

Optimization of the friction factor and frictional pressure drop of r22 and r290

Normah Ghazali, author

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Abstrak

Today, the air-conditioning and refrigeration industry is still searching for environmentally friendly refrigerants that could replace hazardous, ozone-depleting coolants – refrigerants that behave similarly, if not better, than the present ones. The present study examines optimization of the frictional pressure drop of R22 and R290 using genetic algorithm. Outcomes are compared against the measured pressure drop obtained from a horizontal 7.6 mm channel with a length of 1.07 meters. Three equations have been used for calculating the Darcy friction factor and two-phase flow pressure drop for both laminar and turbulent flow regimes in smooth and rough tubes. The effects of the different correlations for the friction factor and pressure drop utilized are demonstrated. The results illustrate that the differences between values of the Darcy friction factor are very small for the two refrigerants examined, with the frictional pressure of R-290 higher than R-22. Use of a smaller channel induced a much higher frictional pressure drop, as well.