EFFECT OF NOZZLE DIAMETER AND VOLUME CAVITY AT VARIOUS DISTANCES FOR ELECTRONIC COOLING

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Declaration by the Candidate

"I declared that this thesis is the result of my own work except the ideas and summaries which I have clarified their sources. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any degree."

Signed : .....

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Abstract

Synthetic jet actuator working by injecting air to dissipate from heated electronic surface. It contains two main parts which are the case and piezoelectric diaphragm. Major advantage was on the device size that smaller compare to the cooling fan, low on dust trap at cooling device with low operation power consumption. The optimization of design synthetic jet is crucial in order to maximize the heat dissipation for a heated electronic device. This research will cover the synthetic jet effect at various volumes and nozzle diameter with various distances to the heated surface on the heat transfer coefficient value effect of various volumes and nozzle diameter at various distances. There are 25 models design with different cavity volume and nozzle diameter have been fabricated using 3D printer. Result obtained from the temperature drop for each experiment has been shown in heat transfer coefficient value. Result shows that small nozzle diameter with smaller cavity volume give the highest value of heat transfer coefficient. The increasing of heat transfer coefficient value shows the efficiency of the synthetic jet device at the optimum condition in dissipates the heat. However, the effective distance from nozzle to the heated surface was depending on the nozzle diameter and cavity volume. Maximum temperature drop was 41.57℃ for synthetic jet model 2mm nozzle diameter and 1mm cavity volume at distance 50mm from nozzle to the heated surface. The maximum value of heat transfer coefficient was 65.82 W/m2℃ for the same model and distance.

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