

Experimental study of heat transfer and thermal performance with longitudinal fins of solar air heater

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Abstract

The thermal performance of a single pass solar air heater with five fins attached was investigated experimentally. Longitudinal fins were used inferior the absorber plate to increase the heat exchange and render the flow fluid in the channel uniform. The effect of mass flow rate of air on the outlet temperature, the heat transfer in the thickness of the solar collector, and the thermal efficiency were studied. Experiments were performed for two air mass flow rates of 0.012 and 0.016 kg s⁻¹. Moreover, the maximum efficiency values obtained for the 0.012 and 0.016 kg s⁻¹ with and without fins were 40.02%, 51.50% and 34.92%, 43.94%, respectively. A comparison of the results of the mass flow rates by solar collector with and without fins shows a substantial enhancement in the thermal efficiency.

Keywords : Fins; Mass flow rate; Thickness; Length; Thermal efficiency.

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