

Analysis of Air-Water Two-Phase Flow in a 3x3 Rod Bundle

Authors : Pei-Syuan Ruan, Ya-Chi Yu, Shao-Wen Chen, Jin-Der Lee, Jong-Rong Wang, Chunkuan Shih

Abstract : This study investigated the void fraction characteristics under low superficial gas velocity (J_{g}) and low superficial fluid velocity (J_{f}) conditions in a 3x3 rod bundle geometry. Three arrangements of conductivity probes were set to measure the void fraction at various cross-sectional regions, including rod-gap, sub-channel and rod-wall regions. The experimental tests were performed under the flow conditions of $J_{g} = 0-0.236$ m/s and $J_{f} = 0-0.142$ m/s, and the time-averaged void fractions were recorded at each flow condition. It was observed that while the superficial gas velocity increases, the small bubbles started to cluster together and become big bubbles. As the superficial fluid velocity increases, the local void fractions of the three test regions will get closer and the bubble distribution will be more uniform across the cross section.

Keywords : conductivity probes, rod bundles, two-phase flow, void fraction

Conference Title : ICAMAME 2018 : International Conference on Aerospace, Mechanical, Automotive and Materials Engineering

Conference Location : Kyoto, Japan

Conference Dates : November 15-16, 2018