

Influence of Channel Depth on the Performance of Wavy Fin Absorber Solar Air Heater

Authors : Abhishek Priyam, Prabha Chand

Abstract : Channel depth is an important design parameter to be fixed in designing a solar air heater. In this paper, a mathematical model has been developed to study the influence of channel duct on the thermal performance of solar air heaters. The channel depth has been varied from 1.5 cm to 3.5 cm for the mass flow range 0.01 to 0.11 kg/s. Based on first law of thermodynamics, the channel depth of 1.5 cm shows better thermal performance for all the mass flow range. Also, better thermohydraulic performance has been found up to 0.05 kg/s, and beyond this, thermohydraulic efficiency starts decreasing. It has been seen that, with the increase in the mass flow rate, the difference between thermal and thermohydraulic efficiency increases because of the increase in pressure drop. At lower mass flow rate, 0.01 kg/s, the thermal and thermohydraulic efficiencies for respective channel depth remain the same.

Keywords : channel depth, thermal efficiency, wavy fin, thermohydraulic efficiency

Conference Title : ICRERES 2017 : International Conference on Renewable Energy Resource and Energy Storage

Conference Location : New York, United States

Conference Dates : June 04-05, 2017