

# **Experimental Results on Air-Water Heterogeneous Mixture in a Horizontal Square Channel**

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## **Abstract**

This research studies and analyzes the behavior of two-phase flow in a square channel measured by employing four different measurement methods. The spatial and temporal distribution of concentration in two-phase flow not only creates obstacles in detecting, measuring and description of flow patterns, but also creates even more difficulties in comparing the results achieved from different measurement systems, which creates the need for comparative studies by using four different measurement systems, i.e., capacitive, conductive, pressure and optical methods to measure characteristic parameters for controlled experimental conditions. The study deals with two-phase flow of air-water mixture in a small horizontal square. In this experiment, air and water are passed through a mixing chamber placed at the start of the square channel. The sensors are placed non-intrusively along the channel to measure the concentration of the two phases and the Computer Aided Experimentation Station (CAES) is used to generate a wide range of flow conditions and flow patterns in the horizontal adiabatic flow, where the in-situ concentration, film thickness, and pressure are measured simultaneously in the same time and space for air-water mixture flow. The data were converted to averaged values, from which root mean square (RMS), histograms and power spectrum density plots were plotted. The analyses of the measured and plotted results will be compared and presented in this paper.