# ABSTRACT


**Enhancement of Electronics Cooling by Parametric Jet Impingement**

Electronics cooling can be enhanced using air jet impingement system. The inclined, non-confined jet of air, also called as submerged jet is experimentally investigated for the cooling applications. Entire analysis and estimates are made by placing jet on the leading edge of a horizontal rectangular target plate at height H, and investigated for downhill side comprehensive cooling performance approach. The jet Reynolds Number in the range of $2000 \leq Re \leq 20000$ is investigated with circular jet for inclination ($\Theta a$) of $15^0 < \Theta a < 75^0$. The effect of jet to target distance (H) is also investigated in the range $0.5 \leq H/D \leq 6.8$. Experimental setup is prepared with above parameters for investigation. It is observed that as $\Theta a$ decreases, the coolest points with high heat transfer shifts to downhill side of target plate. The jet jump is seen in uphill side typically for H/D of higher than 5. The impingement at an angle of $15^0$ will lead to very lower range of $Nu_{avg}$ and the inclination of $45^0$ and $60^0$ are showing the better cooling compared to other jet inclinations. The equation for $Nu_{min}$ is presented. For inclinations of $75^0$ and $60^0$ is almost the performance is same and getting $Nu_{max}$ up to 300, by producing cold spots on target surface. For $45^0$ jet impingement, the $Nu_{max}$ is widely spread. Location of $Nu_{max}$ is also studied which indicates that at higher AR, angle is dominating parameter compared with all. The $EF_{min}$ can be calculated for a particular combination of parameters to be useful for electronics packaging design.

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