## FINAL REGULATION ORDER, Part 2

Note: Amendments to the incorporated regulations are shown with underline text for additions and ~~strikeout text for deletions~~. Newly adopted, incorporated regulations are shown without underline as permitted by California Code of Regulations, title 1, section 8.

Amend the incorporated "California Exhaust Emission Standards and Test Procedures for New 2001 and Later Off-Road Large Spark-Ignition Engines (Parts I and II)" to read:

State of California
AIR RESOURCES BOARD

# CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2001 ~~AND LATER~~ THROUGH 2006 OFF-ROAD LARGE SPARK-IGNITION ENGINES

## PART I

Adopted: September 1, 1999
Amended: March 2, 2007

NOTE: The general provisions herein have been adapted and modified from similar provisions set forth in 40 CFR, Part 86, Subpart A - General Provisions for Emission Regulations for 1977 and Later Model Year New Light-Duty Vehicles, 1977 and Later Model Year New Light Duty Trucks, 1977 and Later Model Year New Heavy-Duty Engines, and for 1985 and Later Model Year New Gasoline-Fueled Heavy-Duty Vehicles.

~~This document is all newly adopted text.~~ The sole amendments are to the title and years of applicability of the regulations.

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## I. Emission Regulations for New 2001 ~~and Later~~ through 2006 Off-Road Large Spark-Ignition Engines, General Provisions.

### 1. General Applicability.

(a) These provisions apply to new off-road large spark-ignition engines with displacement greater than 1.0 liter, produced on or after January 1, 2001 through December 31, 2006.

(b) For any engine that is not a distinctly Otto cycle engine, the Executive Officer shall determine whether the engine shall be subject to these regulations, taking into consideration the relative similarity of the engine's basic characteristics with those of Otto cycle engines.

(c) Every new off-road large spark-ignition engine that is manufactured for sale, sold, offered for sale, introduced or delivered for introduction into commerce into California which is subject to any of the standards prescribed in these provisions, is required to meet California air pollution requirements as certified for use and sale by the manufacturer through the Air Resources Board and covered by an Executive Order issued under these provisions.

(d) The test procedures for determining certification and compliance with the standards for exhaust emissions from new off-road LSI engines with engine displacement equal to or less than 1.0 liter sold in the state are set forth in “California Exhaust Emission Standards and Test Procedures for 1995-2004 ~~and Later~~ Small Off-Road Engines," as last amended ~~March 23, 1999~~ July 26, 2004 or California Exhaust Emission Standards and Test Procedures for 2005 and Later Small Off-Road Engines,” adopted July 26, 2004.

### 2. Definitions.

"Accuracy" means the difference between a measurement and true value.

"Alternate Fuel" means any fuel that will reduce non-methane hydrocarbons (on a reactivity-adjusted basis), NOx, CO, and the potential risk associated with toxic air contaminants as compared to gasoline or diesel fuel and would not result in increased deterioration of the engine. Alternate fuels include, but are not limited to, methanol, ethanol, liquefied petroleum gas, compressed natural gas, and electricity.

"ARB Enforcement Officer" means any officer or employee of the Air Resources Board so designated in writing by the Executive Officer or by the Executive Officer's designee.

"Auxiliary Emission Control Device (AECD)" means any element of design which senses temperature, vehicle speed, engine RPM, transmission gear, manifold vacuum, or any other parameter for the purpose of activating, modulating, delaying, or deactivating the operation of any of the emission control system.

“Basic Engine” means an engine manufacturer’s description of their unique combination of engine displacement, number of cylinders, fuel system, emission control system, and other engine and emission control system characteristics as determined or specified by the Executive Officer.

"Calibrating gas" means a gas of known concentration that is used to establish the response curve of an analyzer.

"Calibration" means the set of specifications, including tolerances, unique to a particular design, version, or application of a component or components assembly capable of functionally describing its operation over its working range.

"Configuration" means a subclassification of an engine-system combination on the basis of engine code, inertia weight class, transmission type and gear ratios, final drive ratio, and other parameters that may be designated by the Executive Officer.

"Confirmatory testing" means ARB directed emissions tests and inspections of the test engines and/or test vehicles used by the manufacturer to obtain test data for submittal with the certification application. The emissions tests may be conducted at ARB, contracted facilities, or at the manufacturer's facility. The testing will be done at the expense of the manufacturer.

"Conveniently available service facility and spare parts for small- volume manufacturers" means that the engine manufacturer has a qualified service facility at or near the authorized point of sale or delivery of its engines and maintains an inventory of all emission-related spare parts or has made arrangements for the part manufacturers to supply the parts by expedited shipment (e.g., using overnight express delivery service, UPS, etc.).

"Crankcase emissions" means airborne substances emitted to the atmosphere from any portion of the engine crankcase ventilation or lubrication systems.

"Critical emission-related components" are those components that are designed primarily for emission control, or whose failure may result in a significant increase in emissions accompanied by no significant impairment (or perhaps even an improvement) in performance, driveability, and/or fuel economy as determined by the Executive Officer.

"Critical emission-related maintenance" means that maintenance to be performed on critical emission-related components.

"Curb-idle" means: (1) For manual transmission code engines, the manufacturer's recommended engine speed with the clutch disengaged. (2) For automatic transmission code engines, curb idle means the manufacturer's recommended engine speed with the automatic transmission in gear and the output shaft stalled.

"Defeat Device" means an AECD that reduces the effectiveness of the emission control system under conditions that may reasonably be expected to be encountered in normal operation and use, unless (1) such conditions are substantially included in the emission test procedure, (2) the need for the AECD is justified in terms of protecting the engine against damage or accident, or (3) the AECD does not go beyond the requirements of engine starting.

“Deterioration Factor” means the calculated or assigned number that represents the certification engine’s emissions change over the durability period. It is multiplied by zero hour (new) engine test results to determine the engine family compliance level. The deterioration factor is determined as per the Test Procedures. See “Emission Durability Period” below.

"Emission-related maintenance" means that maintenance that substantially affects emissions or is likely to affect the emissions deterioration of the equipment, vehicle, or engine during normal in-use operation, even if the maintenance is performed at some time other than that which is recommended.

"Emissions Durability Period" is the period over which, for purposes of certification, a manufacturer must demonstrate compliance with the standards set forth in Section 2433(b), Title 13, of the California Code of Regulations. The durability periods are also noted in the table in

Section 2433 (b). The emissions durability period is used to determine an engine family's deterioration factors.

"Engine code" means a unique combination, within an engine-system combination, of displacement, air/fuel calibration, spark/timing calibration, distributor calibration, auxiliary emission control devices, and other engine and emission control system components specified by the Executive Officer.

"Engine family" is a subclass of a basic engine based on similar emission characteristics. The engine family is the grouping of engines that is used for the purposes of certification and determined in accordance with Section 11.

"Engine family group" means a collection of similar engine families used for the purpose of off-road certification and determined in accordance with Section 11. Generally, the engine family group concept is used to determine the deterioration factors for one or more engine families as determined in accordance with Section 11.

"Engine-system combination" means an engine family-exhaust emission control system combination.

"Executive Officer" means the Executive Officer of the Air Resources Board or an authorized representative.

"Exhaust emissions" means substances emitted to the atmosphere from any opening downstream from the exhaust port of an engine.

"Flexible fuel engine (or equipment or vehicle)" means any engine (or equipment or vehicle) engineered and designed to be operated on a petroleum fuel, a methanol fuel, a gaseous fuel, or any mixture of the above.

"Fuel system" means the combination of fuel tank(s), fuel pump, fuel lines, and carburetor or fuel injection components, and includes all fuel system vents and fuel evaporative emission control system components.

"Gross Power" means the power measured at the crankshaft or its equivalent, the engine being equipped only with the standard auxiliaries necessary for its operation on the test bed.

"Malfunction" means not operating according to specifications (e.g. those specifications listed in the application for certification).

"Maximum rated horsepower" means the maximum brake horsepower output of an engine as stated by the manufacturer in his sales and service literature and his application for certification under Section 8.

"Maximum rated torque" means the maximum torque produced by an engine as stated by the manufacturer in his sales and service literature and his application for certification under Section 8.

"Methanol-fueled" means any equipment, motor vehicle or engine that is engineered and designed to be operated using methanol fuel (i.e., a fuel that contains at least 50 percent methanol ($CH_3OH$) by volume) as fuel. Flexible fuel engines are methanol-fueled engines.

"Military engine" means any engine manufactured solely for the Department of Defense to meet military specifications.

"New Engine Compliance testing" means ARB directed emissions tests and inspections of a reasonable number of production engines and/or equipment that are offered for sale, or manufactured for sale, in California in order to verify compliance with the applicable

certification emission standards. The emissions tests must be conducted at a qualified testing facility. The testing facility is chosen by the manufacturer and approved by the Executive Officer. This may include ARB facilities, contracted facilities, or at the manufacturer's facility. The testing will be done at the expense of the manufacturer.

"Non-emission-related maintenance" means that maintenance that does not substantially affect emissions and that does not have a lasting effect on the emissions deterioration of the equipment, vehicle, or engine during normal in-use operation once the maintenance is performed.

"Non-oxygenated hydrocarbon" means organic emissions measured by a flame ionization detector excluding methanol.

“Off-Road Large Spark-ignition Engines” or “LSI Engines” means any engine that produces a gross horsepower 25 and greater horsepower or is designed (e.g., through fueling, engine calibrations, valve timing, engine speed modifications, etc.) to produce 25 and greater horsepower. If an engine family has models at or above 25 horsepower and models below 25 horsepower, only the models at or above 25 horsepower would be considered LSI engines. The engine’s operating characteristics are significantly similar to the theoretical Otto combustion cycle with the engine’s primary means of controlling power output being to limit the amount of air that is throttled into the combustion chamber of the engine. LSI engines or alternate fuel powered LSI internal combustion engines are designed for powering, but not limited to powering, forklift trucks, sweepers, generators, and industrial equipment and other miscellaneous applications. All engines and equipment that fall within the scope of the preemption of Section 209(e)(1)(A) of the Federal Clean Air Act, as amended, and as defined by regulation of the Environmental Protection Agency, are specifically excluded from this category.

Specifically excluded from this category are: 1) engines operated on or in any device used exclusively upon stationary rails or tracks; 2) engines used to propel marine vessels; 3) internal combustion engines attached to a foundation at a location for at least 12 months; 4) off-road recreational vehicles and snowmobiles; and 5) stationary or transportable gas turbines for power generation

"Option" means any available equipment or feature not standard equipment on a model.

"Organic Material Hydrocarbon Equivalent" means the sum of the carbon mass contributions of non-oxygenated hydrocarbons, methanol and formaldehyde as contained in a gas sample, expressed as gasoline fueled engine hydrocarbons. In the case of exhaust emissions, the hydrogen-to-carbon ratio of the equivalent hydrocarbon is 1.85:1.

"Oxides of nitrogen" means the sum of the nitric oxide and nitrogen dioxide contained in a gas sample as if the nitric oxide was in the form of nitrogen dioxide.

"Peak torque speed" means the speed at which an engine develops maximum torque.

"Percent load" means the fraction of the maximum available torque at a specified engine speed.

"Precision" means the standard deviation of replicated measurements.

"Rated speed" means the speed at which the manufacturer specifies the maximum rated horsepower of an engine.

"Reconfigured emission-data engine" means an emission-data engine obtained by modifying a previously used emission-data engine to represent another emission-data engine.

"Scheduled maintenance" means any adjustment, repair, removal, disassembly, cleaning, or replacement of equipment or engine components or systems required by the manufacturer that is performed on a periodic basis to prevent part failure or equipment or engine malfunction, or anticipated as necessary to correct an overt indication of equipment or engine malfunction or failure for which periodic maintenance is not appropriate.

"Similar systems" are engine, fuel metering and emission control system combinations that use the same fuel (e.g., gasoline, LPG, etc.), combustion cycle (i.e., two or four stroke), general type of fuel system (i.e., carburetor or fuel injection), catalyst system (e.g., none, oxidation, three-way only, etc.), fuel control system (i.e., feedback or non-feedback), secondary air system (i.e., equipped or not equipped) and EGR (i.e., equipped or not equipped).

“Small Volume Manufacturer” means an engine manufacturer that produces a total of less than 2000 large spark-ignition engines annually for sale in the United States.

"Span gas" means a gas of known concentration that is used routinely to set the output level of an analyzer.

"Specific emissions" means emissions expressed on the basis of observed gross power or net power in grams per brake horsepower hour. For many engine types the auxiliaries that will be fitted to the engine in service are not known at the time of manufacture or certification. For this reason the emissions shall be expressed on the basis of gross power. When it is not convenient to test the engine in the gross conditions, e.g., if the engine and transmission form a single integral unit, the engine may be tested in the net condition.

"Standard equipment" means those features or equipment that are marketed on a product over which the purchaser can exercise no choice.

"System" includes any engine modification that controls or causes the reduction of substances emitted from an engine or piece of equipment.

"Test engine" means any engine used in certification, production line testing, quality audit, or compliance testing. A test engine can be a prototype engine or a production engine depending on the testing program in which it is used.

“Test Procedures” means the procedures specified in both Part I and Part II of the “California Exhaust Emission Standards and Test Procedures for New 2001 ~~and Later~~ through 2006 Off-Road Large Spark-Ignition Engines.”

"Throttle" means a device used to control an engines power output by limiting the amount of air entering the combustion chamber.

"Transmission class" means the basic type of transmission, e.g. manual, automatic, semiautomatic.

"Transmission configuration" means a unique combination, within a transmission class, of a number of the forward gears and, if applicable, overdrive. The Executive Officer may further subdivide a transmission configuration (based on such criteria as gear ratios, torque converter multiplication ratio, stall speed and shift calibration, etc.), if he determines that significant fuel economy or exhaust emission differences exist within that transmission configuration.

"Unscheduled maintenance" means any inspection, adjustment, repair, removal, disassembly, cleaning, or replacement of engine, equipment, or vehicle components or systems that is performed to correct or diagnose a part failure or equipment or vehicle (if the engine were

installed in a vehicle) malfunction that was not anticipated.

"Useful life" means a period of 7 years or 5000 hours of operation, whichever first occurs for engines having engine displacement greater than 1.0-liter, and 2 years or 1,000 hours of operations, whichever occurs first, for engines having engine displacement equal to or less than 1.0-liter. However, in no case may this period be less than the manufacturer's basic mechanical warranty period for the engine family.

"Zero (0) hours" means that point after normal assembly line operations and adjustments are completed and before fifty (50) additional operating hours have been accumulated, including emission testing, if performed.

**3. Abbreviations.**

(a) The abbreviations in this section apply to these provisions and have the following meanings:

AECD--Auxiliary emission control device.
API--American Petroleum Institute.
ARB--California Air Resources Board.
ASTM--American Society for Testing and Materials.
BHP--Brake horsepower.
BSCO--Brake specific carbon monoxide.
BSHC--Brake specific hydrocarbons.
BSNO --Brake specific oxides of nitrogen.
C--Celsius.
CFV--Critical flow venturi.
CFV-CVS--Critical flow venturi-constant volume sampler.
$CH_4$--Methane.
CL--Chemiluminescence.
CLD--Unheated chemiluminescence detector.
$CO_2$ --Carbon dioxide.
CO--Carbon monoxide.
conc.--concentration.
cfm--cubic feet per minute.
CVS--Constant volume sampler.
ECS--Electro-chemical sensor.
F--Fahrenheit.
FID--Flame ionization detector.
ft.--feet.
g--gram(s).
gal.--U.S.gallon(s).
GC--Gas chromatograph.
GVW--Gross vehicle weight.
GVWR--Gross vehicle weight rating.

h--hour(s).
hr--hour(s).
$H_2O$--water.
HC--Hydrocarbon(s).
HCLD--Heated chemiluminescence detector.
HCHO--Formaldehyde.
HFID--Heated flame ionization detector.
hp.--horsepower.
IBP--Initial boiling point.
ID--Internal diameter.
in.--inch(es).
K--Kelvin.
kg--kilogram(s).
kPa--kilopascal(s).
lb.--pound(s).
lb.-ft.--pound-feet.
m--meter(s).
max.--maximum.
MeOH--Methanol ($CH_3OH$).
mg--milligram(s).
mi.--mile(s).
min.--minute(s).
ml--milliliter(s).
mm--millimeter(s).
mph--miles per hour.
mv--millivolt(s).
$N_2$--Nitrogen.
NDIR-Nondispersive infrared.
$NH_3$--Ammonia.
NMC--Non-methane cutter.
NMHC--Non-methane hydrocarbons.
NO--nitric oxide.
$NO_2$--nitrogen dioxide.
NOx--oxides of nitrogen.
No.--Number.
$O_2$ --oxygen.
OMHCE--Organic Material Hydrocarbon Equivalent.
PDP-CVS--Positive displacement pump-constant volume sampler.
PMD--Paramagnetic detector.
ppm--parts per million by volume.
ppm C--parts per million, carbon.
psi--pounds per square inch.
R--Rankin.

rpm--revolutions per minute.
s--second(s).
SAE--Society of Automotive Engineers.
SI--International system of units.
$SO_2$ --Sulfur dioxide.
V--volt(s).
W--watt(s).
WF--Weighting factor.
wt.--weight.
ZROD--Zirconium dioxide sensor.
'--feet.
"--inch(es).
°--degree(s).
Σ--summation.

(b) The symbols defined in this section apply to this part and have the following meanings and units:

| Symbol | Meaning | Unit |
|---|---|---|
| $A_p$ | Cross sectional area of the isokinetic sampling probe | $m^2$ |
| $A_T$ | Cross sectional area of the exhaust pipes | $m^2$ |
| F | Engine specific parameter considering atmospheric conditions | |
| $F_{FCB}$ | Fuel specific factor for the carbon balance calculation | |
| $F_{FD}$ | Fuel specific factor for exhaust flow calculation on dry basis | |
| $F_{FH}$ | Fuel specific factor representing the hydrogen to carbon ratio | |
| $F_{FW}$ | Fuel specific factor for exhaust flow calculation on wet basis | |
| $G_{AIRW}$ | Intake air mass flow rate on wet basis | kg/h |
| $G_{AIRD}$ | Intake air mass flow rate on dry basis kg/h | |
| $G_{DIL}$ | Dilution air mass flow rate | kg/h |
| $G_{EDF}$ | Equivalent diluted mass flow rate | kg/h |
| $G_{EDFW}$ | Equivalent diluted mass flow rate wet basis | kg/h |
| $G_{EXHW}$ | Exhaust gas mass flow rate on wet basis | kg/h |
| $G_{Fuel}$ | Fuel mass flow rate | kg/h |
| $G_{TOT}$ | Diluted exhaust gas mass flow rate | kg/h |
| H | Absolute humidity (water content related to dry air) | g/kg |
| i | Subscript denoting an individual mode | |
| $K_H$ | Humidity correction factor | |
| $K_{HDIE}$ | Humidity correction factor for diesel engines. | |
| $K_{HPET}$ | Humidity correction factor for gasoline engines. | |
| L | Percent torque related to max. torque for the test mode | % |
| mass | Pollutant mass flow | g/h |
| $M_{SAM}$ | Mass of sample through particulate sampling filters | kg |
| $p_s$ | Dry Atmospheric pressure | kPa |
| P | Gross power output uncorrected | kW |
| $p_d$ | Test ambient saturation vapor pressure at ambient temperature | kPa |
| $P_{AUX}$ | Declared total power absorbed by auxiliaries fitted for the test | kW |

| | | |
|---|---|---|
| $P_M$ | Maximum power measured at the test speed under test conditions | kW |
| q | Dilution ratio | - |
| r | Ratio of cross sectional areas of sampling probe and exhaust pipe | - |
| $R_a$ | Relative humidity of the ambient air | % |
| S | Dynamometer setting | kW |
| T | Absolute temperature at air inlet | K |
| $V_{SAM}$ | Volume of sample through particulate sampling filters | $m^3$ |
| $T_{Dd}$ | Absolute dewpoint temperature | K |
| $V_{EXHD}$ | Exhaust gas volume flow rate on dry basis | $m^3/h$ |
| $V_{AIRW}$ | Intake air volume flow rate on wet basis | $m^3/h$ |
| $V_{DILW}$ | Dilution air volume flow rate on wet basis | $m^3/h$ |
| $V_{EDFW}$ | Equivalent diluted volume flow rate on wet basis | $m^3/h$ |
| $p_B$ | Total barometric pressure | kPa |
| $V_{EXHW}$ | Exhaust gas volume flow rate on wet basis | $m^3/h$ |
| $V_{TOTW}$ | Diluted exhaust gas volume flow rate on wet basis | $m^3/h$ |
| WF | Weighting factor | |
| $WF_E$ | Effective weighting factor | |

## 4. General Standards; Increase in Emissions; Unsafe Conditions.

(a) Any system installed on or incorporated in a new off-road large spark-ignition engine to enable such engine to conform to standards imposed by these procedures:

(1) Shall not in its operation or function cause the emission into the ambient air of any noxious or toxic substance that would not be emitted in the operation of such engine without such system, except as specifically permitted by regulation; and

(2) Shall not in its operation, function or malfunction result in any unsafe condition endangering the engine, its operator, or persons or property in close proximity to the engine.

(b) In establishing the physically adjustable range of each adjustable parameter on a new off-road large spark-ignition engine, the manufacturer shall take into consideration the production tolerances and ensure that safe operability characteristics are available within that range.

(c) Every manufacturer of new off-road large spark-ignition engines subject to any of the standards imposed by these procedures shall, prior to selling or offering for sale any engines, test or cause to be tested off-road large spark-ignition engines in accordance with good engineering practices to ascertain that such test engines will meet the requirements of this section for the useful life of the engine as defined in these Test Procedures.

**5. Adjudicatory Hearing.**

Parties affected by an Executive Officer's determination may file a request for an adjudicatory hearing under Title 17, Division 3, Chapter 1, California Code of Regulations Subchapter 1.25. If, after reviewing the request and supporting data, the Executive Officer finds that the request raises a substantial issue of fact, a hearing in accordance with Subchapter 1.25 shall be granted.

**6. Maintenance of Records; Submittal of Information; Right of Entry.**

(a) The manufacturer of any new large spark-ignition off-road engine subject to any of the standards or procedures prescribed herein shall establish, maintain and retain the following adequately organized and indexed records.

(1) **General records**.

(i) The records required to be maintained by this paragraph shall consist of:

(A) Identification and description of all certification engines for which testing is required under these procedures.

(B) A description of all emission control systems that are installed on or incorporated in each certification engine.

(C) A description of all procedures used to test each such certification engine.

(ii) A properly filed application for certification, following the format prescribed by the ARB for the appropriate model year, fulfills each of the requirements of this paragraph (a)(1)(i).

(2) **Individual records**.

(i) A brief history of each off-road large spark-ignition engine used for certification under these procedures including:

(A) In the case where a current production engine is modified for use as a certification engine, a description of the process by which the engine was selected and of the modification made. In the case where the certification engine is not derived from a current production engine, a general description of the buildup of the engine (e.g., experimental heads, air intake manifolds, cams, and valves were cast and machined according to supplied drawings, etc.). In both cases above, a description of the origin and selection process for the closed-loop air/fuel system components (carburetor and/or fuel injection components and feedback sensor(s)), auxiliary emission control system components, exhaust emission control system components, and exhaust aftertreatment devices as applicable, shall be included. The required descriptions shall specify the steps taken to assure that the engine used for certification with respect to air/fuel system, emission control system components, exhaust aftertreatment devices, exhaust emission control system components, or any other devices or components, as applicable that can reasonably be expected to influence exhaust emissions, as applicable, will be representative of production engines, and that all components and/or engine construction processes, component inspection and selection techniques, and assembly techniques employed in the construction of the certification engines are reasonably likely to be implemented for

production engines, or that they are as closely analogous as practicable to planned construction and assembly processes.

(B) A complete record of all emission tests performed (except tests performed by ARB directly), including test results, the date and purpose of each test, and the number of hours accumulated on the engine.

(C) The date of each required service accumulation run, listing the number of operating hours accumulated, individual emission test data and results.

(D) [Reserved]

(E) A record and description of all maintenance and other service performed, giving the date of the maintenance or service and the reason for it.

(F) A record and description of each test performed to diagnose engine or emission control system performance, giving the date and time of the test and the reason for it.

(G) [Reserved]

(H) A brief description of any significant events affecting the engine during any time in the period covered by the history not described by an entry under one of the previous headings including such extraordinary events as accidents involving the engine or dynamometer runaway.

(ii) Each such history shall be started on the date that the first of any of the selection or buildup activities in paragraph (a)(2)(i)(A) of this section occurred with respect to the certification engine, shall be updated each time the operational status of the engine changes or additional work is done on it, and shall be kept in a designated location.

(3) All records, other than routine emission test records, required to be maintained under these procedures shall be retained by the manufacturer for a period of eight (8) years after issuance of all Executive Orders to which they relate. Routine emission test records shall be retained by the manufacturer for a period of two (2) year after issuance of all Executive Orders to which they relate. Records may be retained as hard copy or reduced to microfilm, electronic format, punch cards, etc., depending on the record retention procedures of the manufacturer, **provided,** which in every case all the information contained in the hard copy shall be retained.

(b) At the time of issuance of any instructions or explanations regarding the use, repair, adjustment, maintenance, or testing relevant to the control of crankcase or exhaust emissions of any new off-road large spark-ignition engine subject to any of the standards prescribed in these procedures, the engine manufacturer shall submit to the Executive Officer copies of all such instructions issued by the engine manufacturer for use by other manufacturers, assembly plants, distributors, dealers, and ultimate purchasers. However, the manufacturer need not submit any material not translated into the English language unless specifically requested by the Executive Officer.

(c) (1) Any manufacturer who has applied for certification of a new off-road large spark-ignition engine subject to certification testing under these procedures shall admit, or cause to be admitted, to any of the following facilities during operating hours, any ARB Enforcement Officer upon presentation of credentials or if necessary, an inspection warrant obtained pursuant to the California Code of Civil Procedures, Section 1822.50 et seq.

(i) Any facility where any such tests or procedures or activities connected

with such tests are or were performed.

(ii) Any facility warehousing any new off-road large spark-ignition engine that has been, is being, or will be tested.

(iii) Any facility where any construction process or assembly process used in the modification or buildup of such an engine into a certification engine is taking place or has taken place.

(iv) Any facility where any record or other document relating to any of the above is located.

(2) Upon admission to any facility referred to in paragraph (c)(1) of this section, any ARB Enforcement Officer shall be allowed:

(i) To inspect and monitor any part or aspect of such procedures, activities and testing facilities, including, but not limited to, monitoring engine preconditioning, emissions tests and service accumulation, maintenance, and engine storage procedures, and to verify correlation or calibration of test equipment;

(ii) To inspect and make copies of any such records, designs, or other documents; and

(iii) To inspect and/or photograph any part or aspect of any such certification engine and any components to be used in the construction thereof.

(3) In order to allow the Executive Officer to determine whether or not production off-road large spark-ignition engines conform in all material respects to the design specifications that applied to those engines described in the application for certification for which an Executive Order has been issued, any manufacturer shall admit, or cause to be admitted, to any of the following facilities any ARB Enforcement Officer upon presentation of credentials or if necessary, an inspection warrant obtained pursuant to the California Code of Civil Procedures, Section 1822.50 et seq.

(i) Any facility where any document, design, or procedure relating to the translation of the design and construction of engines and emission related components described in the application for certification testing into production engines is located or carried on; and

(ii) Any facility where any off-road large spark-ignition engines, or equipment, to be introduced into commerce are manufactured or assembled.

(4) On admission to any such facility referred to in paragraph (c)(3) of this section, any ARB Enforcement Officer shall be allowed:

(i) To inspect and monitor any aspect of such manufacture or assembly and other procedures;

(ii) To inspect and make copies of any such records, documents or design; and

(iii) To inspect and photograph any part or aspect of any such new off-road large spark-ignition engines (or new off-road equipment powered by a new off-road large spark-ignition engine) and any component used in the assembly thereof that is reasonably related to the purpose of his entry.

(5) Any ARB Enforcement Officer shall be furnished by those in charge of a facility being inspected with such reasonable assistance as he may request to help him discharge any function listed in this paragraph. Each applicant for or recipient of certification is required to cause those in charge of a facility operated for its benefit to furnish such reasonable assistance without charge to ARB whether or not the applicant controls the facility.

(6) The duty to admit or cause to be admitted any ARB Enforcement Officer applies whether or not the applicant owns or controls the facility in question and applies both to domestic and foreign manufacturers and facilities. ARB will not attempt to make any inspection that it has been informed that local law forbids. However, if local law makes it impossible to do what is necessary to insure the accuracy of data generated at a facility, no informed judgement that an engine is certifiable or is covered by an Executive Order can properly be based on those data. It is the responsibility of the manufacturer to locate its testing and manufacturing facilities in jurisdictions where this situation will not arise.

(7) For the purposes of this paragraph (c):

(i) "Presentation of credentials" shall mean display of the document designating a person as an ARB Enforcement Officer.

(ii) Where equipment, vehicle, component, or engine storage areas or facilities are concerned, "operating hours" shall mean all times during which personnel other than custodial personnel are at work in the vicinity of the area or facility and have access to it.

(iii) Where facilities or areas other than those covered by paragraph (c)(7)(ii) of this section are concerned, "operating hours" shall mean all times during which an assembly line is in operation or all times during which testing, maintenance, service accumulation, production or compilation of records, or any other procedure or activity related to certification testing, to translation of designs from the test stage to the production stage, or to engine (or equipment) manufacture or assembly is being carried out in a facility.

(iv) "Reasonable assistance" includes, but is not limited to, clerical, copying, interpretation and translation services, the making available on request of personnel of the facility being inspected during their working hours to inform the ARB Enforcement Officer of how the facility operates and to answer his questions, and the performance on request of emission tests on any engine that is being, has been, or will be used for certification testing. Such tests shall be nondestructive, but may require appropriate service accumulation. The Executive Officer of the ARB may compel a manufacturer to cause the personal appearance of any employee at such a facility before an ARB Enforcement Officer by signing a written request for the employee's appearance and serving it on the manufacturer. Any such employee who has been instructed by the manufacturer to appear will be entitled to be accompanied, represented, and advised by counsel.

(v) Any entry without 24 hour prior written or oral notification to the affected manufacturer shall be authorized in writing by the Executive Officer.

**7. Emission Standards for 2001 ~~and Later~~ through 2006 Model Year Off-Road Large Spark-Ignition Engines.**

(a) (1) Exhaust emissions from new 2001 ~~and later~~ through 2006 model year off-road large spark-ignition engines shall not exceed the following:

(i)

Exhaust Emission Standards
(grams per brake horsepower-hour)
[grams per kilowatt-hour](1)

| Model Year | Engine Displacement | Durability Period | Hydrocarbon plus Oxides of Nitrogen | Carbon Monoxide |
|---|---|---|---|---|
| 2002 and subsequent | ≤1.0 liter | 1,000 hours or 2 years | 9.0 [12.0] | 410 [549] |
| 2001 - 2003(2),(3) | > 1.0 liter | N/A | 3.0 [4.0] | 37.0 [49.6] |
| 2004 - 2006(4) | > 1.0 liter | 3500 hours or 5 years | 3.0 [4.0] | 37.0 [49.6] |
| ~~2007 and subsequent~~ | ~~> 1.0 liter~~ | ~~5000 hours or 7 years~~ | ~~3.0 [4.0]~~ | ~~37.0 [49.6]~~ |

Note: (1) Standards in grams per kilowatt-hour are given only as a reference. Pollutant emissions reported to ARB by manufacturers must be in grams per brake horsepower-hour.

(2) Small volume manufacturers are not required to comply with these emission standards.

(3) Manufacturers must show that at least 25 percent of its California engine sales comply with the standards in 2001, 50 percent in 2002, and 75 percent in 2003.

(4) The standards for in-use compliance for engine families certified to the standards in the row noted are 4.0 g/bhp-hr (5.4 g/kW-hr) hydrocarbon plus oxides of nitrogen and 50.0 g/bhp-hr (67.0 g/kW-hr) carbon monoxide, with a useful life of 5000 hours or 7 years. In-use averaging, banking, and trading credits may be generated for engines tested in compliance with these in-use compliance standards. If the in-use compliance level is above 3.0 but does not exceed 4.0 g/bhp-hr hydrocarbon plus oxides of nitrogen or is above 37.0 but does not exceed 50.0 g/bhp-hr carbon monoxide, and based on a review of information derived from a statistically valid and representative sample of engines, the Executive Officer determines that a substantial percentage of any class or category of such engines exhibits within the warranty periods noted in Section 2435, Title 13, California Code of Regulations, an identifiable, systematic defect in a component listed in that section, which causes a significant increase in emissions above those exhibited by engines free of such defects and of the same class or category and having the same period of use and hours, then the Executive Officer may invoke the enforcement authority under Section 2439, Title 13, California Code of regulations to require remedial action by the engine manufacturer. Such

remedial action is limited to owner notification and repair or replacement of defective components, without regard to the requirements set forth in Section 2439(b)(5) or Section 2439(c)(5)(B)(vi). As used in the section, the term “defect” does not include failures that are the result of abuse, neglect, or improper maintenance.

(b) Reserved

(c) No crankcase emissions shall be discharged into the ambient atmosphere from any new 2001 ~~or later~~ through 2006 model year off-road large spark-ignition engines.

(d) Reserved

**8. Application for certification.**

(a) A separate application for an Executive Order shall be made for each engine family or engine family group for each year. Such application shall be made to the Executive Officer by the manufacturer and shall be updated and corrected by amendment.

(b) The application shall be in writing, signed by an authorized representative of the manufacturer, and shall include the following:

(1) (i) Identification and description of the engines covered by the application and a description of their emission control system and fuel system components. This shall include a detailed description of each AECD to be installed in or on any certification test engine.

(ii) (A) The manufacturer shall provide to the Executive Officer in the application for certification:

(1) A list of those parameters that are physically capable of being adjusted (including those adjustable parameters for which access is difficult) and that, if adjusted to settings other than the manufacturer's recommended setting, may affect emissions;

(2) A specification of the manufacturer's intended physically adjustable range of each such parameter, and the production tolerances of the limits or stops used to establish the physically adjustable range;

(3) A description of the limits or stops used to establish the manufacturer's intended physically adjustable range of each adjustable parameter, or any other means used to inhibit adjustment;

(4) The nominal or recommended setting, and the associated production tolerances, for each such parameter.

(5) A copy of the warranty booklet for each engine family, for ARB staff to review and modify.

(6) A list of special test devices (such as adaptors, simulator, etc.) with detailed descriptions of its functionality necessary to conduct emission testing.

(B) The manufacturer may provide, in the application for certification, information relating to why certain parameters are not expected to be adjusted in actual use and to why the physically adjustable range of each parameter, or any other means used

to inhibit adjustment, are effective in preventing adjustment of parameters on in-use engines to settings outside the manufacturer's intended physically adjustable ranges. This may include results of any tests to determine the difficulty of gaining access to an adjustment or exceeding a limit as intended or recommended by the manufacturer.

(C) The Executive Officer may require to be provided detailed drawings and descriptions of the various emission-related components and/or hardware samples of such components, for the purpose of making his determination of which engine parameter will be subject to adjustment for new certification and new engine compliance testing and of the physically adjustable range for each such engine parameter.

(2) Projected California sales data sufficient to enable the Executive Officer to select a test fleet representative of the engines for which certification is requested.

(3) A description of the test equipment and fuel proposed to be used.

(4) (i) For each engine family, a statement of recommended maintenance and procedures necessary to assure that the engines covered by a Executive Order in operation conform to the regulations, and a description of the program for training of personnel for such maintenance, and the equipment required.

(ii) At the option of the manufacturer, the proposed composition of the emission-data test fleet.

(c) The manufacturers shall submit to the Executive Officer the original application, any amendments thereto, and all notifications under Sections 17, 18, and 19. The Executive Officer may require that manufacturers submit additional copies of all required information up to a maximum of three copies.

**9. Approval of Application for Certification; Test Fleet Selections; Determinations of Parameters Subject to Adjustment for Certification and New Engine Compliance Testing, Adequacy of Limits, and Physically Adjustable Ranges.**

(a) After a review of the application for certification and any other information that the Executive Officer may require, the Executive Officer may approve the application and select a test fleet in accordance with Section 11.

(b) The Executive Officer may disapprove in whole or in part an application for certification for reasons including incompleteness, inaccuracy, inappropriate proposed service accumulation procedures, test equipment, or fuel, and incorporation of defeat devices on engines described by the application.

(c) Where any part of an application is rejected, the Executive Officer shall notify the manufacturer in writing and set forth the reasons for such rejection. Within 30 days following receipt of such notification, the manufacturer may request a hearing on the Executive Officer's determination in accordance with Section 5. The request shall be in writing, signed by an authorized representative of the manufacturer and shall include a statement specifying the manufacturer's objections to the Executive Officer's determinations, and data in support of such objections.

(d) When the Executive Officer selects emission-data engines for the test fleet, he will at

the same time determine those engine parameters that will be subject to adjustment for certification, quality-audit and new engine compliance testing, the adequacy of the limits, stops, seals, or other means used to inhibit adjustment, and the resulting physically adjustable ranges for each such parameter and notify the manufacturer of his determinations.

(1) (i) Except as noted in paragraph (d)(1)(iv) of this section, the Executive Officer may determine that any parameter on any engine is subject to adjustment if it is physically capable of being adjusted, may significantly affect emissions, and was not present on the manufacturer's engines in the previous model year in the same form and function.

(ii) The Executive Officer may, in addition, determine that any other parameter on any engine that is physically capable of being adjusted and that may significantly affect emissions is subject to adjustment. However, the Executive Officer may make a determination only if he has previously notified the manufacturer that he might require such adjustments and has found, at the time he gave this notice that the intervening period would be adequate to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period.

(iii) In determining the parameters subject to adjustment, the Executive Officer shall consider the likelihood that, for each of the parameters listed in paragraphs (d)(1)(i) and (d)(1)(ii) of this section, settings other than the manufacturer's recommended setting will occur on in- use engines. In determining likelihood, the Executive Officer may consider such factors as, but not limited to, information contained in the application, surveillance information from similar in-use engines, the difficulty and cost of gaining access to an adjustment, damage to the engine if an attempt is made to gain such access and the need to replace parts following such attempt, and the effect of settings other than the manufacturer's recommended setting on engine performance characteristics including emission characteristics.

(iv) The Executive Officer shall not consider manual chokes of engines to be a parameter subject to adjustment under the parameter adjustment requirements.

(2) (i) The Executive Officer shall determine a parameter to be adequately inaccessible or sealed if:

(A) In the case of an idle mixture screw, the screw is recessed within the carburetor casting and sealed with lead, thermosetting plastic, or an inverted elliptical spacer; or the screw is sheared off after adjustment at the factory, and the inaccessibility is such that the screw cannot be accessed and/or adjusted with simple tools in one-half hour or for $52 (1998 dollars) or less.

(B) In the case of a choke bimetal spring, the plate covering the bimetal spring is riveted or welded in place, or held in place with nonreversible screws.

(C) In the case of a parameter that may be adjusted by elongating or bending adjustable members (e.g., the choke vacuum break), the elongation of the adjustable member is limited by design or, in the case of a bendable member, the member is constructed of a material that when bent would return to its original shape after the force is removed (plastic or spring steel materials).

(D) In the case of any other parameter, the manufacturer demonstrates that adjusting the parameter to settings other than the manufacturer's recommended setting cannot be performed in one-half hour or costs more than $52 (1998 dollars).

(ii) The Executive Officer shall determine a physical limit or stop to be an adequate restraint on adjustability if:

(A) In the case of a threaded adjustment, the threads are terminated, pinned or crimped so as to prevent additional travel without breakage or need for repairs that cannot be performed in one-half hour or for $52 (1998 dollars) or less.

(B) The adjustment is ineffective at the end of the limits of travel regardless of additional forces or torques applied to the adjustment.

(C) The manufacturer demonstrates that travel or rotation limits cannot be exceeded with the use of simple and common tools (screwdriver, pliers, cutters, drills, open-end or box wrenches, etc.) without incurring significant and costly damage to the engine, equipment, vehicle or control system or without taking more than one-half hour or costing more than $52 (1998 dollars).

(iii) If the manufacturer service manuals or bulletins describe routine procedures for gaining access to a parameter or for removing or exceeding a physical limit, stop, seal or other means used to inhibit adjustment, or if surveillance data indicate that gaining access, removing, or exceeding is likely, paragraphs (d)(2)(i) and (d)(2)(ii) of this section shall not apply for that parameter.

(iv) In determining the adequacy of a physical limit, stop, seal, or other means used to inhibit adjustment of a parameter not covered by paragraph (d)(2)(i) or (d)(2)(ii) of this section, the Executive Officer will consider the likelihood that it will be circumvented, removed, or exceeded on in-use engines. In determining likelihood, the Executive Officer may consider such factors as, but not limited to, information contained in the application; surveillance information from similar in-use engines; the difficulty and cost of circumventing, removing or exceeding the limit, stop, seal, or other means; damage to the engine if an attempt is made to circumvent, remove, or exceed it and the need to replace parts following such attempt; and the effect of settings beyond the limit, stop, seal, or other means on engine performance characteristics other than emission characteristics.

(3) The Executive Officer shall determine two physically adjustable ranges for each parameter subject to adjustment;

(i) (A) In the case of a parameter determined to be adequately inaccessible or sealed, the Executive Officer may include within the physically adjustable range applicable to testing under these procedures (certification testing) all settings within the production tolerance associated with the nominal setting for that parameter, as specified by the manufacturer in the application for certification.

(B) In the case of other parameters, the Executive Officer shall include within this range all settings within physical limits or stops determined to be adequate restraints on adjustability. The Executive Officer may also include the production tolerances on the location of these limits or stops when determining the physically adjustable range.

(ii) (A) In the case of a parameter determined to be adequately inaccessible or sealed, the Executive Officer shall include within the physically adjustable range applicable to testing under the Production-Line Testing Procedure, only the actual settings to which the parameter is adjusted during production.

(B) In the case of other parameters, the Executive Officer shall

include within this range all settings within physical limits or stops determined to be adequate restraints on adjustability, as they are actually located on the test engine.

(e) (1) If the manufacturer submits the information specified in Section 8(b)(1)(ii) in advance of its application for certification, the Executive Officer shall review the information and make the determinations required in paragraph (d) of this section within 90 days of the manufacturer's submittal as required by Section 60030, Title 17, California Code of Regulations.

(2) The 90-day decision period is exclusive of the elapsed time during which ARB may request additional information from manufacturers regarding an adjustable parameter and the receipt of the manufacturers' response(s).

(f) Within 30 days following receipt of notification of the Executive Officer's determinations made under paragraph (d) of this section, the manufacturer may request a hearing on the Executive Officer's determinations in accordance with Section 5. The request shall be in writing, signed by an authorized representative of the manufacturer, and shall include a statement specifying the manufacturer's objections to the Executive Officer's determinations, and data in support of such objections.

**10. Required data for certification.**

(a) The manufacturer shall perform the tests required by the applicable test procedures, and submit to the Executive Officer the following information:

(1) **A record of all pertinent maintenance**. Such testing shall be designed and conducted in accordance with good engineering practice to assure that the engines covered by an Executive Order issued under Section 16 will meet the emission standards in Section 7 in actual use for the useful life of the engine as designated in these Test Procedures.

(2) **Emission data from certification engines**. Emission data on such engines tested in accordance with applicable emission test procedures herein and in such numbers as specified. These data shall include zero-hour data, if generated, and emission data generated for certification as required under Section 13(a)(2).

(3) A statement that the engines for which certification is requested conform to the requirements in Section 4, and that the descriptions of tests performed to ascertain compliance with the general standards in Section 4, and the data derived from such tests, are available to the Executive Officer upon request.

(4) A statement that the test engines with respect to which data are submitted to demonstrate compliance with the applicable standards of these procedures are in all material respects as described in the manufacturer's application for certification, have been tested in accordance with the applicable test procedures utilizing the fuels and equipment described in the application for certification and that on the basis of such tests the engines conform to the requirements of this part. If such statements cannot be made with respect to any engine tested, the engine shall be identified, and all pertinent data relating thereto shall be supplied to the Executive Officer. If, on the basis of the data supplied and any additional data as required by the Executive Officer, the Executive Officer determines that the test engine was not as described in the application for certification or was not tested in accordance with the applicable test procedures utilizing the fuels and equipment as described in the application for certification, the

Executive Officer may make the determination that the engine does not meet the applicable standards. The provisions of Section 16(b) shall then be followed.

(b) The above information must be provided unless the Executive Officer, upon request of the manufacturer, waives the requirement. The Executive Officer may waive any requirement of this section for testing of an engine for which emission data are available or will be available under the provisions of Section 15.

(c) If the manufacturer elects to use a measurement procedure other than the applicable Test Procedures to determine compliance with the standards, the manufacturer shall:

(1) Determine the correlation between the alternative measurement procedure chosen and the procedure set forth in the Test Procedures.

(2) Maintain a description of the procedure and test(s) used to determine the correlation and the data derived from such tests.

(3) Make available to the Executive Officer, upon request, any of the information or data required in paragraphs (c)(1) and (2); and

(4) For each engine family for which a certificate is requested:

(i) Provide a statement that the results obtained by the alternative measurement procedure correlate with the results that would be expected when determined by the Test Procedures and

(ii) Provide these results, adjusted if necessary with the applicable correlation offset, to be compared with the standards of Section 7(a).

**11. Test Engines.**

(a) **Engine Families and Engine Family Groups.**

(1) The engines covered by an application for certification will be divided into groupings of engines that are expected to have similar emission characteristics throughout their useful life. Each group of engines with similar emission characteristics shall be defined as a separate engine family group. An engine family group is defined similarly to an engine family, with the exception that the displacement per cylinder is used as a criterion for grouping the engines rather than the cylinder block configuration.

(2) (i) To be classed in the same engine family, engines must be identical in all the following respects:

(A) The cylinder bore center-to-center dimensions.

(B)-(C) [Reserved]

(D) The cylinder block configuration (air cooled or liquid cooled; L-6, 90° V-8, etc.).

(E) The location of the intake and exhaust valves (or ports).

(F) The method of air aspiration.

(G) The combustion cycle.

(H) Catalytic converter characteristics.

(I) Thermal reactor characteristics.

(J) Type of air inlet cooler (e.g., intercoolers and after-coolers).

(ii) To be classed in the same engine family group for off- road

certification, engines must have the same displacement per cylinder (within 15 percent) and must be identical in all the following respects:

(A) The cylinder bore center-to-center dimensions.

(B)-(C) [Reserved]

(D) [Reserved]

(E) The location of the intake and exhaust valves (or ports).

(F) The method of air aspiration.

(G) The combustion cycle.

(H) Catalytic converter characteristics.

(I) Thermal reactor characteristics.

(J) Type of air inlet cooler (e.g., intercoolers and after-coolers).

(3) Engines identical in all the respects listed in paragraph (a)(2) of this section may be further divided into different engine families if the Executive Officer determines that they may be expected to have different emission characteristics. This determination will be based upon a consideration of the following features of each engine:

(i) The bore and stroke.

(ii) The surface-to-volume ratio of the nominally dimensioned cylinder at the top dead center positions.

(iii) The intake manifold induction port size and configuration.

(iv) The exhaust manifold induction port size and configuration.

(v) The intake and exhaust valve sizes.

(vi) The fuel system.

(vii) The camshaft timing and ignition or injection timing characteristics.

(4) Where engines are of a type that cannot be divided into engine families based upon the criteria listed in paragraphs (a)(2) and (a)(3) of this section, the Executive Officer shall establish families for those engines based upon those features most related to their emission characteristics. Engines that are eligible to be included in the same engine family based on the criteria in paragraphs (a)(2) and (a)(3) of this section may be further divided into different engine families if the manufacturer determines that they may be expected to have different emission characteristics. This determination will be based upon a consideration of the following features of each engine:

(i) The dimension from the center line of the crankshaft to the center line of the camshaft.

(ii) The dimension from the center line of the crankshaft to the top of the cylinder block head face.

(iii) The size of the intake and exhaust valves (or ports).

(5) Engines identical in all the respects listed in paragraph (a)(2) of this section but which use differing fuels may be certified as one engine family, provided the engine family is certified using the fuel that would yield the worst-case emission scenario.

(b) **Emission-data engines**.

(1) Engines will be chosen to be run for emission data based upon engine family groups. Within each engine family group, the requirements of this paragraph must be met.

(2) Engines of each engine family group will be divided into groups based upon

their exhaust emission control systems. One engine of each system combination shall be run for gaseous emission data. The complete gaseous emission test must be conducted. Within each combination, the engine that features the highest horsepower, primarily at or near the rated speed, will usually be selected. The engine manufacturer may elect to test the worst-case emissions engine within each combination with prior approval from the Executive Officer. The engine with the highest horsepower will usually be selected. For engine families that contain multiple fuel systems, the engine manufacturer shall conduct separate individual gaseous emission test based on the worst-case emissions configuration for each different fuel system within the engine family's engine configuration.

(3) The Executive Officer may select a maximum of one additional engine within each engine-system combination based upon features indicating that it may have the highest emission levels of the engines of that combination. In selecting this engine, the Executive Officer will consider such features as the injection system, fuel system, engine control system, rated speed, rated horsepower, peak torque speed, and peak torque.

(4) Within an engine family control system combination, the manufacturer may alter any emission-data engine (or other engine including current or previous model year emission-data engines and development engines provided they meet the emission-data engines' protocol) to represent more than one selection under paragraph (b)(2) and (3) of this section.

(c) In lieu of testing an emission-data engine selected under paragraph (b) of this section, and submitting data therefore, a manufacturer may, with the prior written approval of the Executive Officer, submit exhaust emission data as applicable on a similar engine, for which certification has previously been obtained or for which all applicable data required under Section 10 has previously been submitted.

(d) **Durability-data Engine**

(1) The engine manufacturer shall select the engine configuration that best represents the entire engine family or groups of engine families to demonstrate engine and emission durability. The duration of the engine durability demonstration for the purpose of generating deterioration factors for the emission calculation shall be equivalent to the emissions durability period as defined in these Test Procedures.

(2) (i) The engine manufacturer shall use good engineering practice to determine engine and emission durability.

(ii) The engine manufacturer shall provide the Executive Officer with a written plan of the method used to determine engine and emission durability. The Executive Officer shall approve the plan if it demonstrates, according to good engineering judgement, the development of reasonable deterioration factors. The engine manufacturer shall not proceed with testing until the Executive Officer has approved the plan.

(iii) In the absence of a manufacturer's specific service accumulation cycle, engine durability demonstration shall be conducted using multiple runs of the ISO 8178, Part IV, test cycle C-2, or for constant speed engines using multiple runs of the ISO 8178, Part IV, D-2 test cycle. The engine manufacturer may request, with the advanced approval of the Executive Officer, to reduce the total amount of service accumulation hours for any durability / service accumulation engine. The engine manufacturer may make such request only after an engine has accumulated at a minimum one half of the engine's defined useful life period. The

Executive Officer shall base such approval on engine's durableness, maintenance events, emission test results, and the stability of engine out emissions.

(3) Regardless of which service accumulation cycle is used for generating the deterioration factors for emissions certification, the Executive Officer shall accept the manufacturer's deterioration factors for certification the first year; but, may deny the use of the manufacturer's deterioration factors for subsequent certification based on incorrect or inaccurate representativeness of actual in-use emissions test results.

**12. Maintenance.**

(a) This section specifies the maintenance schedule for emission-related parts that manufacturers shall include in the maintenance instructions furnished under Section 22 to purchasers of new off-road large spark-ignition engines and new off-road equipment powered by a off-road large spark-ignition engine.

(1) Any emission-related maintenance that is performed on equipment, vehicles, engines, subsystems, or components must be technologically necessary to assure in-use compliance with the emission standards. The manufacturer must submit data that demonstrate to the Executive Officer that all of the emission-related scheduled maintenance that is to be performed is technologically necessary. Scheduled maintenance must be approved by the Executive Officer prior to being performed or being included in the maintenance instructions provided to purchasers under Section 22. As provided below, ARB has determined that emission-related maintenance at shorter intervals than that outlined in paragraphs (a)(2)(i), (a)(2)(ii) and (a)(2)(iii) of this section is not technologically necessary to ensure in-use compliance. However, the Executive Officer may determine what maintenance intervals are technologically necessary.

(2) For off-road large spark-ignition engines, emission-related maintenance in addition to, or at shorter intervals than, the following will not be accepted as technologically necessary, except as provided in paragraph (a)(4) of this section.

(i) Fuel injector tips (cleaning **only**).

(ii) The adjustment, cleaning, repair, or replacement of the following parts and components, at 4,500 hours of use and at 4,500-hour intervals thereafter:

(A) Fuel injectors.

(B) Turbocharger.

(C) Electronic engine control unit and its associated sensors and actuators.

(D) Reserved

(3) (i) The following components are currently defined as critical emission-related components:

(A) Catalytic converter.

(B) Air injection system components.

(C) Electronic engine control unit and its associated sensors (including oxygen sensor if installed) and actuators.

(D) Exhaust gas recirculation system (including all related filters

and control valves).

(E) Positive crankcase ventilation valve.

(F) Fuel system (carburetor, throttle-body, port injection system)

(ii) Scheduled maintenance on critical emission-related components must have a reasonable likelihood of being performed in-use. The manufacturer shall be required to show the reasonable likelihood of such maintenance being performed in-use. Critical emission-related scheduled maintenance items that satisfy one of the following conditions shall be accepted by the Executive Officer as showing a reasonable likelihood that the maintenance has been performed in-use:

(A) Data demonstrating a connection between emissions and equipment, engine, or vehicle performance by showing that as emissions increase due to lack of maintenance, its performance will simultaneously deteriorate to a point unacceptable for typical operation.

(B) Survey data which adequately demonstrates that, at an 80 percent confidence level, 80 percent of such engines already have this critical maintenance item performed in-use at the recommended interval(s).

(C) A clearly displayed visible signal system approved by the Executive Officer is installed to alert the engine or equipment operator or vehicle driver that maintenance is due. A signal bearing the message "maintenance needed" or "check engine," or a similar message approved by the Executive Officer, shall be actuated at the appropriate hours of usage point or by component failure. This signal must be continuous while the engine is in operation, and not easily eliminated without performance of the required maintenance. Resetting the signal shall be a required step in the maintenance operation. The method for resetting the signal system shall be approved by the Executive Officer.

(D) A survey, approved by the Executive Officer, showing that a critical maintenance item is likely to be performed without a visible signal on a maintenance item for which there is no prior in-use experience without the signal. To that end, the manufacturer may in a given model year market up to 200 randomly selected engines per critical emission-related maintenance item without such visible signals, and monitor the performance of the critical maintenance item by the owners to show compliance with paragraph (a)(3)(ii)(B) of this section. This option is restricted to two consecutive model years and may not be repeated until any previous survey has been completed. If the critical maintenance involves more than one engine family, the sample will be sales weighted to ensure that it is representative of all the families in question.

(E) The manufacturer provides the maintenance free of charge, and clearly informs the customer that the maintenance is free in the instructions provided under Section 22.

(F) Any other method that the Executive Officer approves as establishing a reasonable likelihood that the critical maintenance will be performed in-use.

(iii) Visible signal systems used under paragraph (a)(3)(ii)(C) of this section are considered an element of design of the emission control system. Therefore, disabling, resetting, or otherwise rendering such signals inoperative without also performing the indicated maintenance procedure is prohibited.

(4) (i) In the case of any new scheduled maintenance, the manufacturer must submit a request for approval to the Executive Officer for any maintenance that it wishes to recommend to purchasers. New scheduled maintenance is that maintenance which did not exist prior to the 2001 model year, including that which is a direct result of the implementation of new technology not found in production prior to the 2001 model year. The manufacturer must also include its recommendation as to the category (**i.e.**, emission-related or non-emission-related, critical or non-critical) of the subject maintenance and, for suggested emission-related maintenance, the maximum feasible maintenance interval. Such request must include detailed evidence supporting the need for the maintenance requested, and supporting data or other substantiation for the recommended maintenance category and for the interval suggested for emission-related maintenance. Requests for new scheduled maintenance must be approved prior to the introduction of the new maintenance. The Executive Officer will then designate the maintenance as emission-related or non-emission-related. For maintenance items established as emission-related, the Executive Officer will further designate the maintenance as critical if the component that receives the maintenance is a critical component under paragraph (a)(3) of this section. For each maintenance item designated as emission-related, the Executive Officer will also establish a technologically necessary maintenance interval, based on industry data and other information available to ARB. Designations of emission-related maintenance items, along with their identification as critical or non-critical, and establishment of technologically necessary maintenance intervals, will be announced through the certification process.

(ii) Any manufacturer may request a hearing in accordance with Section 5 on the Executive Officer's determinations in paragraph (a)(4) of this section. The request shall be in writing, and shall include a statement specifying the manufacturer's objections to the Executive Officer's determinations, and data in support of such objections.

(b) **Maintenance on emission-data engines.**

(1) Adjustment of idle speed on emission data engines may be performed once before the certification emission test point. Any other engine, emission control system, or fuel system adjustment, repair, removal, disassembly, cleaning, or replacement on emission-data engines shall be performed only with the advance approval of the Executive Officer.

(2) Repairs to engine components, other than the emission control system or the fuel system, on an emission-data engine, shall be performed only as a result of part failure, system malfunction, or with the advance approval of the Executive Officer.

(c) Equipment, instruments or tools may not be used to identify malfunctioning, maladjusted, or defective engine components unless the same or equivalent equipment, instruments, or tools will be available to dealerships and other service outlets and:

(1) Are used in conjunction with scheduled maintenance on such components, or

(2) Are used subsequent to the identification of an engine malfunction, as provided in paragraph (c)(1) of this section for emission- data engines, or

(3) Unless specifically authorized by the Executive Officer.

(d) **Durability-data Engine**

(1) The manufacturer may conduct scheduled (routine/scheduled maintenance items as normally appears in the engine owner’s manual) engine maintenance during the

durability / service accumulation cycle test. The maintenance shall be consistent with the maintenance requirements set forth in Section 12(a).

(2) Manufacturer must receive advanced approval from the Executive Officer for any unscheduled maintenance on the durability engine. Engine components, sensors, or emission related components' maintenance conducted without the Executive Officer's approval may disqualify the engine and all related test results.

(e) All test data, maintenance reports, and required engineering reports shall be compiled and provided to the Executive Officer in accordance with Section 10.

**13. Service Accumulation; Emission Measurements.**

(a) (1) The manufacturer shall determine the engine operating schedule to be used for dynamometer service accumulation on emission-data engines selected under Section 11(b). This determination shall be consistent with good engineering practice. A single engine operating schedule shall be used for all engines in an engine family group-control system combination. Operating schedules may be different for different combinations.

(2) The manufacturer shall determine, for each engine family or group of engine families, the number of hours at which the engine-system combination is stabilized (no more than 50 hours for catalyst equipped) for emission-data testing.

(3) The manufacturer shall maintain, and provide to the Executive Officer if requested, a record of the rationale used in making this determination. The manufacturer may elect to accumulate 50 hours on each test engine within an engine family group without making a determination. However, the Executive Officer may determine under Section 11(c) that no testing is required.

(b) (1) (i) The results of all emission testing shall be supplied to the Executive Officer. The manufacturer shall furnish to the Executive Officer an explanation for voiding any test. The Executive Officer will determine if voiding the test was appropriate based upon the explanation given by the manufacturer for the voided test. Tests between test points may be conducted as required by the Executive Officer. Data from all tests (including voided tests) may be submitted weekly to the Executive Officer, but shall be air posted or delivered to the Executive Officer within 7 days after completion of the test. In addition, all test data shall be compiled and provided to the Executive Officer in accordance with Section 10.

(ii) The results of all emission tests shall be recorded and reported to the Executive Officer. These results shall be rounded, in accordance with ASTM E 29-90 to the number of decimal places contained in the applicable emission standard expressed to one additional significant figure.

(2) Whenever a manufacturer intends to operate and test an engine that may be used for emission data, the manufacturer shall retain in its records all information concerning all emissions tests and maintenance, including engine alterations to represent other engine selections. This information shall be submitted, including the engine description and specification information required by the Executive Officer, to the Executive Officer following the emission-data test.

(3) Emission testing of any type with respect to any certification engine other than that specified in these procedures is not allowed except as such testing may be specifically

authorized by the Executive Officer.

**14. Test Procedures, General Requirements.**

(a) Manufacturers shall use the procedures in Part II of these Test Procedures and all of this Part I.

(b) The Executive Officer may, on the basis of written application by a manufacturer, prescribe test procedures, other than those set forth in this part, for any off-road large spark-ignition engine that the Executive Officer determines cannot be satisfactorily tested by the procedures set forth in this part.

(c) If the manufacturer does not submit a written application for use of special test procedures but the Executive Officer determines that an off-road large spark-ignition engine cannot be satisfactorily tested by the procedures set forth in this part, the Executive Officer shall notify the manufacturer in writing that the application for certification has been rejected, and set forth the reasons for such rejection in accordance with the provisions of Section 9(c).

(d) The Executive Officer may amend these procedures when the amendment is supported by data showing the necessity for the correction.

**15. Confirmatory Testing by the Executive Officer.**

(a) The Executive Officer may require that a manufacturer provide to the ARB one or more of the test engines for confirmatory testing at the manufacturer's expense. Such testing shall take place at such place or places as the Executive Officer may designate. The Executive Officer may specify that he will conduct such testing at the manufacturer's facility, in which case instrumentation and equipment specified by the Executive Officer shall be made available by the manufacturer for test operations. Any testing conducted at a manufacturer's facility pursuant to this paragraph shall be scheduled by the manufacturer as promptly as possible.

(b) (1) Whenever the Executive Officer conducts a test on a test engine the results of that test, unless subsequently invalidated by the Executive Officer, shall comprise the official data for the engine at that prescribed test point and the manufacturer's data for that prescribed test point shall not be used in determining compliance with emission standards.

(2) Whenever the Executive Officer does not conduct a test on a test engine at a test point, the manufacturer's test data will be accepted as the official data for that point; **provided** that if the Executive Officer makes a determination that there is a lack of correlation between the manufacturer's test equipment and the test equipment used by the Executive Officer, no manufacturer's test data will be accepted for the purposes of certification until the reasons for the lack of correlation are determined and the validity of the data is established by the manufacturer; **and further provided** that if the Executive Officer has reasonable basis to believe that any test data submitted by the manufacturer is not accurate or has been obtained in violation of any provision of this part, the Executive Officer may refuse to accept that data as the official data pending retesting or submission or further information.

(3) (i) (A) The Executive Officer may adjust or cause to be adjusted any adjustable parameter of an emission-data engine that the Executive Officer has determined to be

subject to adjustment for certification testing in accordance with Section 9(d)(1), to any setting within the physically adjustable range of that parameter, as determined by the Executive Officer in accordance with Section 9(d)(3)(i), prior to the performance of any tests to determine whether such engine conforms to applicable emission standards, including tests performed by the manufacturer under Section 10(c). The Executive Officer, in making or specifying such adjustments, may consider the effect of the deviation from the manufacturer's recommended setting on emissions performance characteristics as well as the likelihood that similar settings will occur on in-use engines. In determining likelihood, the Executive Officer may consider factors such as, but not limited to, the effect of the adjustment on engine performance characteristics and surveillance information from similar in-use engines.

(B) For those engine parameters that the Executive Officer has not determined to be subject to adjustment during certification testing in accordance with Section 9(d)(1), the emission-data engine presented to the Executive Officer for testing shall be calibrated within the production tolerances applicable to the manufacturer's specifications to be shown on the engine label (see the Section 2434, Title 13, California Code of Regulations) as specified in the application for certification. If the Executive Officer determines that an engine is not within such tolerances, the engine shall be adjusted at the facility designated by the Executive Officer prior to the test and an engineering report shall be submitted to the Executive Officer describing the corrective action taken. Based on the engineering report, the Executive Officer will determine if the engine shall be used as an emission-data engine.

(ii) If the Executive Officer determines that the test data developed under paragraph (b)(3)(i) of this section would cause the emission-data engine to fail due to excessive 50-hour emission values, then the following procedure shall be observed:

(A) The manufacturer may request a retest. Before the retest, those engine parameters that the Executive Officer has not determined to be subject to adjustment for certification testing in accordance with Section 9(d)(1) may be readjusted to manufacturer's specification, if these adjustments were made incorrectly prior to the first test. The Executive Officer may adjust or cause to be adjusted any parameter that the Executive Officer has determined to be subject to adjustment in accordance with Section 9(d)(3)(i). However, if the idle speed parameter is one that the Executive Officer has determined to be subject to adjustment, the Executive Officer shall not adjust it to a setting that causes a higher engine idle speed than would have been possible within the physically adjustable range of the idle speed parameter on the engine before it accumulated any dynamometer service, all other parameters being identically adjusted for the purpose of the comparison. Other maintenance or repairs may be performed in accordance with Section 12. All work on the engine shall be done at such location and under such conditions as the Executive Officer may prescribe.

(B) The engine will be retested by the Executive Officer and the results of this test shall comprise the official data for the emission-data engine.

**16. Certification.**

(a) (1) If, after a review of the test reports and data submitted by the manufacturer, data derived from any inspection carried out under Section 6(c), and any other pertinent data or

information, the Executive Officer determines that a test engine(s) meet(s) the requirements of these procedures, he will issue an Executive Order with respect to such test engine(s) except in cases covered by paragraph (c) of this section.

(2) Such certificate will be issued for such period not to exceed one model year as the Executive Officer may determine and upon such terms as he may deem necessary or appropriate to assure that any new off- road large spark-ignition engine covered by the Executive Order will meet the requirements of this part.

(3) One such Executive Order will be issued for each engine family.

(b) (1) The Executive Officer will determine whether an engine covered by the application complies with applicable standards by observing the following relationships:

(i) An emission-data test engine selected under Section 11(b)(3) shall represent all engines in the same engine-system combination.

(ii) An emission-data test engine selected under Section 11(b)(3) shall represent all engines containing that emission control system and having similar peak horsepower.

(2) The Executive Officer will proceed as in paragraph (a) of this section with respect to the engines belonging to an engine family group, all of which comply with all applicable standards.

(3) If, after a review of the test reports and data submitted by the manufacturer, data derived from any additional testing conducted pursuant to Section 15, data or information derived from any inspection carried out under Section 6(c) or any other pertinent data or information, the Executive Officer determines that one or more test engines of the certification test fleet do not meet applicable standards, the Executive Officer will notify the manufacturer in writing, setting forth the basis for his determination. Within 30 days following receipt of the notification, the manufacturer may request a hearing on the Executive Officer's determination under Title 17, California Code of Regulations, Division 3, Chapter 1, Subchapter 1.25.

(4) The manufacturer may, at his option, proceed with any of the following alternatives with respect to any engine family group represented by a test engine(s) determined not in compliance with applicable standards:

(i) Request a hearing under Section 5; or

(ii) Delete from the application for certification the engines represented by the failing test engine. (Engines so deleted may be included in a later request for certification under Section 17.) The Executive Officer may then select in place of each failing engine an alternate engine chosen in accordance with the selection criteria employed in selecting the engine that failed; or

(iii) Modify the test engine and demonstrate by testing that it meets applicable standards. Another engine that is in all material respect the same as the first engine, as modified, may then be operated and tested in accordance with applicable test procedures.

(5) If the manufacturer does not request a hearing or present the required data for certification under paragraphs (b)(4) of this section (as applicable), the Executive Officer will deny certification.

(c) (1) Notwithstanding the fact that any certification engine(s) may comply with other provisions of these procedures, the Executive Officer may withhold or deny the issuance of

an Executive Order (or suspend or revoke any such Executive Order that has been issued) with respect to any such engine(s) if:

(i) The manufacturer submits false or incomplete information in his application for certification thereof;

(ii) The manufacturer renders inaccurate any test data that he submits pertaining thereto or otherwise circumvents the intent of the Act, or of this part with respect to such engine:

(iii) Any ARB Enforcement Officer is denied access on the terms specified in Section 6(c) to any facility or portion thereof that contains any of the following:

(A) The engine;

(B) Any components used or considered for use in its modification or buildup into a certification engine;

(C) Any production engine that is or will be claimed by the manufacturer to be covered by the Executive Order;

(D) Any step in the construction of an engine described in paragraph (c)(iii)(C) of this section;

(E) Any records, documents, reports, or histories required by this part to be kept concerning any of the above;

(iv) Any ARB Enforcement Officer is denied "reasonable assistance" (as defined in Section 6(c)) in examining any of the items listed in paragraph (c)(1)(iii) of this section.

(2) The sanctions of withholding, denying, revoking, or suspending of a certificate may be imposed for the reasons in paragraphs (c)(1)(i), (ii), (iii), or (iv) of this section only when the infraction is substantial.

(3) In any case in which a manufacturer knowingly submits false or inaccurate information or knowingly renders inaccurate or invalid any test data or commits any other fraudulent acts and such acts contribute substantially to the Executive Officer's decision to issue an Executive Order, the Executive Officer may deem such certificate void **ab initio**.

(4) In any case in which certification of an engine is proposed to be withheld, denied, revoked, or suspended under paragraph (c)(1)(iii) or (iv) of this section, and in which the Executive Officer has presented to the manufacturer involved reasonable evidence that a violation of Section 6(c) in fact occurred, the manufacturer shall have the burden of establishing any contention to the satisfaction of the Executive Officer that even though the violation occurred, the engine in question was not involved in the violation to a degree that would warrant withholding, denial, revocation, or suspension of certification under either paragraph (c)(1)(iii) or (iv) of this section.

(5) Any revocation or suspension of certification under paragraph (c)(1) of this section shall:

(i) Be made only after the manufacturer concerned has been offered an opportunity for a hearing conducted in accordance with Section 5 hereof.

(ii) Extend no further than to forbid the introduction into commerce of engines previously covered by the certification that are still in the hands of the manufacturer, except in cases of such fraud or other misconduct as makes the certification invalid **ab initio**.

**17. Addition of an Engine After Certification.**

(a) If a manufacturer proposes to add to his product line an engine of the same engine-system combination as engines previously certified but that was not described in the application for certification when the test engine(s) representing other engines of that combination was certified, he shall notify the Executive Officer. Such notification shall be in advance of the addition unless the manufacturer elects to follow the procedure described in Section 19. This notification shall include a full description of the engine to be added.

(b) The Executive Officer may require the manufacturer to perform such tests on the test engine(s) representing the engine to be added that would have been required if the engine had been included in the original application for certification.

(c) If, after a review of the test reports and data submitted by the manufacturer, and data derived from any testing conducted under Section 15, the Executive Officer determines that the test engine(s) meets all applicable standards, the appropriate Executive Order will be amended accordingly. If the Executive Officer determines that the test engine(s) does not meet applicable standards, he will proceed under Section 16(b).

**18. Changes to an Engine Covered by Certification.**

(a) The manufacturer shall notify the Executive Officer of any change in production engines in respect to any of the parameters listed in Section 11(a)(1) thru 11(a)(4), as applicable, giving a full description of the change. Such notification shall be in advance of the changes unless the manufacturer elects to follow the procedure described in Section 19.

(b) Based upon the description of the change, and data derived from such testing as the Executive Officer may require or conduct, the Executive Officer shall determine whether the engine, as modified, would still be covered by the Executive Order then in effect.

(c) If the Executive Officer determines that the outstanding Executive Order would cover the modified engines he will notify the manufacturer in writing. Except as provided in Section 19 the change may not be put into effect prior to the manufacturer's receiving this notification. If the Executive Officer determines that the modified engines would not be covered by the Executive Order then in effect, the modified engines shall be treated as additions to the product line subject to Section 17.

**19. Alternative Procedures for Notification of Additions and Changes.**

(a) A manufacturer may, in lieu of notifying the Executive Officer in advance of an addition of an engine under Section 17 or a change in an engine under Section 18, notify the Executive Officer concurrently with making an addition of an engine or a change in an engine, if the manufacturer determines that following the change all engines affected by the addition or change will still meet the applicable emission standards. Such notification shall include a full description of the addition or change and any supporting documentation the manufacturer may desire to include to support the manufacturer's determination. The manufacturer's determination that the addition or change does not cause noncompliance shall be based on an engineering evaluation of the addition or change and/or testing.

(b) The Executive Officer may require that additional emission testing be performed to support the manufacturer's original determination submitted in paragraph (a) of this section. If additional testing is required the Executive Officer shall proceed as in Section 17(b) and (c) or Section 18(b) and (c) as appropriate. Additional test data, if requested, must be provided within 30 days of the request or the manufacturer must rescind the addition or change immediately. The Executive Officer may grant additional time to complete testing. If based on this additional testing or any other information, the Executive Officer determines that the engines affected by the addition or change do not meet the applicable standards the Executive Officer will notify the manufacturer to rescind the addition or change immediately upon receipt of the notification.

(c) Election to produce engines under this section will be deemed to be a consent to recall all engines that the Executive Officer determines under Section 17(c) do not meet applicable standards, and cause such nonconformity to be remedied at no expense to the owner.

**20. Submission of Engine Identification Numbers.**

(a) Upon request of the Executive Officer, the manufacturer of any off-road large spark-ignition engine covered by an Executive Order shall, within 30 days, identify by engine identification number or alternative tracking method, the engine(s) covered by the Executive Order.

(b) The manufacturer of any off-road large spark-ignition engine covered by an Executive Order shall provide to the Executive Officer, within 60 days of the issuance of an Executive Order, an explanation of the elements in any engine identification coding system in sufficient detail to enable the Executive Officer to identify those engines that are covered by an Executive Order.

**21. Production Engines.**

Any off-road large spark-ignition engine manufacturer obtaining certification under this part shall notify the Executive Officer, on a yearly basis, of the number of engines of such engine family-engine displacement-exhaust emission control system-fuel system combination produced for sale in California during the preceding year.

## 22. Maintenance Instructions.

(a) The manufacturer shall furnish or cause to be furnished to the purchaser of each new off-road large spark-ignition engine subject to the standards prescribed in Section 7 written instructions for the proper maintenance and use of the engine by the purchaser consistent with the provisions of Section 12, which establishes what scheduled maintenance the Executive Officer approves as being reasonable and necessary.

(1) The maintenance instructions required by this section shall be in clear, and to the extent practicable, nontechnical language.

(2) The maintenance instructions required by this section shall contain a general description of the documentation that the manufacturer will require from the ultimate purchaser or any subsequent purchaser as evidence of compliance with the instructions.

(b) Instructions provided to purchasers under paragraph (a) of this section may specify the performance of any scheduled maintenance allowed under Section 12.

(c) Scheduled emission-related maintenance in addition to that performed under Section 12(b) may only be recommended to offset the effects of abnormal in-use operating conditions, except as provided in paragraph (d) of this section. The manufacturer shall be required to demonstrate, subject to the approval of the Executive Officer that such maintenance is reasonable and technologically necessary to assure the proper functioning of the emission control system. Such additional recommended maintenance shall be clearly differentiated, in a form approved by the Executive Officer, from that approved under Section 12(b).

(d) Inspections of emission-related parts or systems with instructions to replace, repair, clean, or adjust the parts or systems if necessary, are not considered to be items of scheduled maintenance that insure the proper functioning of the emission control system. Such inspections, and any recommended maintenance beyond that approved by the Executive Officer as reasonable and necessary under paragraphs (a), (b), and (c) of this section, may be included in the written instructions furnished to engine or equipment owners under paragraph (a) of this section; **provided** that such instructions clearly state, in a form approved by the Executive Officer that the owner need not perform such inspections or recommended maintenance in order to maintain the emission warranty.

## 23. Submission of Maintenance Instructions.

(a) The manufacturer shall provide to the Executive Officer, no later than the time of the submission required by Section 10, a copy of the maintenance instructions that the manufacturer proposes to supply to the ultimate purchaser in accordance with Section 22(a). The Executive Officer will review such instructions to determine whether they are reasonable and necessary and sufficient to assure the proper functioning of the engine's (or equipment's) emission control systems. The Executive Officer will notify the manufacturer of his determination whether such instructions are reasonable and necessary and sufficient to assure the proper functioning of the emission control systems.

(b) Any revision to the maintenance instructions that will affect emissions shall be

supplied to the Executive Officer at least 30 days before being supplied to the ultimate purchaser unless the Executive Officer consents to a lesser period of time.

**24. Alternative Certification Procedures.**

(a) (1) The Executive Officer shall determine that of the following certification procedures (paragraph (a)(3) or (a)(4) of this section), if any, may be used to demonstrate compliance for each off-road large spark-ignition engine family group for which certification is sought. In making this determination, the Executive Officer will consider whether the following criteria have been met.

(i) In prior certifications:

(A) The applications have been properly completed and demonstrate understanding of the certification protocol.

(B) The test engine selection has been acceptable to the Executive Officer.

(C) All applicable emission control label requirements have been complied with.

(D) The applications have not included requests for deviations from the test procedures.

(ii) For the engine family group in question:

(A) The test engine includes technology similar to previously certified engines.

(B) Such other criteria as the Executive Officer determines on a case-by-case basis.

(2) The engine family groups selected for the procedure described in paragraph (a)(3) of this section shall be subject to this procedure at the option of the manufacturer.

(3) The following provisions apply to those off-road large spark-ignition engine family groups that the Executive Officer has specified may be subject to the abbreviated certification review procedure.

(i) The manufacturer shall satisfy all applicable requirements of these provisions necessary to demonstrate compliance with the applicable standards.

(ii) As specifically allowed by the Executive Officer, the manufacturer shall assume the responsibility for part or all of the decisions applicable to the family group for which certification is sought and that are within the jurisdiction of the Executive Officer, with the exception that the Executive Officer shall determine whether a test engine has met the applicable emission standards.

(iii) The manufacturer shall maintain, update, and correct all records and information required.

(iv) The Executive Officer may review a manufacturer's records at any time. At the Executive Officer's discretion, this review may take place either at the manufacturer's facility or at another facility designated by the Executive Officer.

(v) At the Executive Officer's request, the manufacturer shall notify the Executive Officer of the status of the certification program, including projected schedules of

those significant accomplishments specified by the Executive Officer.

(vi) The manufacturer shall permit the Executive Officer to inspect any facilities, records, and vehicles from which data are obtained under the abbreviated certification review procedure.

(vii) Upon completing all applicable requirements of these provisions, the manufacturer shall submit an application for certification. Such application shall be made in writing to the Executive Officer by the manufacturer.

(A) The Executive Officer may approve or disapprove, whole or in part, an application for certification according to the procedures specified in Section 9(b).

(B) If, after a review of the application for certification, test reports and data submitted by the manufacturer, data obtained during an inspection, and any other pertinent data or information, the Executive Officer determines that a test engine(s) has not met the applicable provisions, the Executive Officer shall notify the manufacturer in writing and set forth the reason(s) for the determination as specified in Section 9.

(4) Those engine family groups that are to be subjected (to the complete ARB review procedure) shall follow the procedures specified in these provisions, with the exception of paragraph (a)(3) of this section.

(b) The manufacturer may request that an engine family group be subject (to the abbreviated certification review procedure) shall make such request during annual certification preview program or at least 6 months before the start of the model year for abbreviated certification review procedure.

(c) The Executive Officer may require that an engine family group previously allowed to be subject (to the abbreviated certification review procedure) be transferred to the complete review procedure.

**25. Test Fuel.**

(a) (1) If the engine is a gasoline-fueled large spark-ignition engine, then the test fuel used shall be consistent with the fuel specifications as outlined in the "California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium- Duty Vehicles," as adopted May 20, 1987, and last amended June 24, 1996, and incorporated by reference herein. The California fuel specifications are contained in the California Code of Regulations, Title 13, Chapter 5, Article 1, Sections 2260-2272. If the engine is tested using the U.S. EPA test fuel, consistent with the fuel specifications as outlined in Title 40 Code of Federal Register, Part 86, the manufacturer shall demonstrate that the emission test results complies with these Test Procedures.

(2) If the engine is not a gasoline-fueled large spark-ignition engine, then the test fuel used shall be consistent with the fuel specifications as outlined in the "California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium- Duty Vehicles," as adopted May 20, 1987, and last amended June 24, 1996, and incorporated by reference herein. The California fuel specifications are contained in the California Code of Regulations, Title 13, Chapter 5, Article 3, Sections 2290-2293.5. If the engine is tested using the U.S. EPA test fuel, consistent with the fuel

specifications as outlined in Title 40 Code of Federal Register, Part 86, the manufacturer shall demonstrate that the emission test results complies with these Test Procedures.

(b) During all engine tests, the engine shall employ a lubricating oil consistent with the engine manufacturer's specifications for that particular engine. These specifications shall be recorded and declared in the certification application.

State of California
AIR RESOURCES BOARD

# CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2001 ~~AND LATER~~ THROUGH 2006 OFF-ROAD LARGE SPARK-IGNITION ENGINES

PART II

Adopted: September 1, 1999
Amended: March 2, 2007

**NOTE**: This document incorporates by reference the International Standards Organization (ISO) 8178 test procedure, Part 1, August 15, 1996, Part 4, August 15, 1996, and Part 5, May 15, 1998, with modifications. Sections which have been included in their entirety are set forth with the section number and title. California provisions which modify specific ISO provisions are denoted by the words "DELETE" for the ISO language and "REPLACE WITH" for the new California language. The symbols "*****" and "..." mean that the remainder of the ISO text for a specific section is not shown in these procedures but has been included by reference, unchanged. ISO sections which are not listed are not part of the procedures.

~~This document is all newly adopted text.~~The sole amendments are to the title and years of applicability of the regulations.

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2001 ~~AND LATER~~ THROUGH 2006 OFF-ROAD LARGE SPARK-IGNITION ENGINES

PART II

To the extent the following provisions of ISO 8178, Part 1, August 15, 1996, Part 4, August 15, 1996, and Part 5, May 15, 1998, pertain to the testing and compliance of exhaust emissions from off-road large spark-ignition engines, they are adopted and incorporated herein by this reference as Part II of the California Exhaust Emission Standards and Test Procedures for New 2001 ~~and Later~~ through 2006 Off-Road Large Spark-Ignition Engines (Test Procedures), except as altered or replaced by the provisions set forth below.

Since the scope of this regulation is limited to off-road spark-ignition engines, the ISO provisions contained in the procedure identified above which pertain to Diesel cycle engines or to engines used for applications other than off-road purposes shall not be applicable to Part II of these Test Procedures.

International Standards Organization (ISO) 8178, RIC Engines - Exhaust emission measurement - Part 1: Test bed measurement of gaseous and particulate exhaust emissions from RIC engines.

1. Scope

2. Normative References

3. Definitions

ADD:

Note: In addition to the definitions listed here, those definitions listed in section 2 of Part I of these Test Procedures apply.

* * * * *

4. Symbols and Abbreviations

ADD:

Note: In addition to the symbols and abbreviations listed here, those symbols and abbreviations listed in section 3 of Part I of these Test Procedures shall apply.

* * * * *

5. Test Conditions

6. DELETE and

REPLACE WITH:

6. Test fuels

Test fuels shall meet the requirements specified in section 25 of Part I of these Test Procedures.

7. Measurement Equipment and data to be measured

DELETE all references to subsection 7.5 (Determination of the Particulates).

8. Calibration of the analytical instruments

9. DELETE

10. Running conditions (Test cycles)

11. Test run

DELETE all references to the particulates and particulate sampling method.

12. Data evaluation for gaseous and particulate emission

DELETE all references to the particulate emission.

13. Calculation of gaseous emissions

14. DELETE

15. Determination of the gaseous emissions

ADD:

NOTE: Manufacturers may use the raw exhaust gas sampling methods for certification testing through 2004 model year with prior Executive Officer approval.

* * * *

16. DELETE

Figures and Explanations

ISO 8178, RIC Engines - Exhaust emission measurement - Part 4: Test cycles for different engine applications.

1. Scope

2. Normative References

3. Definitions

ADD:

Note: In addition to the definitions listed here, those definitions listed in section 2 of Part I of these Test Procedures shall apply.

* * * * *

4. Symbols and Abbreviations

ADD:

Note: In addition to the symbols and abbreviations listed here, those symbols and abbreviations listed in section 3 of Part I of these Test Procedures shall apply.

* * * * *

5. Torque

6. Intermediate speed

7. Information regarding of the test

8. Modes and weighting factors for test cycles

8.2 DELETE

8.3 Test cycle types C "Off-road vehicles and industrial equipment"

8.3.1 DELETE

8.4 Test cycle type D “Constant”

DELETE all references to D-1 test cycle

8.5 DELETE

8.6 DELETE

8.7 Test cycles type G “Utility, lawn and garden”, typically < 25 hp.

DELETE all reference to G-2 and G-3 test cycles.

ADD:

Note: Manufacturers may use the G-1 test cycle for engines equal to or less than 1.0 liter. Manufacturer must show that the engines tested with the G-1 test cycle have engine characteristics and operating characteristics similar to small off-road equipment engines (less than 25 hp).

* * * *

Annex A DELETE

Annex B Combined table of the weighting factors

Annex C Bibliography

ISO 8178, RIC Engines - Exhaust emission measurement - Part 5: Test fuels.

1. DELETE and

REPLACE WITH:

1. Scope

This part specifies the calculation of the fuel specific factors and exhaust gas flow, which are necessary to determine the emission test results in accordance with ISO 8178, Part 1.

2. Normative References

3. Definitions

ADD:

Note: In addition to the definitions listed here, those definitions listed in section 2 of Part I of these Test Procedures apply.

* * * * *

4. Symbols and Abbreviations

ADD:

Note: In addition to the symbols and abbreviations listed here, those symbols and abbreviations listed in section 3 of Part I of these Test Procedures apply.

* * * * *

5. DELETE and REPLACE WITH:

5. Choice of Fuels

Test fuels shall meet the requirements specified in section 25 of Part I of these Test Procedures.

6. DELETE

7. Calculation of the Exhaust Gas Flow Using Fuel Specific Factors

8. Calculation of the Fuel Specific Factors