

## Variation Of Air Flow Pattern Through Dissimilar Valve Lift In A Spark Ignition Engine

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### Abstract

Bi-fuel conversions are a common alternative fuelling option for mono-fuel gasoline SI vehicles because of the minor vehicle modifications required. In Malaysia, most bi-fuel vehicles are fuelled with compressed natural gas (CNG) and gasoline. However, CNG flame speed is lower than gasoline reducing the power and range of the vehicle when operating on CNG. This situation can be improved by increasing the flame speed via higher swirl generation. A Computational fluid dynamics model is used to analyse swirl generated by dissimilar valve lift (DVL) profiles on the intake valve. A three-dimensional engine simulation shows differences in swirl motion and turbulence between the original symmetric valve lift profile and the DVL. The higher swirl number reduces the turbulence kinetic energy level slightly. The best case profile is selected for further experimental testing.

**Keywords:** CFD, compressed natural gas, spark ignition engine, swirl number

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