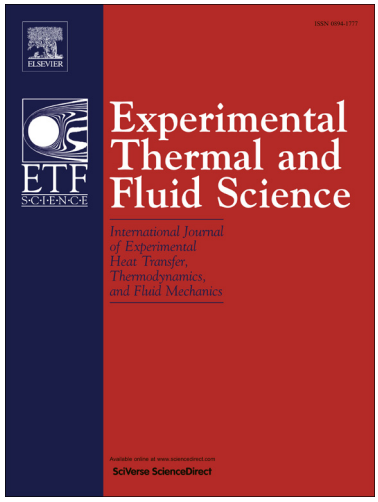

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Experimental study of aerated cavitation in a horizontal venturi nozzle

P. Tomov[a,b,*], S. Khelladi[a], F. Ravelet[a], C. Sarraf[a], F. Bakir[a], P. Vertenoeuil[b]

[a] *DynFluid Laboratory, EA92, Arts et Métiers ParisTech*
151 Boulevard de l'Hôpital, 75013 Paris, France
[b] *SNECMA, SAFRAN group,*
Rond-point Réné Ravaud, 77550 Réau, France

Abstract

The injection of bubbles into an already cavitating flow is a way of influencing the typical cavitating behavior. The present article deals with experiments on aerated and non-aerated cavitation in a transparent horizontal venturi nozzle. The observations are done by means of a high-speed camera. In such a way the extremely rapid cavitation and cavitation-aeration flows are captured and further analysed. The post-processing techniques is based on the detection of the grey level on the series of images. As a result, three different regimes are identified: sheet cavitation, cloud cavitation and "supercavitation". Those regimes are further aerated by injecting air bubbles. Standard deviations, time-space diagrams and frequency spectrum based on the vertical distribution of the grey level along a monitored line are plotted for all of the observed regimes. In the pure cavitation cases we obtain statistically symmetrical structures with characteristic lengths and frequencies. On the other hand, with aeration present, the symmetry is broken and characteristic lengths and frequencies are deeply modified, until a complete disappearance when "supercavitation" is reached.

Keywords: Sheet cavitation, Cloud cavitation, Supercavitation, Aerated cavitation, Venturi nozzle

*Corresponding author
Email address: Petar.TOMOV@ensam.eu (P. Tomov)