

Mass Fraction Burn Comparison of Compressed Natural Gas and Gasoline

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Abstract

Vehicle efficiency relates to pollutants and cost savings in third world countries. In term of subcompact cars, the vehicle characteristics are governed by the engine for alternative fuels. The main focus of this paper was to evaluate a sub compact car engine for its performance and burn rate of gasoline and Compressed Natural Gas (CNG). A bi-fuel sequential system was used to do this evaluation. Measurements of engine speed, torque and fuel were done on an eddy current dynamometer, while measurements or in-cylinder pressure, crank angle and spark were analyzed from results taken by data acquisition system. The emissions readings were also compared from an emission analyzer. The results were analyzed for burn rate based on the first law of thermodynamic. The comparison shows a drop of 18.6% was seen for the power, brake specific fuel consumption (BSFC) loss was 7% and efficiency loss was at 17.3% in average for all engine speed. Pressure analysis shows peak pressure dropped by 16%. Burn rate shows why CNG had a slower burning speed on the small engine. The engine speed of 4000 rpm at Maximum Brake Torque (MBT) produced the most nearest results to gasoline.

Keywords: Bi-Fuel, Burn Rate, Dynamometer, Natural Gas

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