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Microparticle Induced Cavitation MICHAEL DAVIS, PATRICK DUNN, FLINT THOMAS, MUHAMMAD IQBAL, Department of Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, IN 46556, USA — Initiation of the cavitation process requires nuclei that include gases dissolved in the bulk liquid, trapped pockets of gas on solid surfaces such as walls, and trapped pockets of gas on microparticles. Due to imperfect wetting, pockets of gas are trapped and stabilized in crevices on any available surfaces. These gas nuclei act as weaknesses in the liquid initiating rupture and bubble formation. The initial size distribution of the nuclei is an important parameter in determining whether or not the initial microbubble might grow and detach. This implies a critical initial bubble radius necessary for growth. Experiments consisting of high speed photography of the growth of bubbles from surfaces with known nuclei size distributions were performed at different gas saturation levels to observe the effects of nuclei size and dissolved gas content on bubble growth and the detachment process. Measurements of bubble production frequency, bubble diameter, and surface contact angle were made to quantify the amount of gas being released in to the bulk liquid. Liquids examined were distilled water and jet fuel.

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