

EXPERIMENTAL ANALYSIS OF AIR FLOW AND HEAT TRANSFER THROUGH ALUMINIUM METAL FOAMS

C. Suresh¹ & S. Vidyashankar²

¹Assistant Professor, Department of Mechanical Engineering, BIT, Bengaluru, Karnataka, India

²Professor, Department of Mechanical Engineering, BIT, Bengaluru, Karnataka, India

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ABSTRACT

The aim of the research works was to investigate the effect of pore size of the Aluminium metallic foam on air flow and heat transfer through three different pore sizes. Al foams were produced through infiltration process by open metal die casting using soil granules of different diameter as space holder particles (SHP). The fluid flow tests were conducted as per Darcian principle by using custom-made air duct. Developed Al foam density varies from 0.93g/cc to 1.22g/cc, the minimum density of 0.93g/cc for Al foam with SHP ball size of 8mm. Heat transfer test was conducted on Al foam to compare with commercial heat sink using custom made heat transfer setup. Results shows the pressure drop was directly proportional to the SHP ball size in Al foam, it was varied from 2616 Pa/m to 16023Pa/m for Al foam with SHP ball size 10mm. Heat transfer result showed that around 50% reduction in weight of the heat sink used for 2N3055 transistor by replacing commercial TO3 heat sink with Al foam heat sink.

KEYWORDS: Al Foam, Air Flow, SHP, Pressure Drop, Heat Sink