

Experimental Investigation of SAHs Solar Dryers with Zigzag Aluminum Cans

This experimental study investigates the thermal performance of two different solar-air collector designs for Ramadi climate conditions. Two types of absorber plate are fabricated and tested. Type (I) uses an absorber plate without cans, whereas Type (II) uses one with cans, these cans are arranged in a zigzag pattern. These collectors are a single-duct double-pass type. Air first enters through the inlet and then passes over the absorber plate before returning underneath the absorber and moving toward the outlet duct. Moreover, the plate is covered with 4 mm thick glass. An axial fan is used for air circulation. As a result, the increase in temperature difference is approximately 3 °C to 10.5 °C when using aluminum cans with a zigzag array. The increase in thermal efficiency between Types I and II is approximately 20%. Additionally, at an average mass flow rate of 0.075 kg/s, the difference between the practical and theoretical thermal efficiencies for the two models is approximately 3%.