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Vortex Behavior in Fully-Oscillating Low-Speed Jet Flows[1] PRESTON JONES, JOHN BAKER, University of Alabama — Vortex formation associated with a fully oscillating low-speed jet was studied to better understand the fundamental nature of such flows. It has been hypothesized that vortices produced by sinusoidal flow from a nozzle will behave in a manner different from that observed for typical piston-cylinder generated vortices. A variable speed reciprocating pump, designed to produce sinusoidal flow fields at the nozzle exit, was used to examine vortex characteristics as a function of Reynolds number and dynamic vortex formation number. The behavior was visualized using a passive scalar dye. Video recording were used to examine the nature of the flows for the above-mentioned dimensionless parameters. Flows corresponding to Reynolds numbers in the range of 244 to 2708 and dynamic vortex formation numbers in the range of 0.82 to 62.92 were considered. The fully oscillating jets flows produced vortices that appear to not exhibit the critical vortex formation number of 4, commonly observed for pulsating jets. Reynolds number was shown to have an impact on physical vortex detachment.

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