Numerical investigation of an enhanced PTC absorber tube using cylindrical inserts.

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Abstract

The main purpose of this study is to investigate numerically the thermal performance of a parabolic trough solar collector's absorber tube that contains a novel kind of inserts with the objective to improve the heat transfer between the heat transfer fluid and the absorber tube. In the first part of this paper, the diameter and the length of the cylindrical inserts are investigated based on Finite Volume Method and Monte Carlo Ray Tracing method for Reynolds number ranges from $2.36 [?] 10 4$ to $7.09 [?] 10 4$. In the second part, the eccentricity of the cylindrical inserts is investigated under the same operating conditions. The Therminol $^{®}$VP1 is the HTF that used in this investigation intermediate fluid. The numerical simulation indicates that the perturbators enhance the thermal behavior of receiver and reduces the absorber tube's temperature difference.

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