

Investigations of Thermo Fluid Characteristics of Copper Alloy Porous Heat Sinks by Forced Air Cooling

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Abstract : High porosity metal foams are excellent for heat dissipation. Their use has been widened to include heat removal from high density microelectronics circuits. Other important applications have been found in compact heat exchangers for airborne equipment, regenerative and dissipative air cooled condenser towers, and compact heat sinks for power electronic. The low relative density, open porosity and high thermal conductivity of the cell edges, large accessible surface area per unit volume, and the ability to mix the cooling fluid make metal foam heat exchangers efficient, compact and light weight. This paper reports the thermal performance of metal foam for high heat dissipation. In experimentation metal foam samples of different pore diameters i.e. 35 μ , 20 μ , 12 μ , are analyzed for varying velocities and heat inputs. The study investigates the effect of various dimensionless no. like Re, Nu, Pr and heat transfer characteristics of basic flow configuration.

Keywords : pores, foam, effective thermal conductivity, permeability

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