

Two-phase flow boiling heat transfer of r-410a and r-134a in horizontal small tubes

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Abstrak

Experimental investigation on two-phase flow boiling heat transfer of R-410A and R-134A in horizontal small tubes is reported. The pressure drop and local heat transfer coefficients were obtained over heat flux range of 5 to 40 kW/m², mass flux range of 70 to 600 kg/m² s, saturation temperature range of 2 to 12°C, and quality up to 1.0 in test section with inner tube diameters of 3.0 and 0.5 mm, and lengths of 2000 and 330 mm, respectively. The section was heated uniformly by applying a direct electric current to the tubes. The effects of mass flux, heat flux, and inner tube diameter on pressure drop and heat transfer coefficients are presented. The experimental results are compared against several existing correlations. A new boiling heat transfer coefficient correlation based on the superposition model for refrigerants in small tubes is also presented.