Abstract

This study is an experimental investigation of the effect of methanol addition to gasoline on the performance (brake power, brake specific fuel consumption, thermal efficiency, and volumetric efficiency), and emission (carbon dioxide CO_2, carbon monoxide CO, hydrocarbons HC) of a spark ignition engine. The experimental tests were carried out on a single cylinder, four stroke variable compression "Varicomp" Dual Diesel /Petrol cycles with a Dynamometric test unit type (GR0306/000/037A).

The tests were carried out at controlled throttle variable speed condition over the range of 850 to 225 0rpm with compression ratios CR=5, 7, and 9 using various blends of methanol/gasoline (10%, 20% and 30% methanol by volume). It is found that the best engine performance, maximum power output, and minimum brake specific fuel consumption, occur at M10 fuel blend for all compression ratios, and the best compression ratio for the gasoline used is CR=7. The power output from the M10 fuel blend showed an increase about 49.3% over than that for gasoline at CR=7. The addition of methanol indicated an increase in CO_2 emissions about 75.3%, and a decrease in CO emissions about 48% over than those for the gasoline at CR=7, while the increase of CO_2 emissions about 4.08% and the decrease in CO emissions about 10.5% are over than those for the gasoline at CR=9. Hydrocarbon emissions HC is found to be with minimum levels for high compression ratio (CR7 and CR=9) when using M30 blend while for CR=5 the minimum levels of HC emissions were shown with the gasoline and M10 blend.