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Cavitation dynamics in the wake of a backward facing step[1]
ANUBHAV BHATT, HARISH GANESH, STEVEN L. CECCIO, University of Michigan, Ann Arbor, MI-48109 — The flow over a backward facing step is often used as a benchmark for experimental studies on separation and reattachment in hydrodynamic applications. The flow has a separating and reattaching shear layer forming a recirculating region. These shear flows are susceptible to cavitation, and can experience different dynamics depending upon the extent of the cavitation formed in the shear flow and contained within the recirculation bubble. Beginning with cavitation inception, a reduction in cavitation number results in different cavitation regimes such as fully developed cavitation, self-sustained cloud shedding and super-cavitation. This study focuses on quantifying the cavitation dynamics of the developed cavitation, at three Reynolds numbers (8.5*1E4, 10.6*1E4 and 12.7*1E4) using time-resolved X-Ray densitometry and high speed videography. In addition, static and unsteady pressure measurements are performed to understand the change in dynamics within the region of flow separation. The effect of compressibility of the vapor-liquid mixture is assessed by estimating the speed of sound based on the static pressure and void-fraction measurements at different cavitation conditions.

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