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# The Experimental Investigation of Gas-Liquid Two Phase Flow

Shōsuke SATAKE*

This report shows the experimental result about gas-liquid two phase flow in vertical and 26° inclined from vertical plane, visible plastics pipes, 25.4 mm in diameter and 2160 mm in length.

Air was used as the gas phase and water as the liquid. The pressure drop and void ratio were measured for 70 cases in mixture ratio. Measured range of flow rate varies 900～2412 kg/hr for water and 1～6 kg/hr for air. A macroscopic analysis of the two phase flow phenomenon in this paper allows the prediction of pressure drop to be calculated as an imaginary single phase flow of gas. Under the assumptions that the velocity distribution of liquid is turbulent, and that the velocity of liquid at the boundary between gas and liquid is $V_l$, and gas velocity is $V_g$, the relative velocity of gas and liquid $V_r=V_g-V_l$ at the bundary surface.

The pressure drop may be calculated from the equation,

$$h=\lambda\cdot\frac{L}{d}\cdot\frac{V_r}{2g},$$

where $d$ is gas phase diameter, and it can be calculated from void ratio. Our results show the nessecity of modificatian, which is proper to individual apparatus, for previous relults obtained by R. C. Martinelli.

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