

COMPUTATIONAL ANALYSIS OF NATURAL CONVECTION WITH SINGLE 60⁰ V FIN

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Abstract

Because of lateral interactions of the augmented boundary layers in the downstream region, the vertical fins are inapplicable in the heat transfer enhancement. Misumi and Kitamura [3] have reported an experimental work on enhancement of natural convection heat transfer from vertical base plate with a horizontal partition plate and V plates in water as ambience. This heat transfer enhancing technique was further investigated experimentally, in air as ambience by Parishwad et al. [4]. The numerical analysis of this technique is done for 60⁰ V fin using Computational Fluid Dynamics (CFD) software, FLUENT, for natural convection adjacent to a vertical heated plate and fin assembly in ambient air surrounding. Validation of numerical results is done with the experimental results. As compared to conventional vertical fin, this V-type fin works not only as extended surface but also as Flow separators. This V-type fin is compact and hence highly economical. The computational analysis done so far confirms the experimental analysis done earlier well within the 5% variation and concurs that 60⁰ V-fin performs better than vertical fin and horizontal fin of the equal dimensions.

Keywords: Natural convection heat transfer, fins, boundary layer, computational fluid dynamics

Subject Classification: Mechanical Engineering – Heat transfer