Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Assessment of Mixing Models for LES/Filtered Mass Density Function in a Three-Stream Jet DINESH SHETTY, Purdue University, West Lafayette, IN 47907, ABHILASH CHANDY, University of Akron, Akron, OH - 44325, STEVEN FRANKEL, Purdue University, West Lafayette, IN 47907, MATT DINGER, JIAN CAI, CHENNING TONG, Clemson University, Clemson, SC - 29634 — Quantitative comparisons between large eddy simulation (LES) predictions and experimental measurements for a novel three-stream jet mixing experiment are compared in order to assess several different SGS mixing models in the context of the filtered mass density function (FMDF) approach. The three-stream flow consists of a co- annular jet of ethylene and acetone-doped air issuing into an air co-flow. Mean and rms acetone and ethylene concentration profiles are measured downstream of the jet exit using Rayleigh scattering and PLIF. The traditional IEM and EMST mixing models are considered together with the recent parameterized scalar profiles (PSP) model (Phys. Fluids, 18(3), 2006) and a new fractal-based IEM model. The results are in reasonable agreement with the measurements but highlight difficulties in predicting scalar rms and the importance of accounting for a temporally and spatially varying, species-dependent, mixing time scale.

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Date submitted: 04 Aug 2008 Electronic form version 1.4