**Flow and Heat Transfer Characteristics of the Staggered Slotted Semi Cylinders in a Cross Flow Heat Exchangers** SEDAT YAYLA, Yuzuncu Yil University, SEYFETTIN BEYIN, Star Technical university, ALPARSLAN OZTEKIN, Lehigh University — Transient 3-D dimensional turbulent flow simulations are conducted to examine flow and heat transfer characteristics in inline and staggered slotted semi-cylinders placed in a rectangular cross sectioned fin tube heat exchanger. Both Reynolds averaged Navier's equation and Large Eddy simulations model are employed to conduct simulations using Fluent-ANSYS. Predictions of transient simulations are compared against the results of the PIV flow visualization observations at Reynolds number 1500 and 4000. Measured and predicted velocity and the vorticity field in the wake of cylinders agree well with each other at both Reynolds number. The effect of the angle between the slotted semi cylinders and the flow direction is investigated for various values of Reynolds number in both laminar and turbulent flow regimes. Transient nature of the three dimensional flow structures with flow separation, reattachment and vortices are characterized. The effects of the flow structure on the heat transfer characteristics are determined by calculating the heat transfer coefficient along the surface of the semi cylinders.

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