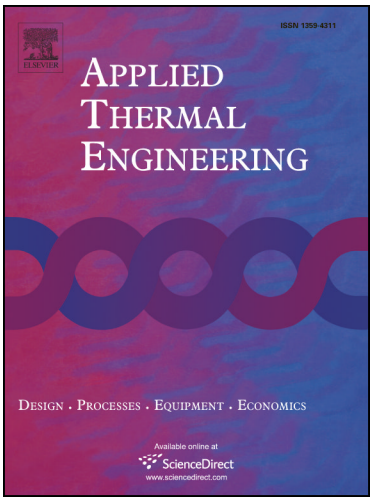

Research Paper

Effect of package spacing on convective heat transfer from thermal sources mounted on a horizontal surface

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Effect of Package Spacing on Convective Heat Transfer from Thermal Sources Mounted on a Horizontal Surface

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Highlights

1. Three-dimensional analysis of an inline module composed of two thermal sources was presented.
2. The study was performed within applicable range of air velocity ($2464 \leq Re_L \leq 16430$), package spacing ratio ($1 \leq s/L \leq 3$)
3. The gap effect on upstream thermal source temperature is vanished at s/L=3.
4. Increasing package spacing more than 3 has almost no additional enhancement on the downstream thermal source
5. Nusselt number correlations for the module were presented within the investigated ranges

Abstract

This work introduces a three-dimensional analysis of an inline module composed of two thermal sources using ANSYS-FLUENT Computational Fluid Dynamics (CFD) package. The effect of package spacing ratio ($1 \leq S \leq 3$) on the heat transfer coefficient of the upstream (UTS) and downstream (DTS) thermal sources within Reynolds number range of $2464 \leq Re_L \leq 16430$ are considered. The predictions are compared with the experiments performed on air wind tunnel with two thermal sources mounted on its horizontal surface within Reynolds number range of$4848 \leq Re_L \leq 13635$. The numerical results are compared