

Experimental Investigation on the Superheated Refrigerant Vapor Condensation Heat Transfer Characteristics of R134a in Horizontal Smooth Tubes

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An experiment is carried out here to investigate the condensation heat transfer characteristics of the superheated refrigerant vapor for refrigerants R134a flowing in horizontal smooth tubes having the inside diameter of 8.0 mm. In the experiment, the refrigerant mass flux is varied from 140 to 400 kg/(m²·s), imposed heat flux from 10 to 25 kW/m², inlet degree of superheat from 20 to 40°C, and refrigerant condensation temperature from 30 to 45°C. In the study the effects of the refrigerant mass flux, condensation temperature, imposed heat flux and degree of superheat on the measured condensation heat transfer coefficient are examined in detail and comparing with various correlations for a plain tube by Shah, Bivens, Boyko and Dobson. The experimental data clearly show that the influences of superheated vapor on condensation heat transfer coefficient of R134a in the horizontal smooth tube are obvious, especially in the high vapor quality areas of inlet; and Boyko's correlation can be used for calculating the condensation heat transfer coefficient of R134a in the horizontal plain tube.