Effect of liquid reynolds number on pressure drop of evaporative r-290 in 500m circular tube

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Abstrak

Due to certain advantages, natural refrigerants have recently become more popular. Environmental issues motivate this study, focused on the characteristics of propane (R-290) as a replacement for conventional refrigerants. The aim of the present research is to characterize the pressure drop of evaporative R-290 in a microchannel of 500μm diameter and 0.5 m length. The variables of the experimental conditions are mass flux between 155 and 1071 kg/m2s and vapor quality between 0 and unity. The results show a laminar flow for liquid R-290 and a turbulence flow for vapor. Some existing correlations of two-phase flow viscosity were used to predict the pressure drop. For homogeneous model, Dukler et al.’s (1964) prediction viscosity correlation best predicted the present experimental pressure drop.