Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Effect of Nozzle Passage Length on the Surface Properties of Turbulent Liquid jets in Crossflow ANU OSTA, KHALED SALLAM, Oklahoma State University — An experimental study on the effect of the injector geometry on the surface properties of turbulent liquid jets in gaseous crossflow was carried out. Nozzles with different L/D ratios were used to gain an understanding of the Nozzle L/D ratio effect on the breakup of liquid jets in cross flow. The measurements are based on laser diagnostics, including double-pulsed holography and shadowgraphy. The measurements include surface properties, breakup location of the liquid column, and the breakup regime transitions. The hologram was captured digitally on a CCD and reconstructed numerically using convolution. With increase in the injector L/D ratio increased turbulence level was introduced from the longer passage resulting in decreasing breakup lengths of turbulent liquid jet for the same injector diameter. The jet surface characteristics were influenced by the passage length of injection and exhibited a greater degree of surface activity (ligament and drop formation) for the jet from a longer passage than a shorter one. The breakup was influenced by a new dimensionless number in terms of liquid/gas momentum ratio and jet Weber number.

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Date submitted: 05 Aug 2008 Electronic form version 1.4