

Accepted Manuscript

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PII: S0894-1777(17)30052-3

DOI: <http://dx.doi.org/10.1016/j.expthermflusci.2017.02.023>

Reference: ETF 9025

To appear in: *Experimental Thermal and Fluid Science*

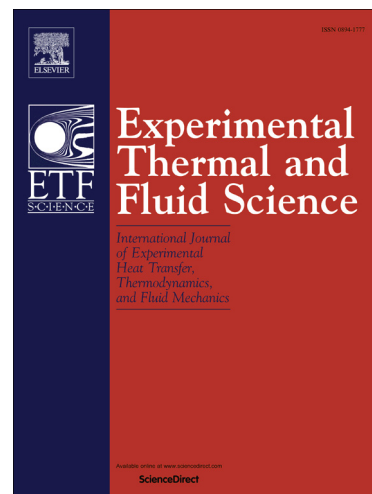
Received Date: 23 September 2016

Revised Date: 17 February 2017

Accepted Date: 26 February 2017

Please cite this article as: M. Attalla, H.M. Maghrabie, E. Specht, Effect of inclination angle of a pair of air jets on heat transfer into the flat surface, *Experimental Thermal and Fluid Science* (2017), doi: <http://dx.doi.org/10.1016/j.expthermflusci.2017.02.023>

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Effect of inclination angle of a pair of air jets on heat transfer into the flat surface

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ABSTRACT

An experimental investigation is performed to study the effect of the inclination angle of air jets on heat transfer from a horizontal surface. A pair of inclined circular jets issuing from the straight pipes of length to diameter ratio of 40 is considered. The inclination angles of 0°, 10°, 20°, 30°, 45°, and 60° are selected while the Reynolds number is varied from 10000 to 40000 based on a jet exit diameter. Jets to impingement plate distance (L/D) as well as the spacing distance (S/D) are changed from 2 to 8. The results of the temperature contours as well as the Nusselt number contours are illustrated to study the characteristics of heat transfer from a flat surface cooled by a pair of oblique jets. The experimental results show that the maximum magnitude of average heat transfer coefficient is achieved in the range of inclination angle from 10° to 20°. Empirical correlations are presented to predict the value of average Nusselt number as a function of Re, Pr, and θ . Moreover, a comparison between the values of average Nusselt number of the present study and those available in the literature is carried out.

Keywords

Pair of jets; Inclination angle; Spacing distance; Separation distance; Nusselt number; Maximum heat transfer.

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