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Design and Simulation Analysis of a Parabolic Trough Solar Collector Hot Water Generation System

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Abstract

Collection of solar energy with the help of a cylindrical parabolic concentrator has been the subject of many investigations. A parabolic trough collector (PTC) system used for hot water generation is presented in this paper. The design of a parabolic trough collector with 90o rim angle is accomplished by considering the optimized collector aperture width and the receiver tube diameter. The simulation program written in MATLAB is used to predict the performance of the parabolic trough collector hot water generation system. The effects of variations in water inlet temperature, mass flow rate, annulus gap and wind velocity on optical and thermal performance of the collector have been analysed.