EVALUATION OF VEHICLE PERFORMANCE FOR RESEARCH AND DEVELOPMENT

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he Malaysian Palm Oil Board (MPOB) has been involved in palm biodiesel research and development since the 1980s. Various experiments and field trials have been conducted searching for a better, cleaner and renewable fuel either using crude palm oil, palm olein or palm methyl ester for the diesel engine. Among the important parameters evaluated during the study are the effects of biodiesel on vehicle performance and emission. To conduct these assessments, MPOB has equipped itself with the necessary testing equipment. With these facilities, MPOB is extending services for evaluating vehicle performance to the industry and scientific community for research and development purposes.

CHASSIS DYNAMOMETER

Automobiles are required to meet increasingly stringent emissions and safety standards. In many cases, dynamic testing is the only way to adequately measure vehicle performance. A dynamometer or dyno is a device used to measure power and torque of an engine. A dyno that can measure power and torque without removing the engine from the frame of the vehicle is known as a chassis dyno. A chassis dynamometer (also called a rolling road dynamometer) is capable of simulating driving situations in a controlled environment (Figure 1).

Generally, chassis dynamometers are typically used to:

- determine vehicle power and torque;
- supplement engine dynamometer testing;
- measure driveline losses;
- measure accurate vehicle output; and
- measure fuel consumption, noise or emissions of vehicle.

Figure 1. Chassis dynamometer.

Among the evaluations offered by MPOB using the chassis dynamometer testing facilities are:

- 1. **Power curve test.** The Horsepower Curve Test performs a sweep-type power measurement test on the vehicle to determine the vehicle's power (kW) and torque (Nm). This test routine supports both a fixed-sweep-time mode and a vehicle-simulation-loading mode. The vehiclesimulation-loading mode will most accurately reflect the actual power that the vehicle will deliver when in use, while a fixed-sweep-time mode test can be used for comparing against test-stand dynamometer values.
- 2. **Timing.** These tests allow for the timing-type vehicle testing routines such as Quarter Mile Sprint, Standing Start Acceleration, Passing Acceleration, etc.









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- 3. **Emissions.** These tests comprise the emissions testing routines for vehicles, such as:
 - a) **Drivers Trace (IM240/FTP***/etc***).** This is a (non-certified) IM-240/FTP*/etc*. type transient emissions test.
 - b) **ASM 50/15.** This is a (non-certified) ASM 50/15 type emissions test.
 - c) **ASM 25/25.** This is a (non-certified) ASM 25/25 type emissions test.
 - d) **Lug down.** This is a (non-certified) diesel lug-down exhaust opacity test.

The current set-up and facilities are only capable of fitting and handling a light-duty vehicle (less than 3500 kg gross vehicle weight).

Specifications of the chassis dynamometer at MPOB:

Maker: Mustang DynamometerModel: MD-600

Horsepower	:	1000 hp (735 kW) maximum
		measurement capability
		750 hp (550 kW) peak
		absorption
Loading	:	Air-cooled eddy current
		power absorber
Maximum speed	:	200 mph (320 km hr-1)
Inertia	:	Approx. 2150 lbs (975 kg)
Axle weight	:	6000 lbs (2722 kg) maximum
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TERMS AND CONDITIONS OF SERVICES

- 1. The starting date of testing is subject to the availability of the testing facilities.
- 2. Fuel and vehicles for testing are to be provided by the customer.
- 3. Services provided to the customer shall not in any way constitute an endorsement by MPOB of the end-product and/or its performance thereof, and none shall therein be inferred.
- 4. MPOB does not in any way warrant that the result of the laboratory analysis conducted hereunder for the services shall be in any way suitable, capable and/or compatible for use in commercial vehicles and/or other commercial applications thereto.

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