

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Characterization of Flow Bench Engine Testing¹ ALEX VORIS, Grove City College, LAUREN RILEY, PAUL PUZINAUSKAS, The University of Alabama — This project was an attempt at characterizing particle image velocimetry (PIV) and swirl-meter test procedures. The flow direction and PIV seeding were evaluated for in-cylinder steady state flow of a spark ignition engine. For PIV seeding, both wet and dry options were tested. The dry particles tested were baby powder, glass particulate, and titanium dioxide. The wet particles tested were fogs created with olive oil, vegetable oil, DEHS, and silicon oil. The seeding was evaluated at 0.1 and 0.25 Lift/Diameter and at cylinder pressures of 10, 25 and 40 inches of H₂O. PIV results were evaluated through visual and fluid momentum comparisons. Seeding particles were also evaluated based on particle size and cost. It was found that baby powder and glass particulate were the most effective seeding options for the current setup. The oil fogs and titanium dioxide were found to deposit very quickly on the mock cylinder and obscure the motion of the particles. Based on initial calculations and flow measurements, the flow direction should have a negligible impact on PIV and swirl-meter results. The characterizations found in this project will be used in future engine research examining the effects of intake port geometry on in-cylinder fluid motion and exhaust gas recirculation tolerances.

¹Thanks to NSF site grant #1358991.

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Date submitted: 27 Jul 2015

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