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An Improved Heat Transfer Prediction Model for Film Condensation inside a Tube with Interphacial Shear Effect

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Abstract : The analysis of heat transfer design methods in condensing inside plain tubes under existing influence of shear stress is presented in this paper. The existing discrepancy in more than 30-50% between rating heat transfer coefficients and experimental data has been noted. The analysis of existing theoretical and semi-empirical methods of heat transfer prediction is given. The influence of a precise definition concerning boundaries of phase flow (it is especially important in condensing inside horizontal tubes), shear stress (friction coefficient) and heat flux on design of heat transfer is shown. The substantiation of boundary conditions of the values of parameters, influencing accuracy of rated relationships, is given. More correct relationships for heat transfer prediction, which showed good convergence with experiments made by different authors, are substantiated in this work.

Keywords : film condensation, heat transfer, plain tube, shear stress
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