

ABSTRAK

Pada sistem pembakaran *spark-ignition engine* menghasilkan emisi gas buang yang berbahaya bagi lingkungan berupa NO_x . Penambahan *additive fuel* etanol pada pertamax menyebabkan proses oksidasi meningkat, dengan menggunakan EGR pada *spark-ignition engine* akan mengakibatkan gas buang memiliki konsentrasi kandungan gas NO_x yang lebih rendah. Tujuan penelitian ini untuk mengetahui pengaruh penggunaan EGR *hot* dan *cold* terhadap performa *internal combustion engine* menggunakan bahan bakar pertamax dengan penambahan *additive fuel* etanol. Penelitian dilakukan variasi pembebanan 25%, 50%, 75%, dan 100%, dengan menggunakan variasi pembukaan EGR *valve hot* dan *cold* 0%, 25%, 50%, 75%, dan 100%, pada presentase terhadap 1 liter *mixing fuel* pertamax dengan etanol 0%, 5%, 10%, 15%, pengujian dilakukan pada putaran mesin 5000 rpm. Hasil pengujian menunjukkan adanya peningkatan *brake torque* dan *brake power* tertinggi sebesar 30% pada EGR *hot* 100% dengan pertamax etanol 15%, penurunan *brake specific fuel consumption* terendah sebesar 22% pada EGR *hot* 100% dengan pertamax etanol 10%, dan peningkatan *brake thermal efficiency* tertinggi sebesar 23% pada EGR *cold* 25% dengan pertamax etanol 5%.

Kata kunci : *exhaust gas recirculating* (EGR), emisi, *additive fuel*, performance

ABSTRACT

The spark-ignition engine combustion system produces exhaust emissions that are harmful to the environment in the form of NO_x. The addition of ethanol fuel additive to Pertamina causes the oxidation process to increase, using EGR on the spark-ignition engine will result in the exhaust gas having a lower concentration of NO_x gas. The aim of this research is to determine the effect of using hot and cold EGR on the performance of internal combustion engines using Pertamina fuel with the addition of ethanol fuel additive. The research carried out load variations of 25%, 50%, 75%, and 100%, using hot and cold EGR valve opening variations of 0%, 25%, 50%, 75%, and 100%, in percentages of 1 liter of Pertamina mixed fuel. with ethanol 0%, 5%, 10%, 15%, testing was carried out at an engine speed of 5000 rpm. The test results show that there is an increase in brake torque and brake power, the highest by 30% at EGR hot 100% with Pertamina ethanol 15%, a decrease in brake specific fuel consumption at the lowest by 22% at EGR hot 100% with Pertamina ethanol 10%, and an increase in brake thermal efficiency The highest was 23% at EGR cold 25% with Pertamina ethanol 5%.

Key words: exhaust gas recirculating (EGR), emissions, additive fuel, performance