

ABSTRACT

“AN EXPERIMENTAL INVESTIGATION OF THE LIQUID PROPERTIES INFLUENCE TO COUNTERCURRENT FLOW LIMITATION IN NEARLY HORIZONTAL PIPES”

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Some experiments in the countercurrent flow limitation (CCFL) are proposed, but only few experiments informing in countercurrent flow limitation (CCFL) in inclined pipes especially for nearly horizontal pipe. Different from the previous experiment, this experimental investigation will give a better sight in countercurrent flow limitation in vary inclination angle in nearly horizontal pipe. This provides a more complete observation in properties of the working fluid and some others contributing to CCFL. This work is undertaken in order to provide further information of CCFL for hypothetical failure in nuclear reactor.

Experiments were conducted to determine the CCFL characteristic for a 50-mm inner diameter smooth acrylic tube with an stratified flow as the liquid inlet at the upper entry and the gas inlet at the lower entry. An experimental facility was designed and constructed to collect data on the CCFL characteristic. The effect of liquid properties are examined by using five different working fluids (Water, two different concentration of butanol and glycerin aqua solutions). In order to capture some of physical phenomena at the onset of flooding, visual pictures were taken. These pictures provided a new understanding and information of the transition process to flooding. As results, (1) CCFL causes a drastic change in the delivered liquid to the lower plenum. (2) The effect of inclination angle is significantly observed. The flooding gas superficial velocity needed decreases with inclination angle. (3) The liquid viscosity affects the flooding phenomena.