ฯ

Thesis Title	A Theoretical Study on Evaporation of Refrigerants in a Horizontal Tube
Thesis Credits	12
Candidate	Mr. Wisis Sripattrapan
Supervisor	Prof. Dr. Somchai Wongwises
Degree of Study	Master of Engineering
Department	Mechanical Engineering
Academic Year	2001

Abstract

This paper presents the results of simulations using two-phase separated flow model to study the heat transfer and flow characteristics during evaporation of refrigerant in a horizontal tube. The one-dimensional flow model of the evaporation of refrigerants under two types of applied heat. First is counter flow of heating water and the other is constant heat flux. The model is performed in which an annular flow pattern is assumed. The basic physical equations governing flow are established from the conservation of mass, energy and momentum. The model is validated by comparing with the experimental data obtained from the previous studies. The present model can be used to predict the variation of the temperature, pressure, heat transfer and heat transfer coefficient of various pure refrigerants along the horizontal tube. The results obtained from the two types of applied heat are discussed. Due to the evaporation occurs at the saturation state, the refrigerant temperature decreases along the tube corresponding to the decreasing of its saturation pressure. The liquid heat transfer coefficient increases with the axial length due to reducing film thickness and increasing velocity of the liquid refrigerant. For the constant heat flux condition, evaporation rate of liquid refrigerant tends to decrease with increasing of axial length due to decreasing of the latent heat which transfer through vapor-liquid interface. In the case of counter flow condition, increasing of evaporation rate is found. For a specified pressure, if no heat applied to refrigerant or the surrounding temperature is not higher than the refrigerant saturation temperature, evaporation of the refrigerant inside the tube does not occur.

Top right: "TE 131343"
Near top center: "v" (handwritten)

Body text:
"The results of this study are of technological importance for the efficient design when systems are assigned to utilize various alternative refrigerants."

"Keywords : Two-Phase Flow / Evaporation / Annular Flow / Refrigerant"

The results of this study are of technological importance for the efficient design when systems are assigned to utilize various alternative refrigerants.