Heat Transfer Augmentation to Measure the Convective Heat Transfer Coefficient and Friction Factor of Stationary Square Duct with Various Angled Staggered Ribs

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Abstract

The thermal and hydraulic performances were examined experimentally for the square duct with arc of circular rib turbulators inclined at 60°. The inclined circular ribs are placed on opposite
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walls of the duct and the heat transfer coefficient and the frictional factor are calculated. The Stationary duct with aspect ratio (W/H=1) is considered for doing the analysis. The hydraulic and thermal performances are measured by calculating Frictional factor and the Nusselt number. Square ribs (w/e=1) are considered as the baseline configuration. The rib geometry configuration are having Blockage ratio of 0.083 and 0.125 and rib spacing (Pitch: Height ratio) is 10. The performance regarding heat transfer for the duct is calculated for varying Reynolds numbers. The results obtained for the duct with different ribs geometry configuration proved that as the rib width increases the thermal performance of the duct also increases. By combined effect of the rib width, rib spacing and flow parameter, the optimal cooling configuration was obtained.

References

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Index Terms

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Keywords

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