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Effect of Non-Condensable Gas on Cavity Dynamics and Sheet to Cloud Transition[1] SIMO MAKIHARJU, HARISH GANESH, STEVEN CECCIO, University of Michigan — Partial cavitation occurs in numerous industrial and naval applications. Cavities on lifting surfaces, in cryogenic rocket motors or in fuel injectors can damage equipment and in general be detrimental to the system performance, especially as partial cavities can undergo auto-oscillation causing large pressure pulsations, unsteady loading of machinery and generate significant noise. In the current experiments incipient, intermittent cloud shedding and fully shedding cavities forming in the separated flow region downstream of a wedge were investigated. The Reynolds number based on hydraulic diameter was of the order of one million. Gas was injected directly into the cavitation region downstream of the wedge's apex or into the recirculating region such that with the same amount of injected gas less ended up in the shear layer. The cavity dynamics were studied with and without gas injection. The hypothesis to be tested were that i) relatively miniscule amounts of gas introduced into the shear layer at the cavity interface can reduce vapor production and ii) gas introduced into the separated region can dampen the auto oscillations. The authors also examined whether the presence of gas can switch the shedding mechanism from one dominated by condensation shock to one dominantly by re-entrant jet.

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