

## C716293 : MAJOR MECHANICAL ENGINEERING

KEY WORD: FUEL QUALITY / OPTIMUM PERFORMANCE / ENGINE EMISSIONS / OPERATING  
PARAMETERS

THONGCHAI SATAPONNANON : THE COMPARATIVE STUDY ON THE EFFECT OF  
FUEL QUALITY ON THE PERFORMANCE OF SI ENGINE. THESIS ADVISOR :  
KANIT WATANAICHEN, Ph.D. 232 pp. ISBN 974-635-983-5.

This work is a comparative study on the effect of three different gasoline qualities which are available in Thailand's market on 1.6-litre SI engine performance. Three different grades of gasoline were RON98, RON97 and RON92. The research has been divided into 3 parts. In the first part, the OEM performance maps of each different gasoline were investigated. In the second part, mixture loop test matrix by controlling fuel injection quantity and MBT timing were conducted. The results were employed in the optimum performance investigation. In the third part, the analytical results of the first and the second part were compared using a vehicle simulation model of the ECE15 driving pattern.

Test results in the first and second parts were corrected according to AS2789.1-1985 recommendation. It was found that the high octane (RON98) gasoline gave higher engine efficiency, particularly when engine speed was lower than 1800 rev/min. Comparing the same gasoline quality results of the first and second parts, the optimum performance from the second part showed the same trend as the first part but with higher thermal efficiencies. These obtained advantages were clearly shown when the engine was extended beyond 2500 rev/min. In the third part, the vehicle model's comparative results showed that OEM fuel consumption may be reduced by 17% with 26% decreased in CO and 81% increased in HC with optimum engine performance when the RON98 gasoline was used. The developed vehicle model could be used as an assisted tool for vehicle-engine matching evaluation in terms of fuel economy and emissions.

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