

Abstract Submitted
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Rapid Confined Mixing Using Transverse Jets Part 2: Multiple Jets DAVID FORLITI, DAVID SALAZAR, Sierra Lobo Inc., Contractor for the Air Force Research Laboratory — An experimental study has been conducted at the Air Force Research Laboratory at Edwards Air Force Base to investigate the properties of confined mixing devices that employ transverse jets. The experiment considers the mixing of water with a mixture of water and fluorescein, and planar laser induced fluorescence was used to measure instantaneous mixture fraction distributions in the cross section view. Part one of this study presents the scaling law development and results for a single confined transverse jet. Part two will describe the results of configurations including multiple transverse jets. The different regimes of mixing behavior, ranging from under to overpenetration of the transverse jets, are characterized in terms of a new scaling law parameter presented in part one. The level of unmixedness, a primary metric for mixing device performance, is quantified for different jet diameters, number of jets, and relative flow rates. It is apparent that the addition of a second transverse jet provides enhanced scalar uniformity in the main pipe flow cross section compared to a single jet. Three and six jet configurations also provide highly uniform scalar distributions. Turbulent scalar fluctuation intensities, spectral features, and spatial eigenfunctions using the proper orthogonal decomposition will be presented. Distribution A: Public Release, Public Affairs Clearance Number: 12656.

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