

## Bubble Formation in a Co-Flowing Air–Water Stream

A. Sevilla, J.M. Gordillo, C. Martinez-Bazan

*Area de Mecanica de Fluidos, Universidad Carlos III de Madrid, Madrid, Spain*

The formation of bubbles in a co-flowing jet has been investigated in the present work. It has been determined that the outer shear layer caused by the difference of velocity between the outer water stream and the stagnant water of the reservoir can trigger the formation of bubbles when the outer diameter of the co-axial nozzle is not sufficiently larger than the inner one. In addition, the characteristic of an air-water stream under the assumption of infinitely large outer to inner jet diameter ratio has also been studied. Under those conditions, two different regimes were described, namely bubbling regime, characterized by a periodic bubble formation and jetting regime, characterized by a long, stable gas jet forming inside the core of the liquid. Furthermore, similar to what happens in a water hammer phenomenon, it has been shown that the bubbling regime is initially influenced by the overpressure generated by the rapid pinch-off of the previous bubble. The analytical results have been satisfactorily compared with the experimental ones.

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