INVESTIGATION OF CHARACTERISTICS OF HEAT PIPES FOR LED LIGHTNING DEVICE

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Abstract

The tests results of the aluminium grooved heat pipes characteristics are presented. Two aluminium grooved heat pipes were designed for a forced air cooling of high-power LED lighting device and used ammonia as a work fluid. Evaporated zone temperature of the heat pipe was in the range of 31.0 to 52.5 °C at the heat flux range of 50 to 100 W and upcoming flow speed range of 0.8 to 2.1 m/s. The temperature difference along the heat pipes was 0.9…1.7 °C at the heat flux 50 W and 1.7…3.1°C at the heat flux 100 W. The thermal resistance of heat pipes was in the range of 0.012 to 0.044 °C/W. The main factors which influence of heat pipes performance are: the heat flux value, the speed of cooling air flux, heat pipe inclination angle relative to the horizon.