ABSTRACT

THE EXPERIMENTAL AND THEORETICAL STUDY OF VOID FRACTION AND PRESSURE DROP FOR VERTICAL UPWARD CO-CURRENT TWO-PHASE GAS-LIQUID FLOW

The goals of the research were to find and analyze the relationship between the void fraction and the pressure drop for vertical upward co-current two-phase gas-liquid (air-water) flow.

The test-section used acrylic pipe 24 mm in diameter and 1800 mm long for the observation of the pressure drop. Meanwhile the void fraction was measured by using the quick closing valves technique. The valves were installed separately 2250 mm to each other. The water was pumped with vary capacities from 4, 8, 12, 16, 20, 24 liter/minutes. And the gas was pumped up to the test-section through the three injectors with vary capacities in range of 1.3 - 60.37 liter/minutes.

The results of the experiment and the theoretical calculation performed that the pressure drop decreased while the void fraction increased, although the trend of the slope was getting gently. Meanwhile the higher the capacity of the water for constant capacity of gas, the pressure drop was getting higher too.

From the comparison of the results of the experiment and the homogeneous, Lockhart-Martinelli separated flow model, and drift flux theoretical models, it was found in general that the results of the experiment were closer to the drift flux, and then homogeneous model, and Lockhart-Martinelli separated flow model.

Key words: air water-, void fraction, pressure drop, homogeneous, separated, drift flux