

Numerical simulation of microchannel double-pipe heat exchanger with ribs

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ABSTRACT

This study numerically investigates a double pipe heat exchanger with triangle and rectangle rib. The simulation is performed using ANSYS package, considering turbulent flow and k- ϵ turbulence model. The working fluid is water in both tube and annulus and the flow arrangement is counter flow. The results show that, the heat transfer of triangle rib and rectangle rib are higher than that of normal DPHE and as the Reynolds number is increasing heat transfer, coefficient of heat transfers and Nusselt number are also increasing. Triangle rib has thermal performance factor of 0.9786 at Re of 40000 and rectangle rib has 1.0290 at Re of 30000. Furthermore, total heat transfer of DPHE with triangle rib is 33% better than normal DPHE at Re of 40000 and that of rectangle rib is 45% better at Re of 40000