



SURFACE VEHICLE STANDARD	J1995®	JAN2014
	Issued	1990-01
	Revised	2014-01
Superseding J1995 JUN1995		
(R) Engine Power Test Code - Spark Ignition and Compression Ignition - Gross Power and Torque Rating		

RATIONALE

This standard is being revised to reflect changes that have been made to the companion SAE J1349 standard for engine net power and torque rating to reflect modern engine controls and changes in commercially available fuels.

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1. SCOPE

This SAE Standard has been adopted to provide a basis for dynamometer determination of gross engine power and torque under reference conditions. It is intended for use primarily by engine manufacturers who supply engines for installation by others in applications where the engine manufacturer may not control the induction and exhaust system design or the speed at which the engine is run.

1.1 Field of Application

This test code document is applicable to both four-stroke and two-stroke spark ignition (SI) and compression ignition (CI) engines, naturally aspirated and pressure charged, with and without charge air cooling. This document does not apply to aircraft or marine engines.

1.2 The corresponding test code for net as installed power and torque rating is SAE J1349.

1.3 The document for mapping engine performance is SAE J1312.

1.4 Relationship to ISO 2534

ISO 2534 (1972) differs from SAE J1995® in several areas, among which the most important are:

- a. This document is not limited to road vehicles.
- b. This document requires inlet fuel temperature be controlled to 40 °C on CI engines with fixed displacement injection systems.
- c. This document includes a reference fuel specification for both SI and CI engines.
- d. This document includes a different procedure for testing engines with a laboratory charge air cooler (ISO method optional).
- e. This document includes a different procedure for correcting power to reference atmospheric conditions on turbocharged CI engines.

1.5 Complete correlation has not been established with ISO 3046. It is expected that this power test code will eventually align with ISO 2534.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

- | | |
|-----------|---|
| SAE J1312 | Procedure for Mapping Engine Performance - Spark Ignition and Compression Ignition Engines |
| SAE J1349 | Engine Power Test Code - Spark Ignition and Compression Ignition – As Installed Net Power and Torque Rating |
| SAE J1940 | Small Engine Power and Torque Rating Procedure |
| SAE J2723 | Engine Power Test Code - Engine Power and Torque Certification |

2.1.2 ISO Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

- | | |
|----------|---|
| ISO 2534 | Road vehicles - Engine test code - Gross power |
| ISO 3046 | Reciprocating internal combustion engines – Performance |

2.1.3 Federal Regulation

Available from The Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

Standard CI diesel fuel specifications are range mean values for Type 2-D EPA test fuel per Title 40, Code of Federal Regulations, Part 1065.703 or most recent.

3. DEFINITIONS

This section contains the definitions of key terms used to describe the gross power test.

3.1 GROSS BRAKE POWER AND TORQUE

The brake power and torque of an engine when configured as a "basic" engine as defined in 3.4 and 6.2, and tested and corrected in accordance with this document.

3.2 RATED GROSS BRAKE POWER AND TORQUE

Engine gross brake power and torque as declared by the manufacturer at corresponding rated speeds.

3.3 RATED SPEEDS

The speeds determined by the manufacturer at which the engine power and torque are rated.

3.4 BASIC ENGINE

A "basic" engine is an engine configured with only the built in equipment required for self- sustained operation. A basic engine does not include accessories that are necessary only to perform its intended service or that power auxiliary systems. If these accessories are integral with the engine or for any reason are included on the test engine, the power absorbed may be determined and added to the gross brake power. Common "basic" engine accessory examples are listed in Table 1.

3.5 REFERENCE TEST CONDITIONS

The standard or reference engine inlet air supply (atmospheric) and inlet fuel conditions to which all power corrections are made.

3.6 FRICTION POWER

The power required to drive the engine alone as equipped for the power test. Friction power may be established by one of the following methods (the value is needed for power correction of spark ignition engines):

- a. Assume 85% mechanical efficiency.
- b. Hot Motoring Friction - Record friction torque at wide open throttle at each test speed run on the power test. All readings are to be taken at the same coolant and oil temperature as observed on the power test points ± 3 °C.

3.7 INDICATED POWER

The power developed in the cylinders. It is defined as the sum of the brake power and friction power for the purpose of this document.

TABLE 1 - ENGINE EQUIPMENT

System	Required	Comments
1. Inlet Air System	No	See 6.1.1
Air Ducting	No	
Air Cleaner Assembly	No	Includes pre-cleaner, housing, filter element, and cover
Air Preheat	No	
2. Pressure Charging System	Yes	For all engines equipped with variable boost as a function of other engine parameters (speed/load/fuel octane, etc).
Boost Control Settings	Manufacturer's Specification	Boost pressure controls must be set within limits specified by manufacturer for in-service operation.
3. Charge Air Cooling System	Yes	If applicable.
Charge Air Cooler	Yes	See 6.1.4 for auxiliary cooler options.
Cooling Pump or Fan	Conditional	Not required if it can be shown to be functioning less than 20% of running time during intended in-service operation at reference test conditions.
4. Electrical System	Yes	See 6.1.5
Ignition System	Yes	
Starter	No	
Generator/Alternator	Conditional	Required only if needed to operate the basic engine in a self-sustained manner and an external power supply is not used. In this case, the generator shall operate at a load level only sufficient to power the required components (i.e., fuel injectors, ignition system, electronic controller, electric fuel pump, cooling fans, coolant pumps). If an auxiliary power supply is used, the actual generator/alternator load for the required components must be determined and the generator/alternator input required to produce that power subtracted from the measured torque and power data.
Ignition and Timing Control Settings	Manufacturer's Specification	For any engine equipped with electronic controls and/ or knock sensors, the spark or timing advance must be set within limits specified by manufacturer for in-service operation.
5. Emissions Control System	No	If used, all control settings or adjustments must be set within limits specified by manufacturer for in-service operation.
6. RFI/EMI Controls (radio frequency or electromagnetic interference)	Manufacturer's Specification	Control settings must be set within limits specified by manufacturer for in-service operation.
7. Fuel Supply System	Yes	
Fuel Filters/Prefilters	No	See 6.1.3
Fuel Supply Pump	Yes	Or equivalent electrical load if applicable.
Injection Pump/Carburetor or Fuel Metering Control Settings	Manufacturer's Specification	Control settings must be set within limits specified by manufacturer for in-service operation.
8. Engine Cooling System (liquid)	Yes	Manufacturer's recommended coolant shall be used.
Cooling Pump	Yes	
Radiator	No	Functionally equivalent laboratory system recommended.
Thermostat	No	If not used, then coolant temperature and flow must be set within limits specified by manufacturer for in-service operation.
Cooling Fan	No	If used, power absorbed should be calculated and added to the gross brake power.
Engine Cooling System (Air) Blower	Yes Conditional	Required if not disconnectable. On controlled units the fan can be disconnected if it can be shown to be functioning less than 20% of engine running time during intended in-service operation at reference test conditions.
9. Lubrication System	Yes	The basic engine closed loop lubrication system is used. Oil fill shall be at manufacturer's full level. Oil temperatures shall reflect in-service levels at reference test conditions. Manufacturer's recommended oil shall be used.
10. Exhaust System	No	See 6.1.2

TABLE 1 - ENGINE EQUIPMENT (CONTINUED)

System	Required	Comments
11. Auxiliary Drives		
Power Steering Pump	No	
Freon Compressor	No	
Vacuum Pumps	Conditional	Required only if needed to drive other required systems listed and it functions in that capacity more than 20% of engine running time during intended in-service operation.
Air Compressors	Conditional	See previous comments same as vacuum pumps.

NOTE: A manufacturer may elect to test with items on the engine which are not required in Table 1. In no case should these items artificially increase the power of the engine beyond that which is available in the intended application.

4. SYMBOLS, UNITS, AND SUBSCRIPTS

4.1 Symbols and Units

See Table 2.

TABLE 2 - SYMBOLS AND UNITS

Symbols	Term	Units
CA	Air correction factor	
CF	Fuel correction factor	
fa	Atmospheric factor	
fm	Engine factor	
fd	Fuel density factor	
fv	Fuel viscosity factor	
α	Pressure sensitivity exponent	
β	Temperature sensitivity exponent	
S	Viscosity sensitivity coefficient	
D	Engine displacement	L or cc
B	Inlet air supply total pressure	kPa
t	Inlet air supply temperature	°C
P	Inlet manifold total pressure	kPa
r	Pressure ratio	
q	Fuel delivery	mg/L cycle
bp	Brake power	kW
fp	Friction power	kW
ip	Indicated power	kW
n	Engine speed	min ⁻¹
F	Fuel flow	g/s
SG	Fuel density at 15 °C	kg/L
V	Fuel viscosity at 40 °C	mm ² /s

4.2 Subscripts

c = Refers to data corrected to reference inlet air and fuel supply conditions

o = Refers to data observed at the actual test conditions

d = Refers to the dry air portion of the total inlet air supply pressure

r = Refers to the reference test conditions per Section 5

5. REFERENCE TEST CONDITIONS AND CORRECTIONS

This section contains reference air and fuel supply test conditions and specifications, recommended test ranges, and applicability of the correction procedures.

5.1 Reference Atmospheric Conditions

Table 3 defines reference atmospheric conditions and test ranges for which correction factors are valid.

TABLE 3 - REFERENCE ATMOSPHERIC CONDITIONS

	Standard Condition	Test Range Limits
Inlet Air Supply Pressure (absolute)	100 kPa	—
Dry Air Pressure (absolute)	99 kPa	90 – 105 kPa
Inlet Air Supply Temperature	25 °C	15 – 35 °C

With the exception of humidity, no modification to the composition of intake air is permitted. Available laboratory equipment shall be set to minimize correction factors by controlling inlet air as close as possible to “reference atmospheric conditions”.

5.2 SI Gasoline Specifications

The ratings of SI engines tested under this standard must reflect the performance that a customer can obtain operating the engine on the manufacturer’s recommended fuel. To achieve that, fuels used in testing must have energy content (defined as lower heating value) typical of that found in commercially available gasoline. The engine rating shall be for fuel octane values typical of commercially available fuels of the grade recommended by the manufacturer. No correction for power output is made due to fuel energy content.

Maximum allowable gasoline octane numbers for engine power rating have been determined corresponding to “regular”, “mid-grade”, and “premium” fuels from surveys of pump gasoline available throughout the United States in 2009. These values are listed in Table 4. . Nominal ethanol content of up to 10% is allowed in the test fuel to match the United States Environmental Protection Agency (EPA) limit on ethanol content of pump gasoline. If the EPA limit for ethanol content in conventional gasoline (Except E85) is increased, the nominal ethanol content allowed under this standard shall be increased to match that limit provided that the ethanol content is within the manufacturer’s recommended limit for the engine. Many SI engines have electronic knock control systems that retard spark when knock is detected. If such a system is active when the engine is rated on the dynamometer, then the fuel used must be within the specified octane limits for the recommended fuel grade. An engine with a knock control system may be tested with higher octane fuel if the knock control system is disabled and the control settings are those that would be achieved when operating on customer-recommended fuel with active knock control. Engines without knock control settings may be rated on any octane level fuel provided that the control settings are those used with customer-recommended fuel.

TABLE 4 - SI GASOLINE SPECIFICATIONS

Fuel Grade	Regular	Mid-Grade	Premium
Max. Research Octane No.:	94	96	99
Max. Motor Octane No.:	85	88	89
Max. Lower Heating Value:	43.5 MJ/kg	43.5MJ/kg	43.5 MJ/kg

The following table shall be used in determining the fuel to be used in testing SI engines:

TABLE 5 - FUEL TYPE SELECTION FOR SI ENGINE RATING

Manufacturer's Specification	Fuel to Use (per Table 3)	Comments
Absence of Declaration	Regular Fuel	
Minimum of 87 Octane	Regular Fuel	Assumed to be (R+M)/2 method.
Regular Fuel	Regular Fuel	
Premium Fuel Recommended	Premium Fuel	
Premium Fuel Required	Premium Fuel	
91+ Octane	Premium Fuel	Assumed to be (R+M)/2 method.
Premium Recommended When Towing	Regular Fuel	Towing is a small subset of customer usage. It is acceptable to have dual ratings.
Flex Fuel with Gasoline or E85	Recommended Gasoline E85 (conditional)	Always report the gasoline rating. If the E85 rating is more than 2% higher than the rating on gasoline, then a dual rating is permitted.
Mid-Grade Fuel Recommended	Mid-Grade Fuel	Premium not allowed.

5.3 Reference CI Fuel Specifications

Reference fuel specifications are defined by Title 40, Code of Federal Regulations, Part 1065.703 or most recent and represent range mean values for Type 2-D diesel fuel. The reference fuel characteristics in Table 6 have been determined to affect engine test power, and are listed with the applicable test ranges for which correction factors are valid. Note that correction factors are not applied for engines where electronic controls adjust power and torque to compensate for fuel properties. Correction factors for engines using positive displacement injection systems are given in Appendix A.

TABLE 6 - REFERENCE CI FUEL SPECIFICATIONS

	Standard Condition	Test Range Limits
Fuel Density at 15 °C	0.850 kg/L	0.840 – 0.860 kg/L
Fuel Kinematic Viscosity at 40 °C	2.6 mm ² /s	2.0 – 3.2 mm ² /s
Fuel Inlet Temperature	40 °C	39 – 41 °C (pump/line/nozzles/common rail) or 37 – 43 °C (unit injectors)

5.4 Alternative Fuels

Reference values for alternative SI and CI fuels, both liquid and gaseous, are not presented in this document. Therefore, when alternative fuels are used for the gross power engine test, no corrections to reference fuel conditions shall be made. Any reference to the rated power and torque for an engine rated on alternative fuel should specify the fuel used in rating the engine.

5.5 Power Correction Factor

The performance of SI and CI engines is affected by the density of the inlet combustion air as well as by the characteristics of the test fuel. Whenever possible, tests should be run at the standard conditions with reference fuels. When this is not possible, in order to provide a common basis of comparison, correction factors should be applied to the observed gross power and torque to account for differences between reference air and fuel conditions and those at which the test data were acquired.

- 5.5.1 All power and torque correction procedures for atmospheric air are based on the conditions of the engine inlet air supply immediately prior to the entrance into the engine air induction system. This may be ambient (atmospheric) air or a laboratory air plenum that maintains air supply conditions within the range limits defined in Table 3. Air supply systems that provide tuning or pressure charging in violation of the intent of this procedure are prohibited.
- 5.5.2 On any engine (CI or SI) where the power output is automatically controlled to compensate for changes in one or more of the listed inlet air and fuel supply test conditions, no correction for that test parameter shall be made. For example, boosted engines with absolute pressure controls shall not be corrected for ambient barometric pressure.
- 5.5.3 The magnitude of the power correction should not exceed 5% for inlet air or 3% for inlet fuel corrections. If the correction factor exceeds these values, it shall be noted in accordance with 8.1.

5.6 Correction Formulas

The applicable correction formulas for spark-ignition and compression-ignition engines are listed in Section 9. These correction formulas are designed for correction of gross brake power of naturally-aspirated engines at full throttle operation.

6. LABORATORY AND ENGINE EQUIPMENT.

This section contains a list of laboratory and engine equipment used in the gross power test.

6.1 Laboratory Equipment

The following standard laboratory test equipment is required for the gross power test.

6.1.1 Inlet System

Any laboratory system that provides a supply of air to the basic engine. The inlet system begins at the point where air enters from the supply source (atmosphere or lab plenum) and ends at the entrance to the throttle body, inlet manifold, or turbocharger inlet, on engines as appropriate. Restriction induced by the inlet system may be at minimum levels. For example, the test may be run with a bellmouth on the throttle body or with the production air filter housing with the filter and filter cover removed. Air entering the induction system must be from a plenum or atmosphere.

6.1.2 Exhaust System

Any laboratory system that vents exhaust gas from the outlet of the basic engine. The exhaust system begins at the exhaust manifold outlet or at the turbine outlet on engines so equipped. The system should not provide tuning to increase engine power. Ideally, the exhaust of the engine should empty directly to a plenum or the atmosphere, but it is recognized that some minimal adaptation may be required for compatibility with laboratory systems. Restriction induced by the exhaust system may be at minimum levels.

6.1.3 Fuel Supply System

Any laboratory system that provides a supply of fuel to the fuel inlet of the basic engine. The fuel supply system must be capable of controlling fuel supply temperature to within the ranges specified in 5.3 for CI engines if the engine is equipped with a positive displacement fuel system. The fuel supply system shall not exceed the manufacturer's maximum permissible restriction requirements, if applicable.

6.1.4 Charge Air Cooler

For charge-cooled engines a laboratory auxiliary cooler may be employed for test purposes. If used, the laboratory unit is set to simulate the manufacturer's intended in-service charge air cooler restriction and inlet manifold temperature as if the ambient and inlet supply air temperatures were 25 °C, and the appropriate correction procedure is applied per Section 9:

6.1.5 Auxiliary Power Supply

Electrically driven engine components determined to be part of the basic engine may be operated via an external power supply. In such cases, the power required must be determined and subtracted from the corrected gross brake power.

6.2 Engine Equipment

A basic engine, as defined in 3.4, is used for the gross power test. Table 1 lists basic engine accessories and control settings required for the gross power test.

7. TEST PROCEDURES

This section contains the required test procedures for determining gross engine power.

7.1 Instrumentation Accuracy

Critical measurements for the determination of engine power include: engine speed and torque; inlet air temperature, pressure and humidity.

The following minimum test instrumentation accuracy is required for the critical measurements listed:

- a. Torque - $\pm 0.5\%$ of measured value
- b. Speed - $\pm 0.2\%$ of measured value
- c. Inlet Air Temperature - ± 1.0 °C
- d. Air Supply Pressure - ± 0.15 kPa
- e. Inlet Air Humidity - ± 1.0 °C wet bulb

The following instrumentation accuracy is recommended for the additional measurements:

- f. Fuel Flow - $\pm 1\%$ of measured value
- g. General Temperature measurements - ± 2 °C
- h. Other Gas Pressures - ± 0.5 kPa

7.2 Measurement Requirements

7.2.1 Inlet Air Supply Pressure and Temperature

Pressure and temperature of the inlet air supply, used for the purpose of correcting engine power, shall be measured in a manner to obtain the total (stagnation) condition at the entrance to the engine air induction system. This measurement shall be made within 0.15 m of the entrance to the Air Induction System inlet duct. On those tests where the engine air supply is ambient air, this pressure is the barometric pressure; on those tests where the air supply is test cell ambient air, this pressure is the cell barometric pressure; on those tests where the inlet air supply is plumbed directly to the Air Induction System, the correction pressure is the pressure measured inside the lab plenum.

7.2.2 Intake Manifold Pressure and Temperature

Intake manifold pressure and temperature shall be measured as static values with probes located in a section common to several cylinders. In such installations, dynamic pressure is assumed zero.

7.2.3 Charge Air Cooler Pressure and Temperature

For engines equipped with a charge air cooler, instrument the engine with thermocouples and pressure probes midstream at the air inlet and outlet of the Charge Air Cooler. On charge air-cooled engines in which a laboratory cooler is employed for testing, pre-cooler charge air pressure must also be measured for the purpose of setting in-service restrictions per SAE J1148. Pre-cooler pressure must be measured upstream of the auxiliary unit in a manner to obtain the total (stagnation) value. Auxiliary cooler restriction is the difference between the pre-cooler and intake manifold pressures.

7.2.4 Coolant Temperature

Coolant temperature in liquid-cooled engines shall be measured at the inlet and outlet of the engine, in air-cooled engines at points specified by the manufacturer.

7.2.5 Oil Pressure and Temperature (if applicable)

Oil pressure shall be measured at the entrance to the main oil gallery. Oil temperature can be measured at the same location or inside the oil sump.

7.2.6 Fuel Temperature and Pressure

Fuel temperature and pressure shall be measured at the inlet to the carburetor or fuel injector rail for SI engines, and at the inlet to the high-pressure injection pump or unit injector rail for CI engines, and at the outlet of the volumetric flow meter for gaseous-fueled engines. Fuel temperature must also be measured at the entrance to the fuel flow meter for the purposes of density correction in the mass fuel flow calculation.

7.2.7 Air/Fuel Ratio

The air/fuel ratio shall be measured for the purpose of ensuring that the air/fuel run on the dynamometer is within the limits specified by the manufacturer for in-service operation.

7.3 Adjustments and Run-in

7.3.1 Adjustments shall be made before the test in accordance with the manufacturer's instructions. No changes or adjustments shall be made during the test.

7.3.2 The engine shall be run-in according to the manufacturer's recommendation. If no such recommendation is available, the engine shall be run-in until corrected brake power is repeatable within 1% over an 8 h period.

7.4 Test Operating Conditions

7.4.1 The engine must be started and warmed up in accordance with manufacturer's specifications. No data shall be taken until torque and speed have been maintained within 1% and temperatures have been maintained within ± 2 °C for at least 1 min.

7.4.2 Engine speed shall not deviate from the nominal speed by more than $\pm 1\%$ or $\pm 10 \text{ min}^{-1}$, whichever is greater.

7.4.3 Coolant outlet temperature for a liquid-cooled engine shall be controlled to within ± 3 °C of the nominal thermostat value specified by the manufacturer. Coolant inlet air temperature for an air-cooled engine is regulated to 15-35 °C.

7.4.4 Fuel inlet temperature for positive displacement diesel fuel injection systems shall be controlled to $40 \text{ }^\circ \pm 3 \text{ }^\circ\text{C}$ for unit injector systems, and $40 \text{ }^\circ \pm 1 \text{ }^\circ\text{C}$ for pump/line/nozzle systems. Test fuel temperature control is not required on SI engine power tests.

7.4.5 The exhaust gas must be vented to a reservoir having a total pressure within 0.75 kPa of the inlet air supply pressure.

7.5 Test Points

Record full throttle data for at least five approximately evenly spaced operating points to define the power curve between the lowest stable speed and the maximum engine speed recommended by the manufacturer. One of the operating speeds shall be the rated power speed, one shall be the rated torque speed.

8. PRESENTATION OF TEST RESULTS

This section contains a listing of test data to be recorded and procedures for presenting results.

8.1 Reporting Requirements

All reported engine test data shall carry the notation: "Performance obtained and corrected in accordance with SAE J1995® Revised December, 2013." Any deviation from this document, its procedures, or limits, shall be noted. All reported test data bearing the SAE J1995® notation shall include a minimum of the following information at each test point:

- a. Engine speed
- b. Corrected gross brake power (or torque) In addition to individual test data points, test data may also be reported in the form of power and torque curves.

8.2 Recorded Test Conditions

Record the following ambient air, fuel, and lubricating oil test conditions and specifications.

8.2.1 Inlet Air Supply Conditions

- a. Air supply pressure
- b. Air supply vapor pressure
- c. Air supply temperature

8.2.2 Spark Ignition Engine Fuel - Liquid

- a. Fuel type and/or blend
- b. Research and motor octane numbers
- c. Lower heating value

8.2.3 Spark Ignition Engine Fuel - Gaseous

- a. Fuel type or grade
- b. Composition
- c. Density at 15 °C and 101 kPa
- d. Lower heating value

8.2.4 Diesel Fuels

- a. ASTM or other fuel grade
- b. Density at 15 °C
- c. Viscosity at 40 °C
- d. Lower heating value (optional)

8.2.5 Lubricating Oil

- a. API engine service classification
- b. SAE-viscosity grade
- c. Manufacturer and brand name

8.3 Recorded Test Data

Record the following minimum information at each data test point:

- a. Brake torque
- b. Friction torque (if measured)
- c. Engine speed
- d. Fuel flow rate
- e. Fuel supply pressure and temperature
- f. Ignition and/or injection timing
- g. Oil pressure and temperature (if applicable)
- h. Coolant temperature (liquid cooled only)
- i. Inlet manifold air temperature and pressure
- j. Total pressure drop across the auxiliary cooler (if applicable)
- k. Smoke (optional - CI engines only)

8.4 Engine Equipment

Record all engine equipment listed per 6.2. Additionally, record engine manufacturer, displacement, bore and stroke, number and configuration of cylinders, fuel system type, plus type of pressure charging system, if applicable. If a laboratory charge air cooler is used, record the test method per 6.1.4.

For SI engines equipped with knock sensors, the engine should be designated as a "regular" or "premium" fuel engine. For those SI engines without knock sensors, the minimum octane number is as recommended by the engine manufacturer.

8.5 Additional Recorded Information

Record any other pertinent test data as determined by the manufacturer. This may include, but is not limited to: test date, engine serial number, test number, test location, etc.

9. CORRECTION FORMULAS

This section includes all formulas necessary to correct observed engine power performance for deviations in inlet air and fuel supply conditions.