Nusselt Number Criteria Equations in the Cross Flow over Single Tube

Blanka Skočilasová[1], Jan Skočilas[2]

[1]Faculty of Production Technology and Management, J. E. Purkyne University in Usti nad Labem. Pasteurova 3334/7, 400 96 Usti nad Labem. Czech Republic. E-mail: skocilasova@fvtm.ujep.cz

2Czech Technical University in Prague, Faculty of Mechanical Engineering, Department of Process Engineering, Technická 4, 166 07 Praha 6, Czech Republic. E-mail: jan.skocilas@fs.cvut.cz

The simple geometry was investigated by analytical simulation in the article. The cylinder cross flow and heat transfer was evaluated. The different Nusselt number equations obtained from literature were mutually compared. The selected range of Reynolds number was from 5 to $2 \cdot 10^6$ with respect to laminar and turbulent regime of fliud flow. The coefficients of Nusselt number equations were also compared with respect to Reynolds number ranges. The Sieder-Tate correction for thermal boundary layer was taking into account and its effect on the Nusselt number values was also evaluated. Differences in result of selected equations are presented. Sieder-Tate correction effect is also discussed. However the equations were applied in its validity intervals of Reynolds and Prandtl numbers, the high differences up to 40 % from each other were found.

Keywords: Heat transfer, Nusselt number, equations, cross flow

Acknowledgements

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