

Implementation of Heat Flux and Mass Velocity on Steam Mass Content of Flow Boiling Regimes in Vertical Two Phase Forced Flow Tubes^{*}

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Abstract

In this paper we have studied the implementation of variation of heat flux and mass velocity on the variation of steam mass content along of steam generation tube for various two phase forced flow boiling regimes of vertical tubes at the following ranges: Pressure $P = 3 \text{ MPa}$, Heat flux $Q = (500 - 2200) \text{ kW/m}^2$, Mass velocity $R_w = (400 - 1800) \text{ kg/m}^2 \cdot \text{s}$, Inlet enthalpy $h_{in} = (300 - 1700) \text{ kJ/kg}$, Tube length $L = 3 \text{ m}$, and Tube diameter $d_m = 8 \text{ mm}$.

We used some of experimental equations to determined mass steam mass content of various two phase flow boiling regimes ,as well as, we provided an analytical study of implementation of these parameters. We established an Algorithm written by Matlab to determine steam mass content of various flow boiling regimes and present the effect heat flux and mass flow velocity on steam mass content along the steam generation tube. At the result looked that there is a possibility of steam mass content control of all flow boiling regimes by changing mass velocity and heat flux at fixed pressure and inlet enthalpy, and that help using steam phase appearance character, and increasing steam mass content in development heat transfer. Heat flux of dispersed annular flow has no effect on mass steam content.

Key wards: Dispersed flow, Steam ma content, Boiling systems, Heat flux, Two phase forced flow.

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