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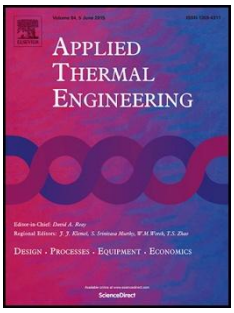

Title: On the thermal analysis of a plate-fin heat sink considering the thermal-entry length effect

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On the Thermal Analysis of a Plate-Fin Heat Sink Considering the Thermal-Entry Length Effect

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Highlights

- Convective heat transfer coefficient plays a major role in heat dissipated by a heat sink. The present paper developed two correlations to compare the effect of adopting a fully-developed or thermal-developing flow correlation on results accuracy compared to experimental results.
- The results significantly showed that a noticeable over and under prediction error in the local air temperature distribution along the heat sink when a fully-developed correlation was picked up and used.
- The prediction error was appreciatively small when the thermal-entry length effect was considered when analyzing the heat sink thermal performance as Prandtl number is less than one.
- The results conclude the importance of considering the thermal-entry length for thermal flow through short conduits as the Prandtl number is less than one.

Abstract

Cooling electric and electronic components is very imperative to keep these components functioning properly. The heat sink is a device used to dissipate generated heat and accordingly cool these components. Airflow through heat sinks experiences velocity and thermal boundary layer variation that significantly affects the heat transfer process and heat sink performance, as a