

Performances of a single pass solar air collector with longitudinal fins inferior an absorber plate

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Abstract

this study experimentally investigates a single pass solar air heater with fins (semi-cylindrical form) attached inferior the absorber plate. This method significantly improves the collector efficiency by increasing the mass flow rates and attractive the heat-transfer coefficient between the absorber plate and air. Experiments had been performed for air mass flow rates of 0.012 and 0.016 kg.s⁻¹. Such comparisons include the outlet temperatures and thermal efficiencies of the solar collector for various design and operating conditions. The highest efficiency had been obtained at 0.016 kg.s⁻¹. Comparison between the thermal efficiency of the mass flow rate at 0.012 and 0.016 kg.s⁻¹ tested in this study with the ones reported had been presented, and a good agreement had been found. A maximum efficiency obtained for the single pass air heater between the air mass flow rates at 0.012 and 0.016 kg.s⁻¹ were 39.72, 50.47 % respectively.

Keywords : tilt angle; Efficiency; heat exchange; mass flow rate; temperature; solar radiation.

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