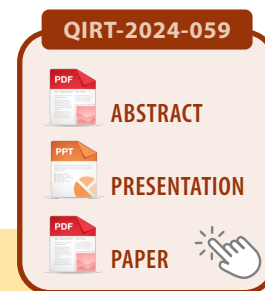




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TEST RIG FOR INVESTIGATION OF INNOVATIVE INDIRECT REGENERATIVE EVAPORATIVE COOLING TECHNOLOGY FOR ELECTRONICS USING IR THERMOGRAPHY

In the article, the authors explain the concept of Indirect Regenerative Evaporative Cooling (IREC) technology and present an experimental test rig for the investigation of an innovative cooling system using a thermal imaging camera. The experimental setup consists of several nodes such as an air supply system with controlled humidity, temperature and flow rate. A prototype of the tested heat exchanger that is intended for cooling the hot plate contains the hot surface of an electronic device. The hot plate is equipped with heating electronic components and temperature sensors on both sides for heat flux measurement. The temperature of the plate can be stabilized by means of PID controller driving above mentioned heat sources to simulate the relevant operating conditions of an electronic device. The main goal

of the proposed research is to find the temperature distributions field on the plate and its transient characteristics through contact sensors and thermal imaging camera. Based on the measured data it becomes possible to estimate the performance of the cooling system and compare it to commercially available solutions with heat sink transfer. Thanks to the unique thermodynamical ability of the heat exchanger through the IREC technology, it is possible to attain the dew point temperature of the ambient air after passing its structure. The obtained results will lead to the extension of further electronics cooling applications of the proposed solution. The conducted research will bring evidence of the future potential for the development of dedicated electronics cooling systems.