

UNIVERSITI TEKNOLOGI MARA

**PROPERTIES ANALYSES ON
EXHAUST GAS EMISSIONS OF
SPARK-IGNITION TURBO ENGINE
WITH ZERO LOAD**

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ABSTRACT

A turbocharger is used to help a petrol engine to produce more power to the engine performance. But it might raise the temperature around the engine, shortening the life of the materials. The objectives of this study are to compare heat localization on various locations on turbo using thermal imager and thermo couple, and to find high temperature profiles on various locations on turbo in petrol engines with varied engine rpms. Additionally, it is necessary to evaluate the impact of high temperatures due to heat localization. With properties analyses on exhaust gas emissions, specific gas properties may be obtained in discussing the effect of pollution. The petrol engine will be operated at varied engine rpms between 1000 and 4000, with intervals of 1000 rpm. The experiment suggests that the temperature of a turbocharged engine will grow as engine speed increases. High temperature may lead to material fatigue and hazardous gas emissions. With the right cooling, it is also possible to calculate the amount of specific heat. High temperature that happened in turbocharger may affect on the gasoline engine.

In order to overcome these problems, a study about the turbocharger on gasoline engine will be research in this project. Thus, the air that in the cylinder is critical for combustion and the density of the intake air in the turbocharger can be increased because of the higher power output from the engine. The objectives of this project are to locate and analyze high temperature profiles at several turbo locations in a petrol engine with a range of engine rpms using thermocouple and thermal imager. Then, to evaluate gas emission of exhaust which may be contributed by turbo engine. The goal of this study was to conduct two experiments using a thermal imager and thermocouples to measure temperatures on a turbocharger with no load and at various engine speeds. It was discovered at the end of the experiments that a thermal imager is a more sophisticated sensor to use than thermocouples. Therefore, there such limitations of this project such as lack of representative load conditions, incomplete combustion, cooling effects, limited exhaust gas flow and ignition system behaviour.

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