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Jalal M. Jalil
Electromechanical Engineering Department, University of Technology, Baghdad., Iraq.
jalamjalil@gmail.com

Ekbal H. Ali
Electromechanical Engineering Department, University of Technology, Baghdad., Iraq.

Hiba H. Kurdi
Electromechanical Engineering Department, University of Technology, Baghdad., Iraq.
hibakordy@yahoo.com

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Numerical and Experimental Study of Cooling in Desktop Computer with Block Heat Sink

Abstract *- This paper investigates numerically and experimentally fluid flow and heat transfer inside the desktop P.C.. The study of cooling considers the components; CPU, heat sink, power supply, motherboard, CD, HDD and fans. Three components have heat source (CPU, motherboard and power supply unit). There were two openings for air inlet and two for air outlet. The tested values of air inlet velocities were 1.2, 1.8 and 2.4 m/s. The work investigates the effect of inlet air velocity and powers (P_{CPU} = 8.5 W, P_{PSU} = 24 W, P_{MO}=12 W) of multi-components (CPU, motherboard and PSU). The numerical results obtained (by finite volume method CFD) are found in a good agreement with the experimental results. The results show that the highest temperature for CPU with block heat sink was 88.1℃ (P_{CPU} = 8.5 W, P_{PSU} = 24 W, P_{MO}=12 W), the temperature of the heat generation components decreases linearly with increases of inlet air velocity. The CPU temperature increases with CPU power linearly. Motherboard temperature was the lowest one due to its position and area (52ºC). Full details of flow field and temperature distribution are shown.*

Keywords*- CPU cooling, heat sink, active heat dissipation, P.C. cooling, forced convection, electronic cooling and computational fluid dynamics. .*

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