

Documents

Menni, Y., Azzi, A., Chamkha, A.

Turbulent heat transfer and fluid flow over complex geometry fins

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Abstract

In this work, we presented a numerical contribution to numerically evaluate the thermal transfer improvement from forcing a 2D flow of air through a baffled channel. Two complex geometry fins were inserted in the flow field to force recirculation zones to augment mixing and thus, the thermal transfer. The dynamic thermo-energy behavior of air is shown for Re numbers ranging from 12×10^3 to 32×10^3 . The governing equations, employed to simulate the turbulent forced-convection airflow in the domain under investigation, were solved using the finite volume method, by means of CFD FLUENT, based on the SIMPLEC algorithm. For using the complex geometry fins, the augmentations in Nusselt number and friction factor are in the range of 194.108 - 387.322 % and 476.779 - 2603.667 % over the smooth channel with no fin, respectively. In addition, the use of complex geometry fins with $Re = 32 \times 10^3$ gives higher TEF than that with $Re = 17,000$, $22,000$, and $27,000$ around 12.072 %, 8.568 %, 5.189 %, and 2.389 %, respectively. © 2018 Trans Tech Publications, Switzerland.

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