

Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Effects of Streamwise Injection Angle on Skin Friction Distribution around a Row of Short Jets-in-Crossflow SEAN PETERSON, MICHAEL PLESNIAK, Purdue University — The velocity field and skin friction distributions around a row of five jets issuing into a crossflow via short ($L/D = 1$) holes inclined by 35 deg. in the streamwise direction are presented. The flow features are compared with previously published data from our laboratory for jets issuing through holes oriented normal to the crossflow. Streamwise injection eliminated the recirculation region and consequent downstream spiral separation node vortices observed in the 90 deg. case. The jetting processes caused by in-hole separations were also found to differ, with the bulk of the jet issuing from the leading half of the streamwise injected hole. The skin friction distribution around the injection holes was very similar to that of the normal holes, particularly in the wake of the hole, despite a much lower trajectory and increased spreading. This may have implications on the understanding of the degree to which the counter-rotating vortex pair impacts the wall shear stress.

Michael Plesniak
Purdue University

Date submitted: 12 Aug 2005

Electronic form version 1.4