

Abstract Submitted
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Experimental Configuration Effects on ICE Tumble Flow Evaluation¹ BRYAN SANTANA, Universidad del Turabo, PAULIUS PUZIN-AUSKAS, University of Alabama — The generation of ICE (Internal Combustion Engine) in-cylinder charge motions, such as swirl and tumble, have shown positive effects on reducing fuel consumption and exhaust emission levels at partial engine loads. Tumble flow is commonly measured utilizing a steady-flow rig and two-dimensional PIV (Particle Image Velocimetry) systems, among others. In order to optimize the tumble flow, it is important to retrieve accurate measurements. The tumble flow values could be affected by variations in the geometry and/or design of the steady-flow rig utilized during flow tests. In this research, a four-valve per cylinder head was tested on a steady flow bench, varying several aspects of the configuration to evaluate how they influence bulk momentum as well as PIV measurements. The configuration variations included symmetrical, asymmetrical and runner-fed configurations throughout testing. Volumetric flow rate and tumble strength flow measurements were retrieved at the selected L/D ratios. Additionally, several PIV seeding particles were characterized for size and shape. Corresponding PIV flow measurements using each type of seeding were made to evaluate how the particles influence the results.

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