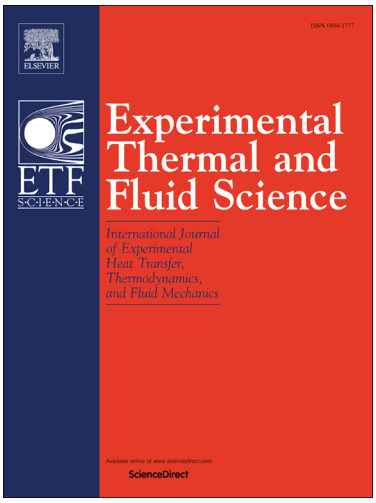

Effects of azimuthal angle of aeration hole on flows inside and outside an air diffuser pipe

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Effects of azimuthal angle of aeration hole on flows inside and outside an air diffuser pipe

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Abstract

Experiments on aeration from a bubble diffuser pipe having five aeration holes are carried out to investigate effects of the azimuthal angle of the holes on flows inside and outside the pipe. The azimuthal angle is varied by rotating the pipe. When the hole angle becomes larger than a certain angle, the liquid height inside the pipe is fixed just below the holes, which results in the prevention of slugging inside the pipe. The effects of hole angle on bubble generation mode and bubble size are small except for the large hole angles, at which generated bubbles are to break up due to an interaction between the bubbles and the pipe wall. Hence uniform aeration is easily realized just by rotating the pipe to some extent. Uniform aeration is also realized with a longer diffuser pipe having ten aeration holes by rotating the pipe. The power in aeration is evaluated from the pressure difference and the total gas inflow. Although the decrease in the hole diameter is also effective to realize the uniform aeration, the increase in the azimuthal angle is superior to the former from the point of view of energy saving.

Keywords: air diffuser pipe; uniform aeration; slugging