

Experimental Study of the Thermal Characteristics for a Thermosyphon Pipe with Finned Condenser

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Abstract

The thermosyphon pipes are two-phase heat transfer devices with extremely high effective thermal conductivity. In this work, the thermal characteristics of a thermosyphon pipe with finned condenser (free convection condenser) is studied experimentally. The thermosyphon pipe is manufactured from copper. Distilled deionized water is used as a working fluid, the pipe is charged at filling ratio equal to 50% of the evaporator volume. Annular fins manufactured from aluminum are installed on the outer surface of the condenser section. The thermosyphon pipe is tested experimentally at different input power (2 W, 5 W, 10W, 15 W, 20 W, 25 W, and 40 W) and different inclination angle (30°, 60°, and 90° from horizontal). The results show that the increase in the input power leads to increase in the thermosyphon pipe operating temperature, while the thermal resistance decreases with increasing the input power. Also the results showed the thermal performance of the pipe is improved when the pipe is positioned at inclination angle of 30° comparing with the inclination angles 60°, and 90°.