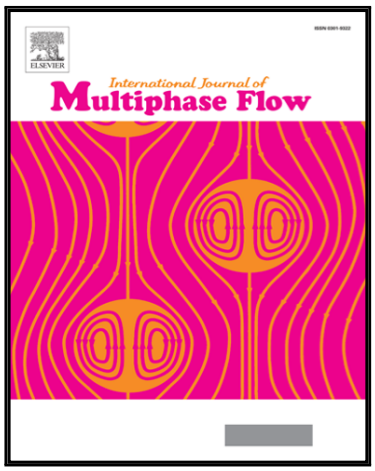


# Experimental Investigation of the Kelvin-Helmholtz Instabilities of Cylindrical Gas Columns in Viscous Fluids

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Highlights

- The analytical solutions of the critical and most unstable Kelvin-Helmholtz instability conditions for a cylindrical interface between two viscous immiscible fluids with finite depths have been presented.
- The most unstable conditions predicted by the Viscous Corrections of the Viscous Potential Flow (VCVPF) KH model match well with the measured air column breakup conditions when the interface is not exposed to highly turbulent flows.
- The cylindrical interface size has noticeable effect on the critical conditions but have negligible effects on the most unstable conditions for interfaces have radius bigger than 1.2 mm
- The critical instability condition can be sensitive the interface size, the chamber size and the perturbation symmetry, the most unstable conditions are insensitive to all these parameters.