

Confined Swirling Jet Impingement Onto An Adiabatic Wall

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PERGAMON-ELSEVIER SCIENCE LTD, INTERNATIONAL JOURNAL OF HEAT AND
MASS TRANSFER; pp: 2947-2955; Vol: 46

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Summary

Impinging swirling jets generate interesting flow fields and depending on the magnitude of the swirl velocity, circulation cells develop in the region close to the solid wall. Moreover, axial momentum of the jet is influenced by the magnitude of the swirl velocity. This, in turn, results in considerable entropy generation in the flow field. In the present study, confined swirling jet impingement onto an adiabatic wall is investigated. The flow and temperature fields are computed numerically for various flow configurations. Different jet exit velocity profiles are considered and their effects on the flow field are examined. The entropy production due to different flow configurations is computed and the irreversibility ratios due to fluid friction and heat transfer are determined. It is found that the jet axis tilts towards the radial direction as swirl velocity increases and reducing the velocity profile number enhances the entropy generation due to heat transfer. The irreversibility ratio variation with the velocity profile number behaves opposite for the fluid friction and heat transfer. (C) 2003 Elsevier Science Ltd. All rights reserved.

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