

A new Non-wallis-type empirical correlation to predict the interfacial friction factor in vertical annular pipes flow

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October 29, 2020

Abstract

Accurate prediction of the interfacial friction factor is the basis to calculate the pressure drop in annular pipe flow. Many previous empirical correlations based on the superficial gas Reynolds number perform not so well in condition with a high pressure or a large liquid velocity. Analysis on the collected experimental data show that the modified Weber number is better than the superficial gas Reynolds number, at considering the effect of the liquid velocity and pressure on the interfacial friction factors simultaneously. So a new correlation was proposed based on the modified Weber number, the form of which is different from that of wallis-type correlation. The new correlation consider the effect of the gas velocity, gas density, liquid velocity and liquid viscosity and pipe diameter. Evaluation against 414 experiment data show that the new correlation works better than any other evaluated correlation with a mean absolute error of 17.77%.

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