Experimental Investigation of the Air Flow Characteristics through Helical-Spiral Inlet Port having Shrouded Inlet Valve in Diesel Engine under Steady Flow Conditions

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Abstract:

Swirl generation is an important parameter inside the diesel engine cylinder as it achieves good mixing of air and fuel which has a great influence on the combustion efficiency, engine emissions, and soot formation. The generated swirl intensity by the inlet port and the inlet valve configuration is usually measured on a steady flow test rig using an impulse torque meter. In this paper, an experimental investigation using steady flow test rig was performed on an engine cylinder having a helical-spiral inlet port and shrouded inlet valve. Three valve shrouds were used, they are; 120o, 150o, and 180o. With each shroud, four orientation angles were used; they are 0o, 30o, 60o, and 90o. The experiments were performed under constant cylinder vacuum pressure of 350 mm H2O. The results showed that using shrouded inlet valve increases the swirl number at all valve shroud and orientation angles except for valve shroud angle of 180o and orientation angle of 90o. Also, using of shrouded inlet valve decreases the mass flow rate and the discharge coefficient at all valve shroud and orientation angles.

Keywords:

Swirl, inlet port,

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