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Heat Transfer Performance for Turbulent Flow through a Tube Using Baffles

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Abstract : Three dimensional numerical investigation of heat transfer enhancement inside a non-uniformly heated parabolic trough solar collector fitted with baffles under turbulent flow was studied in the current paper. Molten salt is used as heat transfer fluid and simulations are carried out in ANSYS computational fluid dynamics (CFD). The present data was validating by the empirical correlations available in the literatures and good agreement was obtained. The Nusselt number and friction factor values for using baffles are considerably higher than that for smooth pipe. The emplacement and the distance between two consecutive baffles have an effect non-negligible on heat transfer characteristics; the results demonstrate that the temperature gradient reduces with the inclusion of inserts.

Keywords : Baffles, heat transfer enhancement, molten salt, Monte Carlo ray trace technique, numerical investigation
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