

# ANALYSIS OF TWO-PHASE FLOW DYNAMIC INSTABILITIES IN VERTICAL AND HORIZONTAL IN-TUBE BOILING SYSTEMS

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**Abstract.** Two-phase instabilities have been observed to occur in many industrial domains like refrigeration systems, turbo-machinery, boiling water reactors and two-phase flow heat exchangers. Predictions of flow parameters such as steady- state pressure drop characteristics, stability boundaries during boiling, as well as the prediction of pressure-drop type and density wave type oscillation characteristics are very crucial in the design and operation of two-phase flow equipment. In this work, investigation of two-phase flow boiling instabilities in vertical and horizontal system is presented. The stead-state system pressure-drop characteristics are determined by a numerical solution of the governing equations as derived from the Drift-Flux model. The transient characteristics of the two-phase flow are obtained for various parameters and the results are presented in graphical and tabular forms. The numerical solutions are determined using an explicit finite difference scheme. The theoretical predictions of the amplitudes and periods of the pressure type oscillations are compared with the experimental findings and a satisfactory agreement between the theory and experiments is obtained

Keywords: two-phase flow, dynamic boiling instabilities, Drift-Flux model

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