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

Adopt incorporated “California Exhaust and Evaporative Emission Standards and Test Procedures for New 2007 through 2009 Off-Road Large Spark-ignition Engines (2007-2009 Test Procedure 1048)” to read:

State of California
AIR RESOURCES BOARD

PROPOSED CALIFORNIA EXHAUST AND EVAPORATIVE EMISSION STANDARDS AND TEST PROCEDURES FOR 2007 THROUGH 2009 OFF-ROAD LARGE SPARK-IGNITION ENGINES

(2007–2009 Test Procedure 1048)

Adopted: March 2, 2007

NOTE: This document incorporates by reference Title 40, Code of Federal Regulations (CFR), Part 1048 – **CONTROL OF EMISSIONS FROM NEW, LARGE NONROAD SPARK-IGNITION ENGINES**, Subparts A, B, C, D, F, G, H, and I, including Appendix I and II to Part 1048 as amended on July 13, 2005 (Federal Register, Volume 70, pages 40465 through 40486), and the internally referenced subparts of 40 CFR Part 86, 40 CFR Part 1065, and 40 CFR Part 1068. Sections that have been included in their entirety are set forth with the section number and title. California provisions that replace specific federal provisions are denoted by the words "DELETE" for the federal language and "REPLACE WITH" or "ADD" for the California regulations. The symbols "* * * * *" and "..." mean that the remainder of the CFR text for a specific section, which is not shown in these regulations, has been included by reference, with only the printed text changed. Federal regulations that are not listed are not part of the California regulations.

This document is all newly adopted text.

PART 1048 – CONTROL OF EMISSIONS FROM NEW, LARGE NONROAD SPARK-IGNITION ENGINES

Subpart A—Overview and Applicability

§1048.1 Does this part apply to me?

*** * * * ***

This part 1048 applies for engines built from January 1, 2007 through December 31, 2009. You need not follow this part for engines you produce before January 1, 2007. See §1048.101 through 1048.115, and the definition of model year in §1048.801 for more information about the timing of new requirements.

*** * * * ***

(d) DELETE AND REPLACE WITH:
Engines with a maximum engine power at or below 19 kW are covered by Title 13, California Code of Regulations, Chapter 9, Article 1, Small Off-Road Engines

§1048.5 Which engines are excluded from this part's requirements?

This part does not apply to the following nonroad engines:

(a) DELETE AND REPLACE WITH:
Engines that are subject to the requirements of Title 13, California Code of Regulations, Chapter 9, Article 3, Off-Highway Recreational Vehicles and Engines, including any related provisions and guidelines that are applicable to Off-Highway Recreational Vehicles and Engines.

(b) DELETE AND REPLACE WITH:
Propulsion marine engines. See Title 13, California Code of Regulations, Chapter 9, Article 4.7, Spark-Ignition Marine Engines. This part applies with respect to auxiliary marine engines.

§1048.10 How is this part organized?

§1048.15 Do any other regulation parts affect me?

*** * * * ***

(b)(6) DELETE AND REPLACE WITH:
Procedures for In-Use Engine Recalls for Large Off-Road Spark-Ignition Engines with an Engine Displacement Greater Than 1.0 Liter, Chapter 9, Article 4.5, section 2439, Title 13, California Code of Regulations

*** * * * ***

(b)(7) DELETE AND REPLACE WITH:
Administrative Procedures – Hearings, Subchapter 1, Article 1, Sections 60040 – 60094, Title 17, California Code of Regulations

*** * * * ***

ADD:
(b)(8)
Large Spark-Ignition (LSI) Engine Fleet Requirements, Chapter 15, Article 2, sections 2775, 2775.1, and 2775.2, Title 13, California Code of Regulations

§1048.20 What requirements from this part apply to excluded stationary engines?

Subpart B—Emission Standards and Related Requirements

§1048.101 What exhaust emission standards must my engines meet?

*** * * * ***
DELETE AND REPLACE WITH:
(a)(2) *Exhaust Emission Standards.* Exhaust emissions from off-road large spark-ignition engines manufactured for sale, sold, or offered for sale in California, or that are introduced, delivered or imported into California for introduction into commerce, must not exceed:

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

Model Year	*Engine Displacement*	*Durability Period*	*HC + NOx*	*Carbon Monoxide*
2007 - 2009	≤1.0 liter	1,000 hours or 2 years	9.0 [12.0]	410 [549]
2007 - 2009	> 1.0 liter	5000 hours or 7 years	2.0 [2.7]	3.3 [4.4]

Note: (1) Pollutant emissions reported to ARB by manufacturers must be in grams per kilowatt-hour.

For severe-duty engines, the HC+NOx standard is 2.7 g/kW-hr and the CO standard is 130.0 g/kW-hr. The following engines are not subject to the transient standards in this

paragraph (a):

A. High-load engines.
B. Engines with maximum engine power above 560 kW.
C. Engines with maximum test speed above 3400 rpm.

* * * * *

(e) Fuel types. DELETE AND REPLACE WITH:
(e) Fuel types and Test Fuel
(1) Fuel types.
The exhaust emission standards in this section apply for engines using each type of fuel specified in 40 CFR part 1065, subpart H, on which the engines in the engine family are designed to operate, except for engines certified under §1048.625. For engines certified under §1048.625, the standards of this section apply to emissions measured using the specified test fuel. You must meet the numerical emission standards for hydrocarbons in this section based on the following types of hydrocarbon emissions for engines powered by the following fuels:

(A) Gasoline- and LPG-fueled engines: THC emissions.
(B) Natural gas-fueled engines: NMHC emissions.
(C) Alcohol-fueled engines: THCE emissions.

* * * * *

ADD:
(2) Test Fuel.
(A) 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 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as of January 1, 2006 (last amended August 4, 2005) incorporated by reference in Section 1961(d), Title 13, CCR). 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 1065, subpart H, the manufacturer shall demonstrate that the emission test results complies with these Test Procedures.
(B) 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 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as of January 1, 2006 (last amended August 4, 2005) incorporated by reference in Section 1961(d), Title 13, CCR). 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 1065, subpart H, the manufacturer shall

demonstrate that the emission test results complies with these Test Procedures.
(C) 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.

(f) DELETE AND REPLACE WITH:
Large spark-ignition engines, one liter or less. Engines with total displacement at or below 1000 cc shall comply with the requirements of Title 13, California Code of Regulations, Chapter 9, Article 4.5, Off-Road Large Spark-Ignition Engines.

*** * * * ***

§1048.105 What evaporative emission standards and requirements apply?

§1048.110 How must my engines diagnose malfunctions?

§1048.115 What other requirements must my engines meet?
Engines subject to this part must meet the following requirements:
(a) DELETE AND REPLACE WITH:
Crankcase emissions. No crankcase emissions shall be discharged directly into the ambient atmosphere from any new 2001 or later engines subject to the provisions of this part.

*** * * * ***

§1048.120 What emission-related warranty requirements apply to me?

* * * * *

ADD:
(f) Each engine, including all parts of its emission-control system must meet the requirements of California Code of Regulations, Title 13, Chapter 9, Article 4.5, Section 2436, Emission Control System Warranty Statement.

* * * * *

§1048.125 What maintenance instructions must I give to buyers?

§1048.130 What installation instructions must I give to equipment manufacturers?

§1048.135 How must I label and identify the engines I produce?

* * * * *

ADD:

(g) Engine labels must meet the requirements of California Code of Regulations, Title 13, Chapter 9, Article 4.5, Section 2434, Emission Control Labels − 2001 and Later Off-Road Large Spark-Ignition Engines.

§1048.140 What are the provisions for certifying Blue Sky Series engines?
DELETE SECTION AND REPLACE WITH:
§1048.140 What are the provisions for certifying optional lower-emission standard engines?
This section defines optional exhaust emission standards for engines equipped with superior emission control systems. These engines, designated as "optional lower-emission standard" or "OLES" engines, must meet all the requirements in this part that apply to 2007- 2009 model year engines and one of the standards in the following table. These engines must also meet all testing and reporting requirements:

Optional Exhaust Emission Standards for
Hydrocarbons plus Oxides of Nitrogen (HC+NOx) and Carbon Monoxide (CO)
in grams per brake horsepower-hour (grams per kilowatt-hour)[(1)]

Model Year	Engine Displacement	Durability Period	Standard – g/bhp-hr (g/kW-hr)	
			HC+NOx	CO
2007-2009	> 1.0 liter	5000 hours or 7 years	1.5 (2.0)	4.8 (6.4)
			1.0 (1.3)	8.3 (11.1)
			0.6 (0.8)	15.4 (20.6)
			0.4 (0.5)	
			0.2 (0.3)	
			0.1 (0.1)	

Note: (1) Pollutant emissions reported to ARB by manufacturers must be in grams per kilowatt-hour.

If you certify an engine family under this section, it is subject to all the requirements of this part as if these voluntary standards were mandatory.

* * * * *

§1048.145 Are there interim provisions that apply only for a limited time?
(a) DELETE

Subpart C—Certifying Engine Families

§1048.201 What are the general requirements for obtaining a certificate of conformity?

§1048.205 What must I include in my application?

*** * * * ***

(aa) DELETE AND REPLACE WITH:
Name an agent for service of process located in the United States. Service on this agent constitutes service on you or any of your officers or employees for any action by the California Air Resources Board.

§1048.210 May I get preliminary approval before I complete my application?

§1048.220 How do I amend the maintenance instructions in my application?

§1048.225 How do I amend my application for certification to include new or modified engines?

§1048.230 How do I select engine families?

*** * * * ***

(f) DELETE

§1048.235 What emission testing must I perform for my application for a certificate of conformity?

§1048.240 How do I demonstrate that my engine family complies with exhaust emission standards?

§1048.245 How do I demonstrate that my engine family complies with evaporative emission standards?

§1048.250 What records must I keep and make available to ARB?

*** * * * ***

ADD:
(e)
Maintain certification engines for a period of two years.

§1048.255 When may EPA deny, revoke, or void my certificate of conformity?

Subpart D—Testing Production-line Engines

§1048.301 When must I test my production-line engines?

§1048.305 How must I prepare and test my production-line engines?

§1048.310 How must I select engines for production-line testing?

§1048.315 How do I know when my engine family fails the production-line testing requirements?

§1048.320 What happens if one of my production-line engines fails to meet emission standards?

§1048.325 What happens if an engine family fails the production-line requirements?

§1048.330 May I sell engines from an engine family with a suspended certificate of conformity?

§1048.335 How do I ask EPA to reinstate my suspended certificate?

§1048.340 When may EPA revoke my certificate under this subpart and how may I sell these engines again?

§1048.345 What production-line testing records must I send to EPA?

§1048.350 What records must I keep?

Subpart E—Testing In-use Engines

§1048.401 What testing requirements apply to my engines that have gone into service?

§1048.405 How does this program work?
DELETE

§1048.410 How must I select, prepare, and test my in-use engines?
DELETE AND REPLACE WITH:

(a) This section applies to 2007 through 2009 model year off-road large spark-ignition engines with engine displacement greater than 1.0 liter.

(b) Manufacturer In-Use Testing Program.

Standards and Test Procedures. The emission standards, exhaust sampling and analytical procedures are those described in the Test Procedures, and are applicable to engines tested only for exhaust emissions. An engine is in compliance with these standards and test procedures only when all portions of these in-use test procedures and specified requirements from the Test Procedures are fulfilled, except that any adjustable engine parameters must be set to the nominal value or position as indicated on the engine label.

(1) Within a manufacturer's model-year engine production period, the ARB will identify those engine families, and the specific configurations within an engine family, that the manufacturer must subject to in-use testing as described below. For each model year, ARB may identify a number of engine families that is no greater than 25 percent of the number of engine families to which this article is applicable. For those manufacturers producing three or less engine families in a model year, ARB may designate a maximum of one engine family per model year for in-use testing.

(2) For each engine family identified by ARB, engine manufacturers must perform emission testing of an appropriate sample of in-use engines from each engine family. Manufacturers must submit data from this in-use testing to ARB.

(3) An engine manufacturer must test in-use engines from each engine family identified by ARB. All engines selected by the manufacturer for testing must be identified by the manufacturer, and a list of the selected engines must be submitted to the Executive Officer, prior to the onset of testing. Engines to be tested must have accumulated a minimum of 0.50 (50 percent) of the family's certified useful life period. The number of engines to be tested by a manufacturer will be determined by the following method:

(A) a minimum of four engines per family, provided that no engine fails any emission standard. For each exceedance, two additional engines must be tested until the total number of engines equals ten.

(B) For engine families of less than 500 engines (national production) for the identified model year or for engine manufacturers who make less than or equal to 2,000 engines nationally for that model year, a minimum of two (2) engines per family provided that no engine fails any emission standard. For each failing engine, two more engines shall be tested until the total number of engines equals ten (10).

(C) If an engine family was certified using carryover emission data and has been previously tested under paragraphs (b)(3)(A) or (b)(3)(B) of this section (and a recall for that family has not occurred), then only one engine for that family must be tested. If that

one engine fails any emission standard, testing must be conducted as outlined in subsections (b)(3)(A) or (b)(3)(B), whichever is appropriate.

(4) The Executive Officer may approve an alternative to manufacturer in-use testing, where:

(A) Engine family production is less than or equal to 200 per year, nationally;

(B) Engines cannot be obtained for testing because they are used substantially in vehicles or equipment that are not conducive to engine removal such as large vehicles or equipment from which the engine cannot be removed without dismantling either the engine, vehicle, or equipment; or

(C) Other compelling circumstances associated with the structure of the industry and uniqueness of engine applications. Such alternatives shall be designed to determine whether the engine family is in compliance.

(5) The engine manufacturer shall procure in-use engines which have been operated between 0.50 and 1.0 times the certified engine's useful life period. The engine manufacturer may test engines from more than one model year in a given year. The manufacturer shall submit a plan for testing within twelve calendar months after receiving notice that ARB has identified a particular engine family for testing and shall complete testing of such engine family within 24 calendar months from the date of approval of the plan by ARB. Test engines may be procured from sources associated with the engine manufacturer (i.e., manufacturer-established fleet engines, etc.) or from sources not associated with the manufacturer (i.e., consumer-owned engines, independently owned fleet engines, etc.).

(c) Maintenance, procurement and testing of in-use engines.

(1) A test engine must have a maintenance and use history representative of in-use conditions.

(A) To comply with this requirement a manufacturer must obtain information from the end users regarding the accumulated usage, maintenance, repairs, operating conditions, and storage of the test engines.

(B) Documents used in the procurement process must be maintained as required.

(2) The manufacturer may perform minimal restorative maintenance on components of a test engine that are not subject to parameter adjustment. Maintenance may include only that which is listed in the owner's instructions for engines with the amount of service and age of the acquired test engine. Repairs may be performed on a test engine with prior Executive Officer approval. Documentation of all maintenance, repairs, defects, and adjustments shall be maintained and retained as required.

(3) At least one valid emission test, according to the Test Procedure, is required for each in-use engine.

(4) The Executive Officer may waive portions or requirements of the test procedure, if any, that are not necessary to determine in-use compliance.

(5) If a selected in-use engine fails to comply with any applicable emission standards, the manufacturer shall determine the reason for noncompliance. The manufacturer must report within 72 hours after the completion of the test specifying the emission results and identifying the pollutant which failed to comply with the emission standard. The manufacturer must report all such reasons of noncompliance within fifteen business days of completion of testing. Additional time beyond the initial fifteen days may be granted providing that the manufacturer receives prior approval from the Executive Officer. The reports may be filed electronically or mailed to the following address: Chief of Mobile Source Operations Division, 9528 Telstar Avenue, El Monte, CA 91731.

(6) At the discretion of the Executive Officer, an engine manufacturer may test more engines than the minima described in paragraph (b)(3) of this section or may concede failure before testing a total of ten engines. Upon conceding failure the manufacturer shall proceed with a voluntary recall program as specified in Section 2439.

(7) The Executive Officer will consider failure rates, average emission levels and the existence of any defects, among other factors, in determining whether to pursue remedial action under this subpart. The Executive Officer may order a recall pursuant to Section 2439 before testing reaches the tenth engine whenever the Executive Officer has determined, based on production-line test results or in-use test results, enforcement testing results, or any other information, that a substantial number of a class or category of equipment or engines produced by that manufacturer, although properly maintained and used, contain a failure in an emission-related component which, if uncorrected, may result in the equipments' or engines' failure to meet applicable standards over their useful lives; or whenever a class or category of equipment or engines within their useful lives, on average, do not conform to the emission standards prescribed pursuant to Part 5 (commencing with Section 43000) of Division 26 of the Health and Safety Code, or any regulation adopted by the state board pursuant thereto, other than an emissions standard applied to new engines to determine "certification" as specified in Chapter 9, as applicable to the model year of such equipment or engines.

(8) Prior to an ARB-ordered recall, the manufacturer may perform a voluntary emissions recall pursuant to Article 4.5, Section 2439(b). Such manufacturer is subject to the reporting requirements in subsection (d) below.

(9) Once ARB determines that a substantial number of engines fail to conform with the requirements, the manufacturer will not have the option of a voluntary emissions recall.

(d) In-use test program reporting requirements.

(1) The manufacturer shall electronically submit to the Executive Officer within three months of completion of testing all emission testing results generated from the in-use testing program. The following information must be reported for each test engine:

(A) engine family,

(B) model,

(C) engine serial number or alternate identification, as applicable,

(D) date of manufacture,

(E) estimated hours of use,

(F) date and time of each test attempt,

(G) results (if any) of each test attempt,

(H) results of all emission testing,

(I) summary of all maintenance, repairs, and adjustments performed,

(J) summary (if any) of all ARB pre-approved modifications and repairs,

(K) determinations of noncompliance or compliance.

(2) The manufacturer must electronically submit the results of its in-use testing with a pre-approved information heading. The Executive Officer may exempt manufacturers from this requirement upon written request with supporting justification.

(3) All testing reports and requests for approvals made under this subpart shall be sent to the Executive Officer.

(4) The Executive Officer may require modifications to a manufacturer's in-use testing programs.

§1048.415 What happens if in-use engines do not meet requirements?
DELETE AND REPLACE WITH:

Procedures for In-Use Engine Recalls for Large Off-Road Spark-Ignition Engines with an Engine Displacement Greater Than 1.0 Liter.

(a) The recall procedures in this section apply as set forth in Title 13, California Code of Regulations, Sections 2433 and 2438.

(b) Voluntary Emissions Recall

(1) When any manufacturer initiates a voluntary emission recall, the manufacturer shall notify the Executive Officer of the recall at least 30 days before owner notification is to begin. The manufacturer shall also submit to the Executive Officer a voluntary recall plan for approval, as prescribed in the following:

(A)(i) a description of each class or category of engines to recall, including the number of engines to be recalled, the engine family or a sub-group thereof, the model year, and such other information as may be required to identify the engines:

(ii) a description of the specific modifications, alterations, repairs, corrections, adjustments, or other changes to be made to correct the engines affected by the nonconformity;

(iii) a description of the method by which the manufacturer will notify engine owners including copies of any letters of notification to be sent to engine owners;

(iv) a description of the proper maintenance or use, if any, upon which the manufacturer conditions eligibility for repair under the recall plan, and a description of the proof to be required of an engine owner to demonstrate compliance with any such conditions;

(v) a description of the procedure to be followed by engine owners to obtain correction of the nonconformity. This shall include designation of the date on or after which the owner can have the nonconformity remedied, the time reasonably necessary to perform the labor to remedy the nonconformity, and the designation of facilities at which the nonconformity can be remedied;

(vi) a description of the class of persons other than dealers and authorized warranty agents of the manufacturer who will remedy the nonconformity;

(vii) a description of the system by which the manufacturer will assure that an adequate supply of parts is available to perform the repair under the plan; or

(B)(i) a description of each class or category of engines subject to recall, including the number of engines subject to being recalled, the engine family or a sub-group thereof, the model year, and such other information as may be required to identify the engines;

(ii) a description of the method by which the manufacturer will use the in-use emissions credit, averaging, banking, and trading program, as described in Section 2438(e), to remedy the nonconformity.

(2) Voluntary Recall Progress Report. A manufacturer who initiates a voluntary emission recall campaign pursuant to paragraph (b)(1)(A) of this section must submit at least one report on the progress of the recall campaign. This report shall be submitted to the

Executive Officer by the end of the fifth quarter, as defined in Section 2112(j), Chapter 2, Title 13 of the California Code of Regulations, following the quarter in which the notification of equipment or engine owners was initiated, and include the following information:

(A) Engine family involved and recall campaign number as designated by the manufacturer.

(B) Date owner notification was begun, and date completed.

(C) Number of equipment or engines involved in the recall campaign.

(D) Number of equipment or engines known or estimated to be affected by the nonconformity.

(E) Number of equipment or engines inspected pursuant to the recall plan and found to be affected by the nonconformity.

(F) Number of inspected equipment or engines.

(G) Number of equipment or engines receiving repair under the recall plan.

(H) Number of equipment or engines determined to be unavailable for inspection or repair under the recall plan due to exportation, theft, scrapping, or for other reasons (specify).

(I) Number of equipment or engines determined to be ineligible for recall action due to removed or altered components.

(J) A listing of the identification numbers of equipment or engines subject to recall but for whose repair the manufacturer has not been invoiced. This listing shall be supplied in a standardized computer data storage device to be specified by the Executive Officer.

(K) Any service bulletins transmitted to dealers which relate to the nonconformity and which have not previously been submitted.

(L) All communications transmitted to equipment or engine owners which relate to the nonconformity and which have not previously been submitted.

(3) The information gathered by the manufacturer to compile the reports must be retained for not less than seven years from the date of the manufacture of the engines and must be made available to the Executive Officer or designee of the Executive Officer upon request.

(4) A voluntary recall plan shall be deemed approved unless disapproved by the

Executive Officer within 20 business days after receipt of the recall plan.

(5) Under a voluntary recall program, initiated and conducted by a manufacturer or its agent or representative as a result of in-use enforcement testing or other evidence of noncompliance provided or required by the Board to remedy any nonconformity, the capture rate shall be at a minimum 55 percent of the equipment or engine within the subject engine family or a sub-group thereof. The manufacturer shall comply with the capture rate by the end of the fifth quarter, as defined in Section 2112(j), Chapter 2, Title 13 of the California Code of Regulations, following the quarter in which the notification of equipment or engine owners was initiated. If the manufacturer cannot correct the percentage of equipment specified in the plan by the applicable deadlines, the manufacturer must use good faith efforts through other measures, subject to approval by the Executive Officer, to bring the engine family into compliance with the standards. If the Executive Officer does not approve the manufacturer's efforts, the manufacturer shall propose mitigation measures to offset the emissions of the unrepaired equipment within 45 days from the last report filed pursuant to paragraph (b)(2), above. The Executive Officer shall approve such measures provided that:

(A) The emission reductions from the recalled and repaired equipment or engines and the mitigation measures are equivalent to achieving the capture rate; and

(B) The emission reductions from the mitigation measures are real and verifiable; and

(C) The mitigation measures are implemented in a timely manner.

(c) Initiation and Notification of Ordered Emission-Related Recalls.

(1) A manufacturer shall be notified whenever the Executive Officer has determined, based on production-line test results or in-use test results, enforcement testing results, or any other information, that a substantial number of a class or category of equipment or engines produced by that manufacturer, although properly maintained and used, contain a failure in an emission-related component which, if uncorrected, may result in the equipments' or engines' failure to meet applicable standards over their useful lives; or whenever a class or category of equipment or engines within their useful lives, on average, do not conform to the emission standards prescribed pursuant to Part 5 (commencing with Section 43000) of Division 26 of the Health and Safety Code, or any regulation adopted by the state board pursuant thereto, other than an emissions standard applied to new engines to determine "certification" as specified in Chapter 9, as applicable to the model year of such equipment or engines.

(2) It shall be presumed for purposes of this section that an emission-related failure will result in the exceedance of emission standards unless the manufacturer presents evidence in accordance with the procedures set forth in subsections (A), (B), and (C) which demonstrates to the satisfaction of the Executive Officer that the failure will not result in exceedance of emission standards within the useful life of the equipment or engine.

(A) In order to overcome the presumption of noncompliance set forth in paragraph (c)(2) above, the average emissions of the equipment and engines with the failed emission-related component must comply with applicable emission standards. A manufacturer may demonstrate compliance with the emission standards by following the procedures set forth in either paragraphs (c)(2)(B) or (c)(2)(C) of this section.

(B) A manufacturer may test properly maintained in-use equipment with the failed emission-related component pursuant to the applicable certification emission tests specified in Section 2433, Title 13 of the California Code of Regulations. The emissions shall be projected to the end of the equipment's or engine's useful life using in-use deterioration factors. The in-use deterioration factors shall be chosen by the manufacturer from among the following:

(i) "Assigned" in-use deterioration factors provided by the ARB on a manufacturer's conditions; request and based on ARB in-use testing; or,

(ii) deterioration factors generated during certification, provided adjustments are made to account for equipment aging, customer hour usage-accumulation practices, type of failed component, component failure mode, effect of the failure on other emission-control components, commercial fuel and lubricant quality, and any other factor which may affect the equipment's or engine's operating or,

(iii) subject to approval by the Executive Officer, a manufacturer-generated deterioration factor. Such deterioration factor must based on in-use data generated from certification emission tests performed on properly maintained and used equipment in accordance with the procedures set forth in Section 2433 of Title 13 of the California Code of Regulations, and the equipment from which it was derived must be representative of the in-use fleet with regard to emissions performance and equipped with similar emission control technology as equipment with the failed component.

(C) In lieu of the equipment or engine emission testing described in subsection (B) above and subject to approval by the Executive Officer, a manufacturer may perform an engineering analysis, laboratory testing or bench testing, when appropriate, to demonstrate the effect of the failure.

(3) The notification shall include a description of each class or category of equipment or engines encompassed by the determination of nonconformity, shall set forth the factual basis for the determination and shall designate a date at least 45 business days from the date of receipt of such notification by which the manufacturer shall submit a plan to remedy the nonconformity.

(4) Availability of Public Hearing.

(A) The manufacturer may request a public hearing pursuant to the procedures set forth in Subchapter 1.25, Division 3, Chapter 1, Title 17, California Code of Regulations to

contest the finding of nonconformity and the necessity for or the scope of any ordered corrective action.

(B) If a manufacturer requests a public hearing pursuant to subsection (A) above, and if the Executive Officer's determination of nonconformity is confirmed at the hearing, the manufacturer shall submit the recall plan required by Section 2439 within 30 days after receipt of the Board's decision.

(5) Ordered Recall Plan.

(A) Unless a public hearing is requested by the manufacturer, a recall plan shall be submitted to the Chief, Mobile Source Operations Division, 9528 Telstar Avenue, El Monte, CA 91731, within the time limit specified in the notification. The Executive Officer may grant the manufacturer an extension upon good cause shown.

(B) The recall plan shall contain the following:

(i) A description of each class or category of equipment or engine to be recalled, including the engine family or sub-group thereof, the model-year, the make, the model, and such other information as may be required to identify the equipment or engines to be recalled.

(ii) A description of the nonconformity and the specific modifications, alterations, repairs, corrections, adjustments or other changes to be made to bring the equipment or engines into conformity including a brief summary of the data and technical studies which support the manufacturer's decision regarding the specific corrections to be made.

(iii) A description of the method by which the manufacturer will determine the names and addresses of equipment or engine owners and the method by which they will be notified.

(iv) A description of the procedure to be followed by equipment or engine owners to obtain correction of the nonconformity including the date on or after which the owner can have the nonconformity remedied, the time reasonably necessary to perform the labor required to correct the nonconformity, and the designation of facilities at which the nonconformity can be remedied. The repair shall be completed within a reasonable time designated by the Executive Officer from the date the owner delivers the equipment or engine for repair. This requirement becomes applicable on the date designated by the manufacturer as the date on or after which the owner can have the nonconformity remedied.

(v) If some or all of the nonconforming equipment or engines are to be remedied by persons other than dealers or authorized warranty agents of the manufacturer, a description of such class of persons and a statement indicating that the participating members of the class will be properly equipped to perform such remedial action.

(vi) The capture rate required for each class or category of equipment or engine to be recalled. Under recalls based on exceedance of emission standards, the capture rate shall be at a minimum 80 percent of the equipment or engine within the subject engine family.

(vii) The plan may specify the maximum incentives (such as a free tune-up or specified quantity of free fuel), if any, the manufacturer will offer to induce equipment or engine owners to present their equipment for repair, as evidence that the manufacturer has made a good faith effort to repair the percentage of equipment or engines specified in the plan. The plan shall include a schedule for implementing actions to be taken including identified increments of progress towards implementation and deadlines for completing each such increment.

(viii) A copy of the letter of notification to be sent to equipment or engine owners.

(ix) A description of the system by which the manufacturer will assure that an adequate supply of parts will be available to perform the repair under the recall plan including the date by which an adequate supply of parts will be available to initiate the repair campaign, and the method to be used to assure the supply remains both adequate and responsive to owner demand.

(x) A copy of all necessary instructions to be sent to those persons who are to perform the repair under the recall plan.

(xi) A description of the impact of the proposed changes on fuel economy, operation, performance and safety of each class or category of equipment or engines to be recalled and a brief summary of the data, technical studies, or engineering evaluations which support these descriptions.

(xii) A description of the impact of the proposed changes on the average emissions of the equipment or engines to be recalled based on noncompliance described in subsection (c)(1), above. The description shall contain the following:

(1.) Average noncompliance emission levels.

(2.) Average emission reduction or increase per pollutant resulting from the recall repair. These averages shall be verified by the manufacturer by applying the proposed recall repairs to two or more in-use equipment or engines representing the average noncompliance emission levels. Only those equipment or engines with baseline emission levels within 25 percent of the average emission levels of noncomplying pollutant(s) established under the in-use enforcement test program may be used by manufacturers to verify proposed recall repairs. The Executive Officer may allow the use of equipment or engines exceeding these upper averaging noncompliance limits if none which meet the limits can be reasonably procured.

(3.) An estimate of the average emission level per pollutant for a class or category of equipment or engines after repair as corrected by the required capture rate. The estimated average emission level shall comply with the applicable emission standards. If the average emissions levels achieved by applying the average emission reduction per equipment or engine after repair and the estimated capture rate, do not achieve compliance with the emissions standards, a manufacturer shall propose other measures to achieve average emissions compliance.

(xiii) Any other information, reports, or data which the Executive Officer may reasonably determine to be necessary to evaluate the recall plan.

(6) Approval and Implementation of Recall Plan.

(A) If the Executive Officer finds that the recall plan is designed effectively to correct the nonconformity and complies with the provisions of this Section, he or she will so notify the manufacturer in writing. Upon receipt of the approval notice from the Executive Officer, the manufacturer shall commence implementation of the approved plan. Notification of equipment or engine owners and the implementation of recall repairs shall commence within 45 days of the receipt of notice unless the manufacturer can show good cause for the Executive Officer to extend the deadline.

(B) If the Executive Officer does not approve the recall plan or the mitigation measures provided in this Section as submitted, the Executive Officer shall order modification of the plan or mitigation measures with such changes and additions as he or she determines to be necessary. The Executive Officer shall notify the manufacturer in writing of the disapproval and the reasons for the disapproval.

(C) The manufacturer may contest the Executive Officer's disapproval by requesting a public hearing pursuant to the procedures set forth in Subchapter 1.25, Division 3, Chapter 1, Title 17, California Code of Regulations. As a result of the hearing, the Board may affirm, overturn or modify the Executive Officer's action. In its decision, affirming or modifying, the Board shall specify the date by which the manufacturer shall commence notifying equipment or engine owners and implementing the required recall repairs.

(D) If no public hearing is requested in accordance with (C) above, the manufacturer shall incorporate the changes and additions required by the Executive Officer and shall commence notifying equipment or engine owners and implementing the required recall repairs within 60 days of the manufacturer's receipt of the Executive Officer's disapproval.

(7) Notification of Owners.

(A) Notification to equipment or engine owners shall be made by first class mail or by such other means as approved by the Executive Officer provided, that for good cause, the Executive Officer may require the use of certified mail to ensure an effective

notification.

(B) The manufacturer shall use all reasonable means necessary to locate equipment or engine owners provided, that for good cause, the Executive Officer may require the manufacturer to use motor equipment registration lists, as applicable, available from State or commercial sources to obtain the names and addresses of equipment or engine owners to ensure effective notification.

(C) The Executive Officer may require subsequent notification by the manufacturer to equipment or engine owners by first class mail or other reasonable means provided, that for good cause, the Executive Officer may require the use of certified mail to ensure effective notification.

(D) The notification of equipment or engine owners shall contain the following:

(i) The statement: "The California Air Resources Board has determined that your (equipment or engine) (is or may be) releasing air pollutants which exceed (California or California and Federal) standards. These standards were established to protect your health and welfare from the dangers of air pollution."

(ii) A statement that the nonconformity of any such equipment or engines will be remedied at the expense of the manufacturer.

(iii) A statement that eligibility may not be denied solely on the basis that the equipment or engine owner used parts not manufactured by the original equipment manufacturer, or had repairs performed by outlets other than the equipment or engine manufacturer's franchised dealers.

(iv) A clear description of the components which will be affected by the recall action and a general statement of the measures to be taken to correct the nonconformity.

(v) [Reserved]

(vi) A description of the adverse effects, if any, that an uncorrected nonconformity would have on the performance, fuel economy, or driveability of the equipment or engine or to the function of other engine components.

(vii) A description of the procedure which the equipment or engine owner should follow to obtain correction of the nonconformity including the date on or after which the owner can have the nonconformity remedied, the time reasonably necessary to correct the nonconformity, and a designation of the facilities located in California at which the nonconformity can be remedied.

(viii) After the effective date of the recall enforcement program referred to above, a statement that a certificate showing that the equipment has been repaired under the recall program shall be issued by the service facilities and that such a certificate may be

required as a condition of equipment registration or operation, as applicable.

(ix) A card to be used by a equipment or engine owner in the event the equipment or engine to be recalled has been sold. Such card should be addressed to the manufacturer, have postage paid, and shall provide a space in which the owner may indicate the name and address of the person to whom the equipment or engine was sold.

(x) The statement: "In order to ensure your full protection under the emission warranty made applicable to your (equipment or engine) by State or Federal law, and your right to participate in future recalls, it is recommended that you have your (equipment or engine) serviced as soon as possible. Failure to do so could be determined to be a lack of proper maintenance of your (equipment or engine)".

(xi) A telephone number provided by the manufacturer, which may be used to report difficulty in obtaining recall repairs.

(xii) The manufacturer shall not condition eligibility for repair on the proper maintenance or use of the equipment except for strong or compelling reasons and with approval of the Executive Officer; however, the manufacturer shall not be obligated to repair a component which has been removed or altered so that the recall action cannot be performed without additional cost.

(xiii) No notice sent pursuant to Section (D), nor any other communication sent to equipment or engine owners or dealers shall contain any statement, express or implied, that the nonconformity does not exist or will not degrade air quality.

(xiv) The manufacturer shall be informed of any other requirements pertaining to the notification under this section which the Executive Officer has determined are reasonable and necessary to ensure the effectiveness of the recall campaign.

(8) Repair Label.

(A) The manufacturer shall require those who perform the repair under the recall plan to affix a label to each equipment or engine repaired or, when required, inspected under the recall plan.

(B) The label shall be placed in a location as approved by the Executive Officer and shall be fabricated of a material suitable for such location and which is not readily removable.

(C) The label shall contain the recall campaign number and a code designating the facility at which the repair, inspection for repair, was performed.

(9) Proof of Correction Certificate. The manufacturer shall require those who perform the recall repair to provide the owner of each equipment or engine repaired with a

certificate, through a protocol and in a format prescribed by the Executive Officer, which indicates that the noncomplying equipment or engine has been corrected under the recall program. This requirement shall become effective and applicable upon the effective date of the recall enforcement program referred to in this section, above.

(10) Capture Rates and Alternative Measures.

The manufacturer shall comply with the capture rate specified in the recall plan as determined pursuant to this Section, above, by the end of the fifth quarter, as defined in Section 2112(j), Chapter 2, Title 13 of the California Code of Regulations, following the quarter in which the notification of equipment or engine owners was initiated. If, after good faith efforts, the manufacturer cannot correct the percentage of equipment specified in the plan by the applicable deadlines and cannot take other measures to bring the engine family into compliance with the standards, the manufacturer shall propose mitigation measures to offset the emissions of the unrepaired equipment within 45 days from the last report filed pursuant to Section 2439(c)(13), below. The Executive Officer shall approve such measures provided that:

(A) The emission reductions from the recalled and repaired equipment or engines and the mitigation measures are equivalent to achieving the capture rate; and

(B) The emission reductions from the mitigation measures are real and verifiable; and

(C) The mitigation measures are implemented in a timely manner.

(11) Preliminary Tests. The Executive Officer may require the manufacturer to conduct tests on components and equipment or engines incorporating a proposed correction, repair, or modification reasonably designed and necessary to demonstrate the effectiveness of the correction, repair, or modification.

(12) Communication with Repair Personnel. The manufacturer shall provide to the Executive Officer a copy of all communications which relate to the recall plan directed to dealers and other persons who are to perform the repair. Such copies shall be mailed to the Executive Officer contemporaneously with their transmission to dealers and other persons who are to perform the repair under the recall plan.

(13) Recordkeeping and Reporting Requirements.

(A) The manufacturer shall maintain sufficient records to enable the Executive Officer to conduct an analysis of the adequacy of the recall campaign. For each class or category of equipment or engine, the records shall include, but need not be limited to, the following:

(i) Engine family involved and recall campaign number as designated by the manufacturer.

(ii) Date owner notification was begun, and date completed.

(iii) Number of equipment or engines involved in the recall campaign.

(iv) Number of equipment or engines known or estimated to be affected by the nonconformity.

(v) Number of equipment or engines inspected pursuant to the recall plan and found to be affected by the nonconformity.

(vi) Number of inspected equipment or engines.

(vii) Number of equipment or engines receiving repair under the recall plan.

(viii) Number of equipment or engines determined to be unavailable for inspection or repair under the recall plan due to exportation, theft, scrapping, or for other reasons (specify).

(ix) Number of equipment or engines determined to be ineligible for recall action due to removed or altered components.

(x) A listing of the identification numbers of equipment or engines subject to recall but for whose repair the manufacturer has not been invoiced. This listing shall be supplied in a standardized computer data storage device to be specified by the Executive Officer. The frequency of this submittal, as specified in subsection (C) below, may be changed by the Executive Officer depending on the needs of recall enforcement.

(xi) Any service bulletins transmitted to dealers which relate to the nonconformity and which have not previously been submitted.

(xii) All communications transmitted to equipment or engine owners which relate to the nonconformity and which have not previously been submitted.

(B) If the manufacturer determines that the original responses to subsections (A)(iii) and (iv) of these procedures are incorrect, revised figures and an explanatory note shall be submitted. Responses to subsections (A)(v), (vi), (vii), (viii), and (ix) shall be cumulative totals.

(C) Unless otherwise directed by the Executive Officer, the information specified in subsection (A) of these procedures shall be included in six quarterly reports or two annual reports, beginning with the quarter in which the notification of owners was initiated, or until all nonconforming equipment or engines involved in the campaign have been remedied, whichever occurs sooner. Such reports shall be submitted no later than 25 days after the close of each calendar quarter.

(D) The manufacturer shall maintain in a form suitable for inspection, such as computer

information storage devices or card files, and shall make available to the Executive Officer or his or her authorized representative upon request, lists of the names and addresses of equipment or engine owners:

(i) To whom notification was given;

(ii) Who received remedial repair or inspection under the recall plan; and

(iii) Who were denied eligibility for repair due to removed or altered components.

(E) The records and reports required by these procedures shall be retained for not less than one year beyond the useful life of the equipment or engines involved, or one year beyond the reporting time frame specified in subsection (C) above, whichever is later.

(14) Penalties.

Failure by a manufacturer to carry out all recall actions ordered by the Executive Officer pursuant to Sections 2439(c) of these procedures is a violation of Health and Safety Code Section 43013 and 43105 and shall subject the manufacturer, on a per engine basis, to any and all remedies available under Part 5, Division 26 of the Health and Safety Code, sections 43000 et seq.

(d) Extension of Time. The Executive Officer may extend any deadline in the plan if he or she finds in writing that a manufacturer has shown good cause for such extension.

(e) The Executive Officer may waive any or all of the requirements of these procedures if he or she determines that the requirement constitutes an unwarranted burden on the manufacturer without a corresponding emission reduction.

§1048.420 What in-use testing information must I report to EPA?
DELETE

§1048.425 What records must I keep?
DELETE

Subpart F—Test Procedures

§1048.501 How do I run a valid emission test?

§1048.505 How do I test engines using steady-state duty cycles, including ramped-modal testing?

§1048.510 Which duty cycles do I use for transient testing?

§1048.515 What are the field-testing procedures?

Subpart G—Compliance Provisions

§1048.601 What compliance provisions apply to these engines?

§1048.605 What provisions apply to engines certified under the motor-vehicle program?

§1048.610 What provisions apply to vehicles certified under the motor-vehicle program?

§1048.615 What are the provisions for exempting engines designed for lawn and garden applications?
DELETE

§1048.620 What are the provisions for exempting large engines fueled by natural gas?

§1048.625 What special provisions apply to engines using noncommercial fuels?

§1048.630 What are the provisions for exempting engines used solely for competition?

§1048.635 What special provisions apply to branded engines?

Subpart H—[Reserved]

Subpart I—Definitions and Other Reference Information

§1048.801 What definitions apply to this part?
The following definitions apply to this part. The definitions apply to all subparts unless we note otherwise. All undefined terms have the meaning the Act gives to them. The definitions follow:

*** * * * ***

All-terrain vehicle has the meaning given in 40 CFR 1051.801

DELETE AND REPLACE WITH: All-terrain vehicle has the meaning given in Title 13, California Code of Regulations, Chapter 9, Article 3, Off-Highway Recreational Vehicles and Engines.

*** * * * ***

Designated Compliance Officer means the Manager, Engine Programs Group (6405-J), U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., NW., Washington, DC 20460.

DELETE AND REPLACE WITH:

Designated Compliance Officer means the Executive Officer of the California Air Resources Board or a designee of the Executive Officer.

Designated Enforcement Officer means the Director, Air Enforcement Division (2242A), U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., NW, Washington, DC 20460.

DELETE AND REPLACE WITH:

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

*** * * * ***

Small-volume engine manufacturer means a company with fewer than 200 employees. This includes any employees working for parent or subsidiary companies.

DELETE AND REPLACE WITH:

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 of America.

*** * * * ***

§1048.805 What symbols, acronyms, and abbreviations does this part use?

§1048.810 What materials does this part reference?

§1048.815 What provisions apply to confidential information?

§1048.820 How do I request a hearing from the executive officer of the ARB?

DELETE AND REPLACE WITH:

(a) You may request a hearing under certain circumstances, as described elsewhere in this part. To do this, you must file a written request, including a description of your objection and any supporting data, within 30 days after we make a decision.
(b) For a hearing you request under the provisions of this part, we will approve your request if we find that your request raises a substantial factual issue.
(c) If we agree to hold a hearing, we will use the procedures specified in §1048.15(b)(7).

Appendix I to Part 1048—Large Spark-ignition (SI) Transient Cycle for Constant-Speed Engines
Appendix II to Part 1048—Large Spark-ignition (SI) Composite Transient Cycle

Adopt “California Exhaust and Evaporative Emission Standards and Test Procedures for New 2010 and Later Off-Road Large Spark-ignition Engines (2010 and Later Test Procedure 1048),” to read:

State of California
AIR RESOURCES BOARD

PROPOSED CALIFORNIA EXHAUST AND EVAPORATIVE EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2010 AND LATER OFF-ROAD LARGE SPARK-IGNITION ENGINES

(2010 and Later Test Procedure 1048)

Adopted: March 2, 2007

NOTE: This document incorporates by reference Title 40, Code of Federal Regulations (CFR), Part 1048 – **CONTROL OF EMISSIONS FROM NEW, LARGE NONROAD SPARK-IGNITION ENGINES**, Subparts A, B, C, F, G, H, and I, including Appendix I and II to Part 1048 as amended on July 13, 2005 (Federal Register, Volume 70, pages 40465 through 40486), and the internally referenced subparts of 40 CFR Part 86, 40 CFR Part 1065, and 40 CFR Part 1068. Sections that have been included in their entirety are set forth with the section number and title. California provisions that replace specific federal provisions are denoted by the words "DELETE" for the federal language and "REPLACE WITH" or "ADD" for the California regulations. The symbols "* * * * *" and "..." mean that the remainder of the CFR text for a specific section, which is not shown in these regulations, has been included by reference, with only the printed text changed. Federal regulations that are not listed are not part of the California regulations.

This document is all newly adopted text.

PART 1048 – CONTROL OF EMISSIONS FROM NEW, LARGE NONROAD SPARK-IGNITION ENGINES

Subpart A—Overview and Applicability

§1048.1 Does this part apply to me?

*** * * * ***

(b) DELETE AND REPLACE WITH:
This part 1048 applies for engines built on or after January 1, 2010. You need not follow this part for engines you produce before January 1, 2010. See §1048.101 through 1048.115, and the definition of model year in §1048.801 for more information about the timing of new requirements.

*** * * * ***

(d) DELETE AND REPLACE WITH:
Engines with a maximum engine power at or below 19 kW are covered by Title 13, California Code of Regulations, Chapter 9, Article 1, Small Off-Road Engines

§1048.5 Which engines are excluded from this part's requirements?
This part does not apply to the following nonroad engines:

(a) DELETE AND REPLACE WITH:
Engines that are subject to the requirements of Title 13, California Code of Regulations, Chapter 9, Article 3, Off-Highway Recreational Vehicles and Engines, including any related provisions and guidelines that are applicable to Off-Highway Recreational Vehicles and Engines.

(b) DELETE AND REPLACE WITH:
Propulsion marine engines. See Title 13, California Code of Regulations, Chapter 9, Article 4.7, Spark-Ignition Marine Engines. This part applies with respect to auxiliary marine engines.

§1048.10 How is this part organized?

*** * * * ***

(b) DELETE AND REPLACE WITH:

Subpart B of this part describes the emission standards and other requirements that must be met to certify engines under this part.

§1048.15 Do any other regulation parts affect me?

*** * * * ***

(b)(2) DELETE AND REPLACE WITH:
Certification Procedures for Aftermarket Parts for Off-road Vehicles, Engines, Equipment, Chapter 9, Article 4.7, sections 2470 – 2476, Title 13, California Code of Regulations

*** * * * ***

(b)(6) DELETE AND REPLACE WITH:
Procedures for In-Use Engine Recalls for Large Off-Road Spark-Ignition Engines with an Engine Displacement Greater Than 1.0 Liter, Chapter 9, Article 4.5, section 2439, Title 13, California Code of Regulations

*** * * * ***

(b)(7) DELETE AND REPLACE WITH:
Administrative Procedures – Hearings, Subchapter 1, Article 1, Sections 60040 – 60094, Title 17, California Code of Regulations

ADD:
(b)(8)
Large Spark-Ignition (LSI) Engine Fleet Requirements, Chapter 15, Article 2, sections 2775, 2775.1, and 2775.2, Title 13, California Code of Regulations

§1048.20 What requirements from this part apply to excluded stationary engines?

Subpart B—Emission Standards and Related Requirements

§1048.101 What exhaust emission standards must my engines meet?

*** * * * ***

(a) DELETE AND REPLACE WITH:
Emission standards for transient testing. Starting in the 2010 model year, transient exhaust emissions from your engines may not exceed the following emission standards:
(1) Measure emissions using the applicable transient test procedures described in subpart F of this part.

DELETE AND REPLACE WITH:
(a)(2) *Exhaust Emission Standards.* Exhaust emissions from off-road large spark-ignition engines manufactured for sale, sold, or offered for sale in California, or that are

introduced, delivered or imported into California for introduction into commerce, must not exceed:

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

Model Year	Engine Displacement	Durability Period	HC + NOx	Carbon Monoxide
2010 and subsequent	≤1.0 liter	1,000 hours or 2 years	9.0 [12.0]	410 [549]
2010 and subsequent[(2)]	> 1.0 liter	5000 hours or 7 years	0.6 [0.8]	15.4 [20.6]

Note: (1) Pollutant emissions reported to ARB by manufacturers must be in grams per kilowatt-hour.
(2) Small volume manufacturers are required to comply with these emission standards in 2013.

For severe-duty engines, the HC+NOx standard is 2.7 g/kW-hr and the CO standard is 130.0 g/kW-hr. The following engines are not subject to the transient standards in this paragraph (a):

A. High-load engines.
B. Engines with maximum engine power above 560 kW.
C. Engines with maximum test speed above 3400 rpm.

* * * * *

(e) Fuel types. DELETE AND REPLACE WITH:
(e) Fuel types and Test Fuel
(1) Fuel types.
The exhaust emission standards in this section apply for engines using each type of fuel specified in 40 CFR part 1065, subpart H, on which the engines in the engine family are designed to operate, except for engines certified under §1048.625. For engines certified under §1048.625, the standards of this section apply to emissions measured using the specified test fuel. You must meet the numerical emission standards for hydrocarbons in this section based on the following types of hydrocarbon emissions for engines powered by the following fuels:

(A) Gasoline- and LPG-fueled engines: THC emissions.
(B) Natural gas-fueled engines: NMHC emissions.
(C) Alcohol-fueled engines: THCE emissions.

*** * * * ***

ADD:

(2) Test Fuel.
(A) 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 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as of January 1, 2006 (last amended August 4, 2005) incorporated by reference in Section 1961(d), Title 13, CCR). 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 1065, subpart H, the manufacturer shall demonstrate that the emission test results complies with these Test Procedures.
(B) 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 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as of January 1, 2006 (last amended August 4, 2005) incorporated by reference in Section 1961(d), Title 13, CCR). 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 1065, subpart H, the manufacturer shall demonstrate that the emission test results complies with these Test Procedures.
(C) 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.

(f) DELETE AND REPLACE WITH:
Large spark-ignition engines, one liter or less. Engines with total displacement at or below 1000 cc shall comply with the requirements of Title 13, California Code of Regulations, Chapter 9, Article 4.5, Off-Road Large Spark-Ignition Engines.

*** * * * ***

§1048.105 What evaporative emission standards and requirements apply?

§1048.110 How must my engines diagnose malfunctions?

§1048.115 What other requirements must my engines meet?
Engines subject to this part must meet the following requirements:
(a) DELETE AND REPLACE WITH:

Crankcase emissions. No crankcase emissions shall be discharged directly into the ambient atmosphere from any new 2001 or later engines subject to the provisions of this part.

*** * * * ***

§1048.120 What emission-related warranty requirements apply to me?
DELETE AND REPLACE WITH:

PART 1

(a) Applicability. This section applies to new 2010 and later model year off-road large spark-ignition engines with engine displacement greater than 1.0 liter that are certified to the applicable emission standards. The warranty period begins on the date the engine or equipment is delivered to an ultimate purchaser. The use of alternative fuels must not void the warranties on any engine certified to use such fuel.

(b) General Emissions Warranty Coverage. The manufacturer of each off-road large spark-ignition engine must warrant to the ultimate purchaser and each subsequent purchaser that the engine is:

(1) Designed, built, and equipped so as to conform with all applicable regulations adopted by the Air Resources Board pursuant to its authority in Chapters 1 and 2, Part 5, Division 26 of the Health and Safety Code; and

(2) Free from defects in materials and workmanship which cause the failure of a warranted part to be identical in all material respects to the part as described in the engine manufacturer's application for certification for a period of 3 years or 2,500 hours, whichever occurs first.

(3) Free from defects in materials and workmanship which cause the failure of a high-cost warranted part to be identical in all material respects to the part as described in the engine manufacturer's application for a period of five years or 3,500 hours of operation, whichever occurs first.

> (A) Each manufacturer shall identify in its application for certification the "high-priced" warranted parts which (i) are included on the Board's "Emission Warranty Parts List" as last amended February 22, 1985, incorporated herein by reference, and (ii) have an individual replacement cost, at the time of certification, exceeding the cost limit defined in subsection (B). The replacement cost shall include the cost of the part, labor and standard diagnosis. The costs shall be those of the highest-cost metropolitan area of California.
>
> (B) The dollar value of a high cost part shall be based on the following formula:

$\text{Cost Limit}_n = \$300 * (\text{CPI}_{n-2} / 118.3)$

where,

Cost Limit_n is the cost limit for the applicable model year of the engine rounded to the nearest ten dollars.

n is the model year of the new engines.

n-2 is the calendar year two years prior to the model year of the new engines.

CPI= is the annual average nationwide urban consumer price index published by the United States Bureau of Labor Statistics.

(C) The cost limit shall be reviewed annually by the Executive Officer. The highest-cost metropolitan area in California shall be identified by the Executive Officer for use in this subsection. If a manufacturer seeks certification of an engine before the applicable annual average CPI is available, the cost limit shall be calculated using the average of the monthly nationwide urban CPI figures for the most recent twelve month period for which figures have been published by the United States Bureau of Labor Statistics.

(D) Each manufacturer shall submit to the Executive Officer the documentation used to identify the "high-priced" warranted parts required in this subsection. The documentation shall include the estimated retail parts costs, labor rates in dollars per hour, and the labor hours necessary to diagnosis and replace the parts.

(4) In the absence of a device to measure hours of use, the engine must be warranted for a period of the years noted above in subsections (2) and (3). If a device to measure hours is used, the engine must be warranted for the number of hours or the number of years noted above in subsections (2) and (3), whichever occurs first.

(c) The warranty on emissions-related parts must be interpreted as follows:

(1) Any warranted part that is not scheduled for replacement as required maintenance in the written instructions required by Subsection (e) must be warranted for the warranty period defined in Subsection (b)(2) and (b)(3). If any such part fails during the period of warranty coverage, it must be repaired or replaced by the engine manufacturer according to Subsection (4) below. Any such part repaired or replaced under the warranty must be warranted for the remaining warranty period.

(2) Any warranted part that is scheduled only for regular inspection in the written instructions required by Subsection (e) must be warranted for the warranty period defined in Subsection (b)(2) and (b)(3). A statement in such written instructions to the effect of "repair or replace as necessary" must not reduce the period of warranty

coverage. Any such part repaired or replaced under warranty must be warranted for the remaining warranty period.

(3) Any warranted part that is scheduled for replacement as required maintenance in the written instructions required by Subsection (e) must be warranted for the period of time prior to the first scheduled replacement point for that part. If the part fails prior to the first scheduled replacement, the part must be repaired or replaced by the engine manufacturer according to Subsection (4) below. Any such part repaired or replaced under warranty must be warranted for the remainder of the period prior to the first scheduled replacement point for the part.

(4) Repair or replacement of any warranted part under the warranty provisions of this article must be performed at no charge to the owner at a warranty station.

(5) Notwithstanding the provisions of Subsection (4) above, warranty services or repairs must be provided at all manufacturer distribution centers that are franchised to service the subject engines.

(6) The owner must not be charged for diagnostic labor that leads to the determination that a warranted part is in fact defective, provided that such diagnostic work is performed at a warranty station.

(7) The engine manufacturer must be liable for damages to other engine components proximately caused by a failure under warranty of any warranted part.

(8) Throughout the engine's warranty period defined in Subsection (b)(2) and (b)(3), the engine manufacturer must maintain a supply of warranted parts sufficient to meet the expected demand for such parts.

(9) Any replacement part, as defined in Section 1900(b)(13), Title 13, may be used in the performance of any maintenance or repairs and must be provided without charge to the owner. It is not necessary for replacement parts to be the same brand or by the same manufacturer as the original part sold with the engine. Such use must not reduce the warranty obligations of the engine manufacturer.

(10) Add-on or modified parts, as defined in Section 1900(b)(1) and (b)(10), Title 13, that are not exempted by the Air Resources Board may not be used. The use of any non-exempted add-on or modified parts will, at the discretion of the engine manufacturer, be grounds for disallowing a warranty claim made in accordance with this article. The engine manufacturer must not be liable under this article to warrant failures of warranted parts caused by the use of a non-exempted add-on or modified part.

(11) The Executive Officer may request and, in such case, the engine manufacturer must provide, any documents that describe that manufacturer's warranty procedures or policies.

(d) Each manufacturer must include a copy of the following emission warranty parts list with each new engine, using those portions of the list applicable to the engine.

(1) Fuel Metering System
- (A) Fuel injection system.
- (B) Air/fuel ratio feedback and control system.
- (C) Carburetor system (internal parts and/or pressure regulator or fuel mixer or injection system).
- (D) Cold start enrichment system.

(2) Air Induction System
- (A) Intake manifold or air intake system.
- (B) Air mass sensor assembly.
- (C) Turbocharger/supercharger systems.

(3) Exhaust Gas Recirculation (EGR) System
- (A) EGR valve body, and carburetor spacer if applicable.
- (B) EGR rate feedback and control system.

(4) Air injection System
- (A) Air pump or pulse valve.
- (B) Valves affecting distribution of flow.
- (C) Distribution manifold.

(5) Catalyst or Thermal Reactor System
- (A) Catalytic converter.
- (B) Thermal reactor.
- (C) Exhaust manifold.

(6) Positive Crankcase Ventilation (PCV) System.
- (A) PCV Valve.
- (B) Oil Filler Cap.

(7) Ignition Control System
- (A) Engine Control Module (ECM).
- (B) Ignition module(s).

(8) Miscellaneous items Used in Above Systems
- (A) Vacuum, temperature, and time sensitive valves and switches.
- (B) Sensors used for electronic controls.
- (C) Hoses, belts, connectors, assemblies, clamps, fittings, tubing, sealing gaskets or devices, and mounting hardware.
- (D) Pulleys, belts and idlers.

(e) Each manufacturer must furnish with each new engine written instructions for the maintenance and use of the engine by the owner. The instructions must be consistent with this article and applicable regulations contained herein.

(f) Each manufacturer must submit the documents required by Subsections (d) and (e) with the manufacturer's preliminary application for engine certification for approval by the Executive Officer. Approval by the Executive Officer of the documents required by Subsections (d) and (e) must be a condition of certification. The Executive Officer must approve or disapprove the documents required by Subsections (d) and (e) within 90 days of the date such documents are received from the manufacturer. Any disapproval must be accompanied by a statement of the reasons therefor. In the event of disapproval, the manufacturer may file for an adjudicative hearing under Title 17, California Code of Regulation, Division 3, Chapter 1, Subchapter 1.25 to review the decision of the Executive Officer.

(g) In the application, each manufacturer must include a statement concerning proper maintenance of the engine to maximize emissions performance. The statement must include, but not be limited to, information on air filter care and replacement schedule, proper fueling and fuel mixing, engine maintenance, and a maintenance schedule to ensure that the owner returns to a servicing center to check for deposits, debris build-up, etc.

(h) Each engine, including all parts of its emission-control system must meet the requirements of California Code of Regulations, Title 13, Chapter 9, Article 4.5, Section 2436, Emission Control System Warranty Statement.

PART 2

(a) Each manufacturer must furnish a copy of the following statement with each new off-road large spark-ignition engine with engine displacement greater than 1.0 liter, that have been certified to the applicable emission standards pursuant to Section 2433(b), using those portions of the statement applicable to the engine. Each manufacturer must furnish a copy of the warranty statement as set forth in the California Code of Regulations, Title 13, Section 2406(a) with each new off-road large spark-ignition engine with engine displacement less than or equal to 1.0 liter, using those portions of the statement applicable to the engine.

CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT

YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board (and manufacturer's name, optional) is pleased to explain the emission control system warranty on your (model year(s)) (equipment type or off-road large spark-ignition) engine. In California, new off-road large spark-ignition (LSI) engines must be designed, built and equipped to meet the State's stringent anti-smog standards. (Manufacturer's name) must warrant the emission control system on

your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the carburetor, regulator or fuel-injection system, ignition system, engine computer unit (ECM), catalytic converter and air induction system. Also included may be sensors, hoses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, (manufacturer's name) will repair your LSI engine at no cost to you including diagnosis, parts and labor. MANUFACTURER'S WARRANTY COVERAGE: The (model year(s)) off-road large spark-ignition engines are warranted for (warranty period). If any emission-related part on your engine is defective, the part will be repaired or replaced by (manufacturer's name). OWNER'S WARRANTY RESPONSIBILITIES: - As the off-road LSI engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. (Manufacturer's name) recommends that you retain all receipts covering maintenance on your off-road engine, but (manufacturer's name) cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance. - As the off-road large spark-ignition engine owner, you should however be aware that (manufacturer's name) may deny you warranty coverage if your off-road large spark-ignition engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications. - Your engine is designed to operate on (specific fuel(s)).Use of any other fuel may result in your engine no longer operating in compliance with California's emissions requirements. - You are responsible for initiating the warranty process. The ARB suggests that you present your off-road large spark-ignition engine to a (manufacturer's name) dealer as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible.

If you have any questions regarding your warranty rights and responsibilities, you should contact (Insert chosen manufacturer's contact) at 1-XXX-XXX-XXXX.

(b) Warranty statement furnishing requirements.

(1) Commencing with the 2001 model year for large off-road large spark-ignition engines with engine displacement greater than 1.0 liter, each manufacturer must furnish with each new engine a warranty statement that generally describes the obligations and rights of the engine manufacturer and owner under this article. Engine manufacturers must also include in the warranty statement a phone number the customer may use to obtain their nearest franchised service center.

(2) Commencing with the 2002 model year for large off-road large spark-ignition engines with engine displacement less than or equal to 1.0 liter, each manufacturer must furnish with each new engine a warranty statement as set forth in the California Code of Regulations, Title 13, Section 2406(b).

(c) Each manufacturer must submit the documents required by Subsections (a) and (b) with the manufacturer's preliminary application for new engine certification for approval by the Executive Officer. The Executive Officer may reject or require modification of the documents to the extent the submitted documents do not satisfy the requirements of Subsections (a) and (b). Approval by the Executive Officer of the documents required by Subsections (a) and (b) must be a condition of certification. The Executive Officer must approve or disapprove the documents required by Subsections (a) and (b) within 90 days of the date such documents are received from the manufacturer. Any disapproval must be accompanied by a statement of the reasons therefor. In the event of disapproval, the manufacturer may petition the Board to review the decision of the Executive Officer.

§1048.125 What maintenance instructions must I give to buyers?

§1048.130 What installation instructions must I give to equipment manufacturers?

§1048.135 How must I label and identify the engines I produce?

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(c)(9) DELETE AND REPLACE WITH:
Contain the maintenance specifications and adjustments recommended by the engine manufacturer, including, as applicable: spark plug gap width, valve lash, ignition timing, idle air/fuel mixture setting procedure and value (e.g., idle CO, idle speed drop), and high idle speed. These specifications must indicate the proper transmission position (if applicable) during tune-up and what accessories, if any, should be in operation, and what systems, if any (e.g., vacuum advance, air pump), should be disconnected during the tune-up. If the manufacturer does not recommend adjustment of the foregoing specifications, the manufacturer must include in lieu of the “specifications” the single statement “No other adjustments needed.” For all engines, the instructions for tune-up adjustments must be sufficiently clear on the label to preclude the need for a mechanic or equipment owner to refer to another document in order to correctly perform the adjustments.

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(17) DELETE AND REPLACE WITH:
If your engines are certified to the optional lower-emission standards in §1048.140, state: “OLES.”

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ADD:

(g) Engine labels must meet the requirements of California Code of Regulations, Title 13, Chapter 9, Article 4.5, Section 2434, Emission Control Labels − 2001 and Later Off-Road Large Spark-Ignition Engines and must also include evaporative warranty information as described in California Code of Regulations, Title 13, Chapter 15, Article 1, Section 2759.

§1048.140 What are the provisions for certifying Blue Sky Series engines?
DELETE SECTION AND REPLACE WITH:
§1048.140 What are the provisions for certifying optional lower-emission engines?
DELETE AND REPLACE WITH:
This section defines optional exhaust-emission standards for engines equipped with superior emission control systems. These engines, designated as "optional lower-emission standard" or "OLES" engines, must meet all the requirements in this part that apply to 2010 model year engines and one of the standards in the following table. These engines must also meet all testing and reporting requirements:

Optional Exhaust Emission Standards for
Hydrocarbons plus Oxides of Nitrogen (HC+NOx) and Carbon Monoxide (CO)
in grams per brake horsepower-hour (grams per kilowatt-hour)

Model Year	Engine Displacement	Durability Period	Standard – g/bhp-hr (g/kW-hr)	
			HC+NOx	CO
2010 and subsequent	> 1.0 liter	5000 hours or 7 years	0.4 (0.5)	15.4 (20.6)
			0.2 (0.3)	
			0.1 (0.1)	

Note: (1) Pollutant emissions reported to ARB by manufacturers must be in grams per kilowatt-hour.

If you certify an engine family under this section, it is subject to all the requirements of this part as if these voluntary standards were mandatory.

§1048.145 Are there interim provisions that apply only for a limited time?
(a) DELETE

Subpart C—Certifying Engine Families

§1048.201 What are the general requirements for obtaining a certificate of conformity?

§1048.205 What must I include in my application?

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(aa) DELETE AND REPLACE WITH:
Name an agent for service of process located in the United States. Service on this agent constitutes service on you or any of your officers or employees for any action by the California Air Resources Board.

§1048.210 May I get preliminary approval before I complete my application?

§1048.220 How do I amend the maintenance instructions in my application?

§1048.225 How do I amend my application for certification to include new or modified engines?

§1048.230 How do I select engine families?

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(f) DELETE

§1048.235 What emission testing must I perform for my application for a certificate of conformity?

§1048.240 How do I demonstrate that my engine family complies with exhaust emission standards?

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(c) DELETE AND REPLACE WITH:
To compare emission levels from the emission-data engine with the applicable emission standards, apply deterioration factors to the measured emission levels for each pollutant. Specify the deterioration factors based on emission measurements using four significant figures, consistent with good engineering judgment. For example, your deterioration factors must take into account any available data from in-use testing with similar engines (see subpart E of this part). Apply deterioration factors as follows:

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(2) DELETE

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§1048.245 How do I demonstrate that my engine family complies with evaporative emission standards?

§1048.250 What records must I keep and make available to ARB?

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ADD:
(e) Maintain certification engines for a period of two years.

§1048.255 When may EPA deny, revoke, or void my certificate of conformity?

Subpart D—Testing Production-line Engines

§1048.301 When must I test my production-line engines?
DELETE AND REPLACE WITH:

(a) Compliance Test Procedures

(1) These procedures apply, commencing with the 2001 model year, to any large off-road spark-ignition engine family group (as defined in Sections 2 and 11 of the "California Exhaust Emission Standards and Test Procedures for New 2001 and Later Off-Road Large Spark-ignition Engines") or any subgroup within an engine family group selected for compliance testing pursuant to this section, with an engine displacement greater than 1.0 liter, that have been certified to the applicable emission standards pursuant to Section 2433(b). 2002 and later model year large off-road spark-ignition engines with engine displacement less than or equal to 1.0 liter must comply with the new engine compliance test procedures set forth in the California Code of Regulations, Title 13, Section 2407.

(2) The Executive Officer may, with respect to any new engine family group or subgroup being sold, offered for sale, or manufactured for sale in California, order an engine manufacturer to make available for compliance testing and/or inspection a reasonable number of engines, and may direct that the engines be delivered to the state board at the Haagen- Smit Laboratory, 9528 Telstar Avenue, El Monte, California 91731 or where specified by the Executive Officer. The Executive Officer may also, with respect to any new engine family group or subgroup being sold, offered for sale, or manufactured for sale in California, have a manufacturer compliance test and/or inspect a reasonable number of engines at the manufacturer's facility under the supervision of an ARB Enforcement Officer. Engines must be representatively selected from sources specified by the Executive Officer according to a method approved by him/her, that insofar as practical must exclude engines that would result in an unreasonable disruption of the manufacturer's distribution system. To the extent practical, the Executive Officer must test a representative configuration (as defined in Section 3 of the "California Exhaust Emission Standards and Test Procedures for New 2001 and Later Off-Road Large Spark-ignition Engines") from the engine family group in order to minimize manufacturers' expense and inconvenience in testing different engine configurations.

A subgroup of an engine family group may be selected for compliance testing only if the Executive Officer has reason to believe that the emissions characteristics of that subgroup are substantially in excess of the emissions of the engine family group as a whole.

(3) For all 2001 and subsequent model year off-road large spark-ignition engines selected for compliance testing, the selection and testing of engines and the evaluation of data must be made in accordance with the procedures set forth herein.

(4) For manufacturers that have more than one engine family group, the Air Resources Board or its designated laboratory may procure and test at the manufacturer's expense no more than one engine family group per year, if compliance testing is required.

Notwithstanding the above, if a manufacturer fails to demonstrate compliance with the emission standards after one engine family group has been tested, the ARB or its designated laboratory may test additional engine family groups at the manufacturer's expense, until compliance is demonstrated on one engine family group or all of a manufacturer's engine family groups have been tested. However, the ARB may conduct engine enforcement testing pursuant to the engine test procedures specified in Section 2433, at its own expense. In such an instance, the Executive Officer must order testing only in those cases where evidence such as production line test data or in-use test data indicate that engines may not be in compliance.

(5) All testing must be conducted in accordance with the applicable model year certification emission test procedures. Break-in before testing may be performed on test engines to the same extent it is performed on production-line testing engines (See subsection (b)). No break-in or modifications, adjustments, or special preparation or maintenance will be allowed on engines chosen for compliance testing without the written consent of the Executive Officer. Such consent must not be unreasonably withheld where such adjustment or alteration is required to render the engine testable and reasonably operative.

(6) If the manufacturer elects to specify a different break-in or adjustments, they will be performed by the manufacturer under the supervision of ARB personnel.

(7) Correction of damage or maladjustment that may reasonably be found to have resulted from shipment of the engine is permitted only after testing the engine, except where 100 percent of the manufacturer's production is given that inspection or maintenance by the manufacturer's own personnel. Exceptions are allowed in the cases where the damage results in the engine being unsafe to operate, inoperable, or unable to complete the emission test. Additionally, an exception is allowed if the damage results in engine performance deficiencies that would be obvious in customer service and that would cause the customer to seek repair of the engine. The manufacturer may request that the engine be repaired from shipping damage, and be retested. If the

Executive Officer concurs, the engine may be retested, and the original test results may be replaced by the after-repair test results.

(8) Engines must be randomly chosen from the selected engine family group or subgroup. Prior to the start of testing, manufacturers must indicate that sampling plan (as described in paragraphs (9) and (10), below) they will use. Once testing has begun, manufacturers may not switch to the other sampling plan; the generated test results will be final. Each chosen engine must be tested according to the "California Exhaust Emission Standards and Test Procedures for New 2001 and Later Off-Road Large Spark-ignition Engines" ("Test Procedures") to determine its emissions. Unique specialty hardware and personnel normally necessary to prepare the engine for the performance of the test as set forth in the Test Procedures must be supplied by the manufacturer within seven days after request. Failure to supply this unique specialty hardware or personnel may not be used by the manufacturer as a cause for invalidation of the subsequent tests.

(9) Engines must be tested in groups of five until a "Pass" or Fail" decision is reached for each pollutant independently for the engine family or subgroup in accordance with the following table:

Number of Engines Tested	Decide “Fail” If “U” is greater than or equal to:	Decide “Pass” If “U” is less than or equal to:
5	2.18	-0.13
10	2.11	0.51
15	2.18	0.88
20	2.29	1.16

where:

$$U = \frac{\sum_{i=1}^{n} (x_i - \mu_o)}{\left(\sum_{i=1}^{n} (x_i - \mu_o)^2\right)^{0.5}}$$

x_i = the projected emissions of one pollutant for the ith engine tested.
μ_o = the applicable calendar year emission standard for that pollutant.
n = the number of engines tested.

(10) The Executive Officer will find that a group of engines has failed the compliance testing pursuant to the above table if the Executive Officer finds that the average

emissions of the engines within the selected engine family or subgroup exceed the applicable calendar year new engine emission standard for at least one pollutant.

(11) If no decision for a pollutant or pollutants can be reached after 20 engines have been tested, the Executive Officer will not make a "Fail" decision for the selected engine family or subgroup on the basis of these 20 tests alone. Under these circumstances the Executive Officer will elect to test 10 additional engines. If the average emissions from the 30 engines tested exceed any one of the exhaust emission standards for which a "Pass" decision has not been previously made, the Executive Officer will render a "Fail" decision.

(12) If the Executive Officer determines, in accordance with the procedures set forth in Subsection (a) that an engine family, or any subgroup within an engine family, exceeds the emission standards for one or more pollutants, the Executive Officer will:

(A) Notify the engine manufacturer that the engine manufacturer may be subject to revocation or suspension of the Executive Order authorizing sales and distribution of the noncompliant engines in the State of California, or enjoined from any further sales or distribution, of the noncompliant engines in the State of California pursuant to Section 43017 of the Health and Safety Code. Prior to revoking or suspending the Executive Order, or seeking to enjoin an engine manufacturer, the Executive Officer will consider production line test results, if any, and any additional test data or other information provided by the engine manufacturer and other interested parties. In addition, the engine manufacturer may be subject to, on a per engine basis, any and all remedies available under Part 5, Division 26 of the Health and Safety Code, sections 43000 et seq.

(B) Notify the equipment manufacturer that the equipment manufacturer may be subject to revocation or suspension of the Executive Order authorizing sales and distribution of the noncompliant engines in the State of California, or being enjoined from any further sales, or distribution, of the equipment manufacturer's equipment product line(s) that are, or utilize engines that are, noncompliant with the applicable emission regulations pursuant to Section 43017 of the Health and Safety Code. Prior to revoking or suspending the Executive Order, or seeking to enjoin an equipment manufacturer, the Executive Officer will consider production line test results, if any, and any additional test data or other information provided by the equipment manufacturer and other interested parties. In addition, the equipment manufacturer may be subject to, on a per engine basis, any and all remedies available under Part 5, Division 26 of the Health and Safety Code, sections 43000 et seq.

(13) Engines selected for inspection must be checked to verify the presence of those emissions-related components specified in the engine manufacturer's application for certification, and for the accuracy of any adjustments, part numbers and labels specified in that application. If any engine selected for inspection fails to conform to any applicable law in Part 5 (commencing with Section 43000) of Division 26 of the Health

and Safety Code, or any regulation adopted by the state board pursuant thereto, other than an emissions standard applied to new engines to determine "certification" as specified in Chapter 9, the Executive Officer will:

(A) Notify the engine manufacturer and may seek to revoke or suspend the Executive Order authorizing sales and distribution or enjoin the engine manufacturer from any further sales, or distribution, of the applicable noncompliant engine families or subgroups within the engine families in the State of California pursuant to Section 43017 of the Health and Safety Code. Before revoking or suspending the Executive Order authorizing sales and distribution of the applicable noncompliant engine families or subgroups within the State of California, or seeking to enjoin an engine manufacturer, the Executive Officer will consider any information provided by the engine manufacturer and other interested parties. In addition, the engine manufacturer may be subject to, on a per engine basis, any and all remedies available under Part 5, Division 26 of the Health and Safety Code, sections 43000 et seq.

(B) Notify the equipment manufacturer and may seek to revoke or suspend the Executive Order authorizing sales and distribution or enjoin the equipment manufacturer from any further sales, or distribution, in the State of California of the equipment manufacturer's equipment product line(s) that are, or utilize engines that are, noncompliant with the applicable emission regulations pursuant to Section 43017 of the Health and Safety Code. Prior to revoking or suspending the Executive Order authorizing sales and distribution of the applicable noncompliant equipment, or seeking to enjoin an equipment manufacturer, the Executive Officer will consider any information provided by the equipment manufacturer and other interested parties. In addition, the equipment manufacturer may be subject to, on a per engine basis, any and all remedies available under Part 5, Division 26 of the Health and Safety Code, sections 43000 et seq.

(b) 2001 and Subsequent Model Cumulative Sum Production Line Test Procedures

(1) The 2001 and subsequent model year off-road large spark-ignition engines with an engine displacement of greater than 1.0 liter, that have been certified to the applicable emission standards pursuant to Section 2433(b), are subject to production line testing performed according to the requirements specified in this section. The 2002 and subsequent model year off-road large spark-ignition engines with an engine displacement of less than or equal to 1.0 liter, that have been certified for sale in California, must comply with production line testing performed according to the requirements set forth in the California Code of Regulations, Title 13, Section 2407.

(A) Standards and Test Procedures. The emission standards, exhaust sampling and analytical procedures are those described in the Test Procedures, and are applicable to engines tested only for exhaust emissions. The production line test procedures are specified in conjunction with the Test Procedures. An engine is in compliance with these production line standards and test procedures only when all portions of these

production line test procedures and specified requirements from the Test Procedures are fulfilled, except any adjustable engine parameters may be set to any value or position that is within the range available to the ultimate purchaser.

(B) Air Resources Board (ARB) personnel and mobile laboratories must have access to engine or equipment assembly plants, distribution facilities, and test facilities for the purpose of engine selection, testing, and observation. Scheduling of access must be arranged with the designated engine manufacturer's representative and must not unreasonably disturb normal operations (See Test Procedures).

(2) Engine Sample Selection.

(A) At the start of each quarter for the model year, the engine manufacturer will begin to randomly select engines from each engine family for production line testing, according to the criteria specified herein. The engines must be representative of the engine manufacturer's California sales. Each engine will be selected from the end of the assembly line. All engine models within the engine family must be included in the sample pool. Each selected engine for production line testing must pass the inspection test, by being equipped with the appropriate emission control systems certified by the ARB. The procedure for randomly selecting engines or units of equipment must be submitted to the Chief, Mobile Source Operations Division, 9528 Telstar Avenue, El Monte, CA, 91731, prior to the start of production for the first year of production.

(i) For newly certified engine families: After two engines are tested, the manufacturer will calculate the required sample size for the model year according to the Sample Size Equation in paragraph (4) of this subsection.

(ii) For carry-over engine families: After one engine is tested, the manufacturer will combine the test with the last test result from the previous model year and then calculate the required sample size for the model year according to the Sample Size Equation in paragraph (4) of this subsection.

(iii) Beginning with the 2006 model year, a manufacturer may annually request of the Executive Officer a reduction in production line testing for an engine family. In making such request, the manufacturer must demonstrate that the engine family's production line test data is consistent and in-use compliance data is consistent for the previous year(s) and in compliance with the emission standards in Section 2433. If the Executive Officer determines that a reduction is warranted, the manufacturer may test as few as one production engine during the subject model year.

(B) Engine manufacturers must provide actual California sales, or other information acceptable to the Executive Officer, including, but not limited to, an estimate based on market analysis and federal production or sales.

(3) Engine Preparation and Preconditioning

(A) No emissions tests may be performed on an engine prior to the first production line test.

(B) The engine or unit of equipment must be tested after the engine manufacturer's recommended break-in period. The engine manufacturer must submit to the Executive Officer the schedule for engine break-in and any changes to the schedule with each quarterly report. This schedule must be adhered to for all production line testing within an engine family and subgroup or engine family and assembly plant as appropriate.

(C) If an engine or unit of equipment is shipped to a remote facility for production line testing, and adjustment or repair is necessary because of such shipment, the engine manufacturer must perform the necessary adjustments or repairs only after the initial test of the engine or equipment. Engine manufacturers must report to the Executive Officer in the quarterly report, all adjustments or repairs performed on engines or equipment prior to each test. In the event a retest is performed, a request may be made to the Executive Officer, within ten days of the production quarter, for permission to substitute the after-repair test results for the original test results. The Executive Officer will either affirm or deny the request by the engine manufacturer within ten working days from receipt of the request.

(D) If an engine manufacturer determines that the emission test results of an engine or unit of equipment are invalid, the engine or equipment must be retested. Emission results from all tests must be reported. The engine manufacturer must include a detailed report on the reasons for each invalidated test in the quarterly report.

(4)(A) Manufacturers will calculate the required sample size for the model year for each engine family using the Sample Size Equation below. N is calculated from each test result. The number N indicates the number of tests required for the model year for an engine family. N is recalculated after each test. Test results used to calculate the variables in the Sample Size Equation must be final deteriorated test results as specified in (d)(3).

$$N = \left[\frac{(t_{95} \, x \, \sigma)}{(x - STD)} \right]^{2} + 1$$

Where:

N	=	required sample size for the model year.
t_{95}	=	95% confidence coefficient. It is dependent on the number of tests completed, n, as specified in the table in paragraph (C) of this section. It defines one-tail, 95% confidence intervals.
σ	=	test sample standard deviation calculated from the following equation:

$$\sigma = \sqrt{\frac{\sum(X_i - x)^2}{n - 1}}$$

Where:

X_i = emission test result for an individual engine
x = mean of emission test results of the sample
STD = emission standard
n = The number of tests completed in an engine family

(B) Reserved

(C) Number of Tests (n) & 1-tail Confidence Coefficients (t 95)

n	t_{95}	n	t_{95}	n	t_{95}
2	6.31	12	1.80	22	1.72
3	2.92	13	1.78	23	1.72
4	2.35	14	1.77	24	1.71
5	2.13	15	1.76	25	1.71
6	2.02	16	1.75	26	1.71
7	1.94	17	1.75	27	1.71
8	1.90	18	1.74	28	1.70
9	1.86	19	1.73	29	1.70
10	1.83	20	1.73	30	1.70
11	1.81	21	1.72	∞	1.645

(D) A manufacturer must distribute the testing of the remaining number of engines needed to meet the required sample size N, evenly throughout the remainder of the model year.

(E) After each new test, the required sample size, N, is recalculated using updated sample means, sample standard deviations and the appropriate 95% confidence coefficient.

(F) A manufacturer must continue testing and updating each engine family's sample size calculations according to paragraphs (4)(A) through (4)(F) of this section until a decision is made to stop testing as described in paragraph (4)(G) of this section or a noncompliance decision is made pursuant to (c)(6).

(G) If, at any time throughout the model year, the calculated required sample size, N, for an engine family is less than or equal to the sample size, n, and the sample mean, x, for HC + NOx is less than or equal to the emission standard, the manufacturer may stop testing that engine family.

(H) If, at any time throughout the model year, the sample mean, x, for HC + NOx is greater than the emission standard, the manufacturer must continue testing that engine family at the appropriate maximum sampling rate.

(I) The maximum required sample size for an engine family (regardless of the required sample size, N, as calculated in paragraph (4)(A) of this section) is thirty tests per model year.

(J) Manufacturers may elect to test additional randomly chosen engines. All additional randomly chosen engines tested in accordance with the testing procedures specified in Emission Standards and Test Procedures must be included in the Sample Size and Cumulative Sum equation calculations as defined in section (b), respectively.

(K) Small volume manufacturers may limit the number of engines tested to one percent of their California production. Compliance would be determined based on the available test data.

(5) The manufacturer must produce and assemble the test engines using its normal production and assembly process for engines to be distributed into commerce.

(6) No quality control, testing, or assembly procedures will be used on any test engine or any portion thereof, including parts and subassemblies, that have not been or will not be used during the production and assembly of all other engines of that family, unless the Executive Officer approves the modification in production or assembly procedures.

(c) Calculation of Cumulative Sum (CumSum) Statistic. Each engine manufacturer must review the test results using the following procedure:

(1) Manufacturers must construct the following CumSum equation for each regulated pollutant for each engine family. Test results used to calculate the variables in the CumSum Equation must be final deteriorated test results as defined in (d)(3).

$$C_i = \max[0 \text{ OR } (C_{i-1} + X_i - (STD + F))]$$

Where:

C_i	=	The current CumSum statistic
C_{i-1}	=	The previous CumSum statistic. Prior to any testing, the CumSum statistic = 0 (i.e. $C_0 = 0$)
X_i	=	The current emission test result for an individual engine
STD	=	Emission standard
F	=	$0.25 \times \sigma$

(2) After each test, C_i is compared to the action limit, H, the quantity which the CumSum statistic must exceed, in two consecutive tests, before the engine family may be determined to be in noncompliance for purposes of paragraph (c).

H	=	The Action Limit. It is $5.0 \times \sigma$, and is a function of the standard deviation, σ.
σ	=	is the sample standard deviation and is recalculated after each test.

(3) After each engine is tested, the CumSum statistic shall be promptly updated according to the CumSum Equation in paragraph (1) of this subsection.

(4) If, at any time during the model year, a manufacturer amends the application for certification for an engine family as specified in Sections 17 and 18 of the Test Procedures by performing an engine family modification (i.e. a change such as a running change involving a physical modification to an engine, a change in specification or setting, the addition of a new configuration, changes in calibration, or the use of a different deterioration factor), all previous sample size and CumSum statistic calculations for the model year will remain unchanged.

(5) A failed engine is one whose final deteriorated test result for a regulated pollutant exceeds the emission standard for that pollutant.

(6) An engine family may be determined to be in noncompliance, if at any time throughout the model year, the CUMSUM statistic, C i, for a regulated pollutant is greater than the action limit, H, for two consecutive tests.

(7) The engine manufacturer must perform a minimum of two (2) tests per engine family per quarter of production, regardless of whether the conditions of sample size have been met.

(8) All results from the previous quarters of the same model year must be included in the on-going Cumulative Sum analysis, provided that the engine family has not failed (e.g., if three engines of a family were tested in the first quarter, the first test of the second quarter would be considered as the fourth test).

(9) If the Cumulative Sum analysis indicates that an engine family has failed, the engine manufacturer must notify the Chief of the Mobile Source Operations Division in writing and by telephone, within ten (10) working days. Corrective action will be taken as noted in paragraphs (e) and (f) below.

(10) If a manufacturer performs corrective action on a failed engine family and then resumes production, all previous tests will be void, and Cumulative Sum analysis will begin again with the next test.

(11) At the end of the quarter, or when the Cumulative Sum analysis indicates that a decision has been made, the manufacturer must provide all the data accumulated during the quarter.

(d) Calculation and reporting of test results.

(1) Initial test results are calculated following the applicable test procedure. The manufacturer rounds these results, in accordance with ASTM E29- 93a, to the number of decimal places contained in the applicable emission standard expressed to one additional significant figure. (ASTM E29-93a has been incorporated by reference.)

(2) Final test results are calculated by summing the initial test results derived in paragraph (a) of this section for each test engine, dividing by the number of tests conducted on the engine, and rounding in accordance with ASTM E29-93a to the same number of decimal places contained in the applicable standard expressed to one additional significant figure.

(3) The final deteriorated test results for each test engine are calculated by applying the appropriate deterioration factors, derived in the certification process for the engine family, to the final test results, and rounding in accordance with ASTM E29-93a to the same number of decimal places contained in the applicable standard expressed to one additional significant figure.

(4) If, at any time during the model year, the CumSum statistic exceeds the applicable action limit, H, in two consecutive tests, the engine family may be determined to be in noncompliance and the manufacturer must notify the Chief of Mobile Sources Operations Division and the Manager of the New Vehicle Audit Section, 9528 Telstar Ave., El Monte, CA 91731, within ten (10) working days of such exceedance by the Cum Sum statistic.

(5) Within 30 calendar days of the end of each quarter, each engine manufacturer must submit to the Executive Officer a report which includes the following information:

(A) The location and description of the manufacturer's or other's exhaust emission test facilities which were utilized to conduct testing reported pursuant to this section;

(B) Total production and sample sizes, N and n, for each engine family;

(C) The applicable emissions standards for each engine family.

(D) A description of the process to obtain engines on a random basis;

(E) A description of the test engines. (i.e., date of test, engine family, engine size, engine or equipment identification number, fuel system, dynamometer power absorber setting in horsepower, engine code or calibration number, and test location).

(F) The date of the end of the engine manufacturer's model year production for each engine family.

(G) For each test conducted,

(i) A description of the test engine, including:

(a) Configuration and engine family identification,

(b) Year, make, and build date,

(c) Engine identification number, and

(d) Number of hours of service accumulated on engine prior to testing;

(ii) Location where service accumulation was conducted and description of accumulation procedure and schedule;

(iii) Test number, date, test procedure used, initial test results before and after rounding, and final test results for all exhaust emission tests, whether valid or invalid, and the reason for invalidation, if applicable;

(iv) A complete description of any adjustment, modification, repair, preparation, maintenance, and/or testing which was performed on the test engine, was not reported pursuant to any other part of this article, and will not be performed on all other production engines;

(v) The exhaust emission data for HC+NOx (or NMHC+NOx, as applicable) and CO for each test engine or equipment. The data reported must provide two significant figures beyond the number of significant figures in applicable emission standards.

(vi) The retest emission data, as described in paragraph (d) above for any engine or unit of equipment failing the initial test, and description of the corrective actions and measures taken, including specific component replaced or adjusted.

(vii) A CumSum analysis, as required in paragraph (c), of the production line test results for each engine family;

(viii) Any other information the Executive Officer may request relevant to the determination whether the new engines being manufactured by the manufacturer do in fact conform with the regulations with respect to which the Executive Order was issued;

(ix) For each failed engine as defined in paragraph (c), a description of the remedy and test results for all retests.

(x) Every aborted test data and reason for the aborted test.

(xi) The start and stop dates of batch-produced engine family production.

(xii) The required information for all engine families in production during the quarter regardless of sample size; and

(xiii) The following signed statement and endorsement by an authorized representative of the manufacturer:

This report is submitted pursuant to this article. This production line testing program was conducted in complete conformance with all applicable regulations under the Test Procedures. No emission-related changes to production processes or quality control procedures for the engine family tested have been made during this production line testing program that affect engines from the production line. All data and information reported herein is, to the best of (Company Name) knowledge, true and accurate. I am aware of the penalties associated with violations of the California Code of Regulations and the regulations thereunder. (Authorized Company Representative.)

(H) Each manufacturer must submit a copy of the report that has been stored (e.g., computer disc), or may be transmitted, in an electronically digitized manner, and in a format that is specified by the Executive Officer. This electronically based submission is in addition to the written submission of the report.

(e) Manufacturer Notification of Failure.

(1) The Executive Officer will notify the engine manufacturer that the engine manufacturer may be subject to revocation or suspension of the Executive Order authorizing sales and distribution of the noncompliant engines in the State of California, or being enjoined from any further sales, or distribution, of the noncompliant engines in the State of California pursuant to Section 43017 of the Health and Safety Code. Prior to revoking or suspending, or seeking to enjoin an engine manufacturer, and other interested parties, including, but not limited to corrective actions applied to the noncompliant engine family. In addition, the engine manufacturer may be subject to, on a per engine basis, any and all remedies available under Part 5, Division 26 of the Health and Safety Code, sections 43000 et seq.

(2) The Executive Officer will notify the equipment manufacturer that the equipment manufacturer may be subject to revocation or suspension of the Executive Order authorizing sales and distribution of the noncompliant equipment in the State of California, or being enjoined from any further sales, or distribution, of the noncompliant equipment product line(s) that are, or utilize engines that are, noncompliant with the applicable emission regulations in the State of California pursuant to Section 43017 of the Health and Safety Code. Prior to revoking or suspending, or seeking to enjoin an equipment manufacturer, and other interested parties, including, but not limited to corrective actions applied to the noncompliant engine family. In addition, the equipment manufacturer may be subject to, on a per engine basis, any and all remedies available under Part 5, Division 26 of the Health and Safety Code, sections 43000 et seq.

(f) Suspension and revocation of Executive Order.

(1) The Executive Order is automatically suspended with respect to any engine failing pursuant to paragraph (c)(5) effective from the time that testing of that engine family is completed.

(2) The Executive Officer may suspend the Executive Order for an engine family which is determined to be in noncompliance pursuant to paragraph (c)(6). This suspension will not occur before fifteen days after the engine family is determined to be in noncompliance.

(3) If the results of testing pursuant to these regulations indicate that engines of a particular family produced at one plant of a manufacturer do not conform to the regulations with respect to which the Executive Order was issued, the Executive Officer may suspend the Executive Order with respect to that family for engines manufactured by the manufacturer at this and all other plants.

(4) Notwithstanding the fact that engines described in the application for certification may be covered by an Executive Order, the Executive Officer may suspend such certificate immediately in whole or in part if the Executive Officer finds any one of the following infractions to be substantial:

(A) The manufacturer refuses to comply with any of the requirements of this subpart.

(B) The manufacturer submits false or incomplete information in any report or information provided to the Executive Officer under this subpart.

(C) The manufacturer renders inaccurate any test data submitted under this subpart.

(D) An ARB enforcement officer is denied the opportunity to conduct activities authorized in this subpart and a warrant or court order is presented to the manufacturer or the party in charge of the facility in question.

(5) The Executive Officer may suspend such certificate immediately in whole or in part if the Executive Officer finds that an ARB enforcement officer is unable to conduct activities authorized in this Section and the Test Procedures because a manufacturer has located its facility in a foreign jurisdiction where local law prohibits those activities.

(6) The Executive Officer shall notify the manufacturer in writing of any suspension or revocation of an Executive Order in whole or in part. A suspension or revocation is effective upon receipt of the notification or fifteen days from the time an engine family is determined to be in noncompliance pursuant to paragraph (c)(5) or (c)(6), whichever is later, except that the certificate is immediately suspended with respect to any failed engines as provided for in paragraph (a) of this section.

(7) The Executive Officer may revoke an Executive Order for an engine family after the certificate has been suspended pursuant to paragraph (b) or (c) of this section if the proposed remedy for the nonconformity, as reported by the manufacturer to the Executive Officer, is one requiring a design change or changes to the engine or emission control system as described in the application for certification of the affected engine family.

(8) Once an Executive Order has been suspended for a failed engine, as provided for in paragraph (a) of this section, the manufacturer must take the following actions before the certificate is reinstated for that failed engine:

(A) Remedy the nonconformity;

(B) Demonstrate that the engine conforms to the emission standards by retesting the engine in accordance with these regulations; and

(C) Submit a written report to the Executive Officer, after successful completion of testing on the failed engine, which contains a description of the remedy and test results for each engine in addition to other information that may be required by this part.

(9) Once an Executive Order for a failed engine family has been suspended pursuant to paragraph (b), (c) or (d) of this section, the manufacturer must take the following actions before the Executive Officer will consider reinstating the certificate:

(A) Submit a written report to the Executive Officer which identifies the reason for the noncompliance of the engines, describes the proposed remedy, including a description of any proposed quality control or quality assurance measures to be taken by the manufacturer to prevent future occurrences of the problem, and states the date on which the remedies will be implemented.

(B) Demonstrate that the engine family for which the Executive Order has been suspended does in fact comply with the regulations of this part by testing as many engines as needed so that the CumSum statistic falls below the action limit. Such testing must comply with the provisions of this Part. If the manufacturer elects to continue testing individual engines after suspension of a certificate, the certificate is reinstated for any engine actually determined to be in conformance with the emission standards through testing in accordance with the applicable test procedures, provided that the Executive Officer has not revoked the certificate pursuant to paragraph (f) of this section.

(10) Once the Executive Order has been revoked for an engine family, if the manufacturer desires to continue introduction into commerce of a modified version of that family, the following actions must be taken before the Executive Officer may issue a certificate for that modified family:

(A) If the Executive Officer determines that the proposed change(s) in engine design may have an effect on emission performance deterioration, the Executive Officer shall notify the manufacturer, within five working days after receipt of the report in paragraph (9)(A) of this section, whether subsequent testing under this subpart will be sufficient to evaluate the proposed change or changes or whether additional testing will be required; and

(B) After implementing the change or changes intended to remedy the nonconformity, the manufacturer must demonstrate that the modified engine family does in fact conform with the regulations of this part by testing as many engines as needed from the modified engine family so that the CumSum statistic, as calculated per aforementioned method, falls below the action limit. When both of these requirements are met, the Executive Officer shall reissue the certificate or issue a new certificate, as the case may be, to include that family. As long as the CumSum statistic remains above the action limit, the revocation remains in effect.

(11) At any time subsequent to a suspension of an Executive Order for a test engine pursuant to paragraph (a) of this section, but not later than 15 days (or such other period as may be allowed by the Executive Officer) after notification of the Executive Officer's decision to suspend or revoke an Executive Order in whole or in part pursuant to paragraphs (b), (c), or (f) of this section, a manufacturer may request a hearing as to whether the tests have been properly conducted or any sampling methods have been properly applied.

(12) Any suspension of an Executive Order under paragraph (f)(4) of this section:

(A) must be made only after the manufacturer concerned has been offered an opportunity for a hearing conducted in accordance with all applicable requirements and;

(B) need not apply to engines no longer in the possession of the manufacturer.

(13) After the Executive Officer suspends or revokes an Executive Order pursuant to this section and prior to the commencement of a hearing, if the manufacturer demonstrates to the Executive Officer's satisfaction that the decision to suspend or revoke the Executive Order was based on erroneous information, the Executive Officer shall reinstate the Executive Order.

(14) To permit a manufacturer to avoid storing non-test engines while conducting subsequent testing of the noncomplying family, a manufacturer may request that the Executive Officer conditionally reinstate the Executive Order for that family. The Executive Officer may reinstate the Executive Order subject to the following condition: the manufacturer must commit to recall all engines of that family produced from the time the Executive Order is conditionally reinstated if the CumSum statistic does not fall below the action limit and must commit to remedy any nonconformity at no expense to the owner.

§1048.305 How must I prepare and test my production-line engines?
DELETE

§1048.310 How must I select engines for production-line testing?
DELETE

§1048.315 How do I know when my engine family fails the production-line testing requirements?
DELETE

§1048.320 What happens if one of my production-line engines fails to meet emission standards?
DELETE

§1048.325 What happens if an engine family fails the production-line requirements?
DELETE

§1048.330 May I sell engines from an engine family with a suspended certificate of conformity?
DELETE

§1048.335 How do I ask EPA to reinstate my suspended certificate?
DELETE

§1048.340 When may EPA revoke my certificate under this subpart and how may I sell these engines again?
(a) We may revoke your certificate for an engine family in the following cases:

*** * * * ***

(2) DELETE AND REPLACE WITH:
Your engine family fails to comply with the requirements of this subpart and your proposed remedy to address a suspended certificate under §1048.301 is inadequate to solve the problem or requires you to change the engine's design or emission-control system.

(b) To sell engines from an engine family with a revoked certificate of conformity, you must modify the engine family and then show it complies with the requirements of this part.
(1) DELETE AND REPLACE WITH:
If we determine your proposed design change may not control emissions for the engine's full useful life, we will tell you within ten working days after receiving your report. In this case we will decide whether production-line testing will be enough for us to evaluate the change or whether you need to do more testing.

*** * * * ***

§1048.345 What production-line testing records must I send to EPA?
DELETE

§1048.350 What records must I keep?

DELETE

Subpart E—Testing In-use Engines

§1048.401 What testing requirements apply to my engines that have gone into service?

§1048.405 How does this program work?

§1048.410 How must I select, prepare, and test my in-use engines?
DELETE AND REPLACE WITH:

(a) This section applies to new 2010 and later model year off-road large spark-ignition engines with engine displacement greater than 1.0 liter.

(b) Manufacturer In-Use Testing Program.

Standards and Test Procedures. The emission standards, exhaust sampling and analytical procedures are those described in the Test Procedures, and are applicable to engines tested only for exhaust emissions. An engine is in compliance with these standards and test procedures only when all portions of these in-use test procedures and specified requirements from the Test Procedures are fulfilled, except that any adjustable engine parameters must be set to the nominal value or position as indicated on the engine label.

(1) Within a manufacturer's model-year engine production period, the ARB will identify those engine families, and the specific configurations within an engine family, that the manufacturer must subject to in-use testing as described below. For each model year, ARB may identify a number of engine families that is no greater than 25 percent of the number of engine families to which this article is applicable. For those manufacturers producing three or less engine families in a model year, ARB may designate a maximum of one engine family per model year for in-use testing.

(2) For each engine family identified by ARB, engine manufacturers must perform emission testing of an appropriate sample of in-use engines from each engine family. Manufacturers must submit data from this in-use testing to ARB.

(3) An engine manufacturer must test in-use engines from each engine family identified by ARB. All engines selected by the manufacturer for testing must be identified by the manufacturer, and a list of the selected engines must be submitted to the Executive Officer, prior to the onset of testing. Engines to be tested must have accumulated a minimum of 0.50 (50 percent) of the family's certified useful life period. The number of engines to be tested by a manufacturer will be determined by the following method:

(A) a minimum of four engines per family, provided that no engine fails any emission standard. For each exceedance, two additional engines must be tested until the total

number of engines equals ten.

(B) For engine families of less than 500 engines (national production) for the identified model year or for engine manufacturers who make less than or equal to 2,000 engines nationally for that model year, a minimum of two (2) engines per family provided that no engine fails any emission standard. For each failing engine, two more engines shall be tested until the total number of engines equals ten (10).

(C) If an engine family was certified using carryover emission data and has been previously tested under paragraphs (b)(3)(A) or (b)(3)(B) of this section (and a recall for that family has not occurred), then only one engine for that family must be tested. If that one engine fails any emission standard, testing must be conducted as outlined in subsections (b)(3)(A) or (b)(3)(B), whichever is appropriate.

(4) The Executive Officer may approve an alternative to manufacturer in-use testing, where:

(A) Engine family production is less than or equal to 200 per year, nationally;

(B) Engines cannot be obtained for testing because they are used substantially in vehicles or equipment that are not conducive to engine removal such as large vehicles or equipment from which the engine cannot be removed without dismantling either the engine, vehicle, or equipment; or

(C) Other compelling circumstances associated with the structure of the industry and uniqueness of engine applications. Such alternatives shall be designed to determine whether the engine family is in compliance.

(5) The engine manufacturer shall procure in-use engines which have been operated between 0.50 and 1.0 times the certified engine's useful life period. The engine manufacturer may test engines from more than one model year in a given year. The manufacturer shall submit a plan for testing within twelve calendar months after receiving notice that ARB has identified a particular engine family for testing and shall complete testing of such engine family within 24 calendar months from the date of approval of the plan by ARB. Test engines may be procured from sources associated with the engine manufacturer (i.e., manufacturer-established fleet engines, etc.) or from sources not associated with the manufacturer (i.e., consumer-owned engines, independently owned fleet engines, etc.).

(c) Maintenance, procurement and testing of in-use engines.

(1) A test engine must have a maintenance and use history representative of in-use conditions.

(A) To comply with this requirement a manufacturer must obtain information from the end users regarding the accumulated usage, maintenance, repairs, operating

conditions, and storage of the test engines.

(B) Documents used in the procurement process must be maintained as required.

(2) The manufacturer may perform minimal restorative maintenance on components of a test engine that are not subject to parameter adjustment. Maintenance may include only that which is listed in the owner's instructions for engines with the amount of service and age of the acquired test engine. Repairs may be performed on a test engine with prior Executive Officer approval. Documentation of all maintenance, repairs, defects, and adjustments shall be maintained and retained as required.

(3) At least one valid emission test, according to the Test Procedure, is required for each in-use engine.

(4) The Executive Officer may waive portions or requirements of the test procedure, if any, that are not necessary to determine in-use compliance.

(5) If a selected in-use engine fails to comply with any applicable emission standards, the manufacturer shall determine the reason for noncompliance. The manufacturer must report within 72 hours after the completion of the test specifying the emission results and identifying the pollutant which failed to comply with the emission standard. The manufacturer must report all such reasons of noncompliance within fifteen business days of completion of testing. Additional time beyond the initial fifteen days may be granted providing that the manufacturer receives prior approval from the Executive Officer. The reports may be filed electronically or mailed to the following address: Chief of Mobile Source Operations Division, 9528 Telstar Avenue, El Monte, CA 91731.

(6) At the discretion of the Executive Officer, an engine manufacturer may test more engines than the minima described in paragraph (b)(3) of this section or may concede failure before testing a total of ten engines. Upon conceding failure the manufacturer shall proceed with a voluntary recall program as specified in Section 2439.

(7) The Executive Officer will consider failure rates, average emission levels and the existence of any defects, among other factors, in determining whether to pursue remedial action under this subpart. The Executive Officer may order a recall pursuant to Section 2439 before testing reaches the tenth engine whenever the Executive Officer has determined, based on production-line test results or in-use test results, enforcement testing results, or any other information, that a substantial number of a class or category of equipment or engines produced by that manufacturer, although properly maintained and used, contain a failure in an emission-related component which, if uncorrected, may result in the equipments' or engines' failure to meet applicable standards over their useful lives; or whenever a class or category of equipment or engines within their useful lives, on average, do not conform to the emission standards prescribed pursuant to Part 5 (commencing with Section 43000) of Division 26 of the Health and Safety Code, or any regulation adopted by the state board

pursuant thereto, other than an emissions standard applied to new engines to determine "certification" as specified in Chapter 9, as applicable to the model year of such equipment or engines.

(8) Prior to an ARB-ordered recall, the manufacturer may perform a voluntary emissions recall pursuant to Article 4.5, Section 2439(b). Such manufacturer is subject to the reporting requirements in subsection (d) below.

(9) Once ARB determines that a substantial number of engines fail to conform with the requirements, the manufacturer will not have the option of a voluntary emissions recall.

(d) In-use test program reporting requirements.

(1) The manufacturer shall electronically submit to the Executive Officer within three months of completion of testing all emission testing results generated from the in-use testing program. The following information must be reported for each test engine:

(A) engine family,

(B) model,

(C) engine serial number or alternate identification, as applicable,

(D) date of manufacture,

(E) estimated hours of use,

(F) date and time of each test attempt,

(G) results (if any) of each test attempt,

(H) results of all emission testing,

(I) summary of all maintenance, repairs, and adjustments performed,

(J) summary (if any) of all ARB pre-approved modifications and repairs,

(K) determinations of noncompliance or compliance.

(2) The manufacturer must electronically submit the results of its in-use testing with a pre-approved information heading. The Executive Officer may exempt manufacturers from this requirement upon written request with supporting justification.

(3) All testing reports and requests for approvals made under this subpart shall be sent to the Executive Officer.

(4) The Executive Officer may require modifications to a manufacturer's in-use testing programs.

§1048.415 What happens if in-use engines do not meet requirements?
DELETE AND REPLACE WITH:

Procedures for In-Use Engine Recalls for Large Off-Road Spark-Ignition Engines with an Engine Displacement Greater Than 1.0 Liter.

(a) The recall procedures in this section apply as set forth in Title 13, California Code of Regulations, Sections 2433 and 2438.

(b) Voluntary Emissions Recall

(1) When any manufacturer initiates a voluntary emission recall, the manufacturer shall notify the Executive Officer of the recall at least 30 days before owner notification is to begin. The manufacturer shall also submit to the Executive Officer a voluntary recall plan for approval, as prescribed in the following:

(A)(i) a description of each class or category of engines to recall, including the number of engines to be recalled, the engine family or a sub-group thereof, the model year, and such other information as may be required to identify the engines:

(ii) a description of the specific modifications, alterations, repairs, corrections, adjustments, or other changes to be made to correct the engines affected by the nonconformity;

(iii) a description of the method by which the manufacturer will notify engine owners including copies of any letters of notification to be sent to engine owners;

(iv) a description of the proper maintenance or use, if any, upon which the manufacturer conditions eligibility for repair under the recall plan, and a description of the proof to be required of an engine owner to demonstrate compliance with any such conditions;

(v) a description of the procedure to be followed by engine owners to obtain correction of the nonconformity. This shall include designation of the date on or after which the owner can have the nonconformity remedied, the time reasonably necessary to perform the labor to remedy the nonconformity, and the designation of facilities at which the nonconformity can be remedied;

(vi) a description of the class of persons other than dealers and authorized warranty agents of the manufacturer who will remedy the nonconformity;

(vii) a description of the system by which the manufacturer will assure that an adequate supply of parts is available to perform the repair under the plan; or

(B)(i) a description of each class or category of engines subject to recall, including the number of engines subject to being recalled, the engine family or a sub-group thereof, the model year, and such other information as may be required to identify the engines;

(ii) a description of the method by which the manufacturer will use the in-use emissions credit, averaging, banking, and trading program, as described in Section 2438(e), to remedy the nonconformity.

(2) Voluntary Recall Progress Report. A manufacturer who initiates a voluntary emission recall campaign pursuant to paragraph (b)(1)(A) of this section must submit at least one report on the progress of the recall campaign. This report shall be submitted to the Executive Officer by the end of the fifth quarter, as defined in Section 2112(j), Chapter 2, Title 13 of the California Code of Regulations, following the quarter in which the notification of equipment or engine owners was initiated, and include the following information:

(A) Engine family involved and recall campaign number as designated by the manufacturer.

(B) Date owner notification was begun, and date completed.

(C) Number of equipment or engines involved in the recall campaign.

(D) Number of equipment or engines known or estimated to be affected by the nonconformity.

(E) Number of equipment or engines inspected pursuant to the recall plan and found to be affected by the nonconformity.

(F) Number of inspected equipment or engines.

(G) Number of equipment or engines receiving repair under the recall plan.

(H) Number of equipment or engines determined to be unavailable for inspection or repair under the recall plan due to exportation, theft, scrapping, or for other reasons (specify).

(I) Number of equipment or engines determined to be ineligible for recall action due to removed or altered components.

(J) A listing of the identification numbers of equipment or engines subject to recall but for whose repair the manufacturer has not been invoiced. This listing shall be supplied in a standardized computer data storage device to be specified by the Executive Officer.

(K) Any service bulletins transmitted to dealers which relate to the nonconformity and which have not previously been submitted.

(L) All communications transmitted to equipment or engine owners which relate to the nonconformity and which have not previously been submitted.

(3) The information gathered by the manufacturer to compile the reports must be retained for not less than seven years from the date of the manufacture of the engines and must be made available to the Executive Officer or designee of the Executive Officer upon request.

(4) A voluntary recall plan shall be deemed approved unless disapproved by the Executive Officer within 20 business days after receipt of the recall plan.

(5) Under a voluntary recall program, initiated and conducted by a manufacturer or its agent or representative as a result of in-use enforcement testing or other evidence of noncompliance provided or required by the Board to remedy any nonconformity, the capture rate shall be at a minimum 55 percent of the equipment or engine within the subject engine family or a sub-group thereof. The manufacturer shall comply with the capture rate by the end of the fifth quarter, as defined in Section 2112(j), Chapter 2, Title 13 of the California Code of Regulations, following the quarter in which the notification of equipment or engine owners was initiated. If the manufacturer cannot correct the percentage of equipment specified in the plan by the applicable deadlines, the manufacturer must use good faith efforts through other measures, subject to

approval by the Executive Officer, to bring the engine family into compliance with the standards. If the Executive Officer does not approve the manufacturer's efforts, the manufacturer shall propose mitigation measures to offset the emissions of the unrepaired equipment within 45 days from the last report filed pursuant to paragraph (b)(2), above. The Executive Officer shall approve such measures provided that:

(A) The emission reductions from the recalled and repaired equipment or engines and the mitigation measures are equivalent to achieving the capture rate; and

(B) The emission reductions from the mitigation measures are real and verifiable; and

(C) The mitigation measures are implemented in a timely manner.

(c) Initiation and Notification of Ordered Emission-Related Recalls.

(1) A manufacturer shall be notified whenever the Executive Officer has determined, based on production-line test results or in-use test results, enforcement testing results, or any other information, that a substantial number of a class or category of equipment or engines produced by that manufacturer, although properly maintained and used, contain a failure in an emission-related component which, if uncorrected, may result in the equipments' or engines' failure to meet applicable standards over their useful lives; or whenever a class or category of equipment or engines within their useful lives, on average, do not conform to the emission standards prescribed pursuant to Part 5 (commencing with Section 43000) of Division 26 of the Health and Safety Code, or any regulation adopted by the state board pursuant thereto, other than an emissions standard applied to new engines to determine "certification" as specified in Chapter 9, as applicable to the model year of such equipment or engines.

(2) It shall be presumed for purposes of this section that an emission-related failure will result in the exceedance of emission standards unless the manufacturer presents evidence in accordance with the procedures set forth in subsections (A), (B), and (C) which demonstrates to the satisfaction of the Executive Officer that the failure will not result in exceedance of emission standards within the useful life of the equipment or engine.

(A) In order to overcome the presumption of noncompliance set forth in paragraph (c)(2) above, the average emissions of the equipment and engines with the failed emission-related component must comply with applicable emission standards. A manufacturer may demonstrate compliance with the emission standards by following the procedures set forth in either paragraphs (c)(2)(B) or (c)(2)(C) of this section.

(B) A manufacturer may test properly maintained in-use equipment with the failed emission-related component pursuant to the applicable certification emission tests specified in Section 2433, Title 13 of the California Code of Regulations. The emissions shall be projected to the end of the equipment's or engine's useful life using in-use deterioration factors. The in-use deterioration factors shall be chosen by the

manufacturer from among the following:

(i) "Assigned" in-use deterioration factors provided by the ARB on a manufacturer's conditions; request and based on ARB in-use testing; or,

(ii) deterioration factors generated during certification, provided adjustments are made to account for equipment aging, customer hour usage-accumulation practices, type of failed component, component failure mode, effect of the failure on other emission-control components, commercial fuel and lubricant quality, and any other factor which may affect the equipment's or engine's operating or,

(iii) subject to approval by the Executive Officer, a manufacturer-generated deterioration factor. Such deterioration factor must based on in-use data generated from certification emission tests performed on properly maintained and used equipment in accordance with the procedures set forth in Section 2433 of Title 13 of the California Code of Regulations, and the equipment from which it was derived must be representative of the in-use fleet with regard to emissions performance and equipped with similar emission control technology as equipment with the failed component.

(C) In lieu of the equipment or engine emission testing described in subsection (B) above and subject to approval by the Executive Officer, a manufacturer may perform an engineering analysis, laboratory testing or bench testing, when appropriate, to demonstrate the effect of the failure.

(3) The notification shall include a description of each class or category of equipment or engines encompassed by the determination of nonconformity, shall set forth the factual basis for the determination and shall designate a date at least 45 business days from the date of receipt of such notification by which the manufacturer shall submit a plan to remedy the nonconformity.

(4) Availability of Public Hearing.

(A) The manufacturer may request a public hearing pursuant to the procedures set forth in Subchapter 1.25, Division 3, Chapter 1, Title 17, California Code of Regulations to contest the finding of nonconformity and the necessity for or the scope of any ordered corrective action.

(B) If a manufacturer requests a public hearing pursuant to subsection (A) above, and if the Executive Officer's determination of nonconformity is confirmed at the hearing, the manufacturer shall submit the recall plan required by Section 2439 within 30 days after receipt of the Board's decision.

(5) Ordered Recall Plan.

(A) Unless a public hearing is requested by the manufacturer, a recall plan shall be submitted to the Chief, Mobile Source Operations Division, 9528 Telstar Avenue,

El Monte, CA 91731, within the time limit specified in the notification. The Executive Officer may grant the manufacturer an extension upon good cause shown.

(B) The recall plan shall contain the following:

(i) A description of each class or category of equipment or engine to be recalled, including the engine family or sub-group thereof, the model-year, the make, the model, and such other information as may be required to identify the equipment or engines to be recalled.

(ii) A description of the nonconformity and the specific modifications, alterations, repairs, corrections, adjustments or other changes to be made to bring the equipment or engines into conformity including a brief summary of the data and technical studies which support the manufacturer's decision regarding the specific corrections to be made.

(iii) A description of the method by which the manufacturer will determine the names and addresses of equipment or engine owners and the method by which they will be notified.

(iv) A description of the procedure to be followed by equipment or engine owners to obtain correction of the nonconformity including the date on or after which the owner can have the nonconformity remedied, the time reasonably necessary to perform the labor required to correct the nonconformity, and the designation of facilities at which the nonconformity can be remedied. The repair shall be completed within a reasonable time designated by the Executive Officer from the date the owner delivers the equipment or engine for repair. This requirement becomes applicable on the date designated by the manufacturer as the date on or after which the owner can have the nonconformity remedied.

(v) If some or all of the nonconforming equipment or engines are to be remedied by persons other than dealers or authorized warranty agents of the manufacturer, a description of such class of persons and a statement indicating that the participating members of the class will be properly equipped to perform such remedial action.

(vi) The capture rate required for each class or category of equipment or engine to be recalled. Under recalls based on exceedance of emission standards, the capture rate shall be at a minimum 80 percent of the equipment or engine within the subject engine family.

(vii) The plan may specify the maximum incentives (such as a free tune-up or specified quantity of free fuel), if any, the manufacturer will offer to induce equipment or engine owners to present their equipment for repair, as evidence that the manufacturer has made a good faith effort to repair the percentage of equipment or engines specified in the plan. The plan shall include a schedule for implementing actions to be taken including identified increments of progress towards implementation and deadlines for

completing each such increment.

(viii) A copy of the letter of notification to be sent to equipment or engine owners.

(ix) A description of the system by which the manufacturer will assure that an adequate supply of parts will be available to perform the repair under the recall plan including the date by which an adequate supply of parts will be available to initiate the repair campaign, and the method to be used to assure the supply remains both adequate and responsive to owner demand.

(x) A copy of all necessary instructions to be sent to those persons who are to perform the repair under the recall plan.

(xi) A description of the impact of the proposed changes on fuel economy, operation, performance and safety of each class or category of equipment or engines to be recalled and a brief summary of the data, technical studies, or engineering evaluations which support these descriptions.

(xii) A description of the impact of the proposed changes on the average emissions of the equipment or engines to be recalled based on noncompliance described in subsection (c)(1), above. The description shall contain the following:

(1.) Average noncompliance emission levels.

(2.) Average emission reduction or increase per pollutant resulting from the recall repair. These averages shall be verified by the manufacturer by applying the proposed recall repairs to two or more in-use equipment or engines representing the average noncompliance emission levels. Only those equipment or engines with baseline emission levels within 25 percent of the average emission levels of noncomplying pollutant(s) established under the in-use enforcement test program may be used by manufacturers to verify proposed recall repairs. The Executive Officer may allow the use of equipment or engines exceeding these upper averaging noncompliance limits if none which meet the limits can be reasonably procured.

(3.) An estimate of the average emission level per pollutant for a class or category of equipment or engines after repair as corrected by the required capture rate. The estimated average emission level shall comply with the applicable emission standards. If the average emissions levels achieved by applying the average emission reduction per equipment or engine after repair and the estimated capture rate, do not achieve compliance with the emissions standards, a manufacturer shall propose other measures to achieve average emissions compliance.

(xiii) Any other information, reports, or data which the Executive Officer may reasonably determine to be necessary to evaluate the recall plan.

(6) Approval and Implementation of Recall Plan.

(A) If the Executive Officer finds that the recall plan is designed effectively to correct the nonconformity and complies with the provisions of this Section, he or she will so notify the manufacturer in writing. Upon receipt of the approval notice from the Executive Officer, the manufacturer shall commence implementation of the approved plan. Notification of equipment or engine owners and the implementation of recall repairs shall commence within 45 days of the receipt of notice unless the manufacturer can show good cause for the Executive Officer to extend the deadline.

(B) If the Executive Officer does not approve the recall plan or the mitigation measures provided in this Section as submitted, the Executive Officer shall order modification of the plan or mitigation measures with such changes and additions as he or she determines to be necessary. The Executive Officer shall notify the manufacturer in writing of the disapproval and the reasons for the disapproval.

(C) The manufacturer may contest the Executive Officer's disapproval by requesting a public hearing pursuant to the procedures set forth in Subchapter 1.25, Division 3, Chapter 1, Title 17, California Code of Regulations. As a result of the hearing, the Board may affirm, overturn or modify the Executive Officer's action. In its decision, affirming or modifying, the Board shall specify the date by which the manufacturer shall commence notifying equipment or engine owners and implementing the required recall repairs.

(D) If no public hearing is requested in accordance with (C) above, the manufacturer shall incorporate the changes and additions required by the Executive Officer and shall commence notifying equipment or engine owners and implementing the required recall repairs within 60 days of the manufacturer's receipt of the Executive Officer's disapproval.

(7) Notification of Owners.

(A) Notification to equipment or engine owners shall be made by first class mail or by such other means as approved by the Executive Officer provided, that for good cause, the Executive Officer may require the use of certified mail to ensure an effective notification.

(B) The manufacturer shall use all reasonable means necessary to locate equipment or engine owners provided, that for good cause, the Executive Officer may require the manufacturer to use motor equipment registration lists, as applicable, available from State or commercial sources to obtain the names and addresses of equipment or engine owners to ensure effective notification.

(C) The Executive Officer may require subsequent notification by the manufacturer to equipment or engine owners by first class mail or other reasonable means provided, that for good cause, the Executive Officer may require the use of certified mail to ensure effective notification.

(D) The notification of equipment or engine owners shall contain the following:

(i) The statement: "The California Air Resources Board has determined that your (equipment or engine) (is or may be) releasing air pollutants which exceed (California or California and Federal) standards. These standards were established to protect your health and welfare from the dangers of air pollution."

(ii) A statement that the nonconformity of any such equipment or engines will be remedied at the expense of the manufacturer.

(iii) A statement that eligibility may not be denied solely on the basis that the equipment or engine owner used parts not manufactured by the original equipment manufacturer, or had repairs performed by outlets other than the equipment or engine manufacturer's franchised dealers.

(iv) A clear description of the components which will be affected by the recall action and a general statement of the measures to be taken to correct the nonconformity.

(v) [Reserved]

(vi) A description of the adverse effects, if any, that an uncorrected nonconformity would have on the performance, fuel economy, or driveability of the equipment or engine or to the function of other engine components.

(vii) A description of the procedure which the equipment or engine owner should follow to obtain correction of the nonconformity including the date on or after which the owner can have the nonconformity remedied, the time reasonably necessary to correct the nonconformity, and a designation of the facilities located in California at which the nonconformity can be remedied.

(viii) After the effective date of the recall enforcement program referred to above, a statement that a certificate showing that the equipment has been repaired under the recall program shall be issued by the service facilities and that such a certificate may be required as a condition of equipment registration or operation, as applicable.

(ix) A card to be used by a equipment or engine owner in the event the equipment or engine to be recalled has been sold. Such card should be addressed to the manufacturer, have postage paid, and shall provide a space in which the owner may indicate the name and address of the person to whom the equipment or engine was sold.

(x) The statement: "In order to ensure your full protection under the emission warranty made applicable to your (equipment or engine) by State or Federal law, and your right to participate in future recalls, it is recommended that you have your (equipment or engine) serviced as soon as possible. Failure to do so could be determined to be a lack

of proper maintenance of your (equipment or engine)".

(xi) A telephone number provided by the manufacturer, which may be used to report difficulty in obtaining recall repairs.

(xii) The manufacturer shall not condition eligibility for repair on the proper maintenance or use of the equipment except for strong or compelling reasons and with approval of the Executive Officer; however, the manufacturer shall not be obligated to repair a component which has been removed or altered so that the recall action cannot be performed without additional cost.

(xiii) No notice sent pursuant to Section (D), nor any other communication sent to equipment or engine owners or dealers shall contain any statement, express or implied, that the nonconformity does not exist or will not degrade air quality.

(xiv) The manufacturer shall be informed of any other requirements pertaining to the notification under this section which the Executive Officer has determined are reasonable and necessary to ensure the effectiveness of the recall campaign.

(8) Repair Label.

(A) The manufacturer shall require those who perform the repair under the recall plan to affix a label to each equipment or engine repaired or, when required, inspected under the recall plan.

(B) The label shall be placed in a location as approved by the Executive Officer and shall be fabricated of a material suitable for such location and which is not readily removable.

(C) The label shall contain the recall campaign number and a code designating the facility at which the repair, inspection for repair, was performed.

(9) Proof of Correction Certificate. The manufacturer shall require those who perform the recall repair to provide the owner of each equipment or engine repaired with a certificate, through a protocol and in a format prescribed by the Executive Officer, which indicates that the noncomplying equipment or engine has been corrected under the recall program. This requirement shall become effective and applicable upon the effective date of the recall enforcement program referred to in this section, above.

(10) Capture Rates and Alternative Measures.

The manufacturer shall comply with the capture rate specified in the recall plan as determined pursuant to this Section, above, by the end of the fifth quarter, as defined in Section 2112(j), Chapter 2, Title 13 of the California Code of Regulations, following the quarter in which the notification of equipment or engine owners was initiated. If, after good faith efforts, the manufacturer cannot correct the percentage of equipment

specified in the plan by the applicable deadlines and cannot take other measures to bring the engine family into compliance with the standards, the manufacturer shall propose mitigation measures to offset the emissions of the unrepaired equipment within 45 days from the last report filed pursuant to Section 2439(c)(13), below. The Executive Officer shall approve such measures provided that:

(A) The emission reductions from the recalled and repaired equipment or engines and the mitigation measures are equivalent to achieving the capture rate; and

(B) The emission reductions from the mitigation measures are real and verifiable; and

(C) The mitigation measures are implemented in a timely manner.

(11) Preliminary Tests. The Executive Officer may require the manufacturer to conduct tests on components and equipment or engines incorporating a proposed correction, repair, or modification reasonably designed and necessary to demonstrate the effectiveness of the correction, repair, or modification.

(12) Communication with Repair Personnel. The manufacturer shall provide to the Executive Officer a copy of all communications which relate to the recall plan directed to dealers and other persons who are to perform the repair. Such copies shall be mailed to the Executive Officer contemporaneously with their transmission to dealers and other persons who are to perform the repair under the recall plan.

(13) Recordkeeping and Reporting Requirements.

(A) The manufacturer shall maintain sufficient records to enable the Executive Officer to conduct an analysis of the adequacy of the recall campaign. For each class or category of equipment or engine, the records shall include, but need not be limited to, the following:

(i) Engine family involved and recall campaign number as designated by the manufacturer.

(ii) Date owner notification was begun, and date completed.

(iii) Number of equipment or engines involved in the recall campaign.

(iv) Number of equipment or engines known or estimated to be affected by the nonconformity.

(v) Number of equipment or engines inspected pursuant to the recall plan and found to be affected by the nonconformity.

(vi) Number of inspected equipment or engines.

(vii) Number of equipment or engines receiving repair under the recall plan.

(viii) Number of equipment or engines determined to be unavailable for inspection or repair under the recall plan due to exportation, theft, scrapping, or for other reasons (specify).

(ix) Number of equipment or engines determined to be ineligible for recall action due to removed or altered components.

(x) A listing of the identification numbers of equipment or engines subject to recall but for whose repair the manufacturer has not been invoiced. This listing shall be supplied in a standardized computer data storage device to be specified by the Executive Officer. The frequency of this submittal, as specified in subsection (C) below, may be changed by the Executive Officer depending on the needs of recall enforcement.

(xi) Any service bulletins transmitted to dealers which relate to the nonconformity and which have not previously been submitted.

(xii) All communications transmitted to equipment or engine owners which relate to the nonconformity and which have not previously been submitted.

(B) If the manufacturer determines that the original responses to subsections (A)(iii) and (iv) of these procedures are incorrect, revised figures and an explanatory note shall be submitted. Responses to subsections (A)(v), (vi), (vii), (viii), and (ix) shall be cumulative totals.

(C) Unless otherwise directed by the Executive Officer, the information specified in subsection (A) of these procedures shall be included in six quarterly reports or two annual reports, beginning with the quarter in which the notification of owners was initiated, or until all nonconforming equipment or engines involved in the campaign have been remedied, whichever occurs sooner. Such reports shall be submitted no later than 25 days after the close of each calendar quarter.

(D) The manufacturer shall maintain in a form suitable for inspection, such as computer information storage devices or card files, and shall make available to the Executive Officer or his or her authorized representative upon request, lists of the names and addresses of equipment or engine owners:

(i) To whom notification was given;

(ii) Who received remedial repair or inspection under the recall plan; and

(iii) Who were denied eligibility for repair due to removed or altered components.

(E) The records and reports required by these procedures shall be retained for not less than one year beyond the useful life of the equipment or engines involved, or one year

beyond the reporting time frame specified in subsection (C) above, whichever is later.

(14) Penalties.

Failure by a manufacturer to carry out all recall actions ordered by the Executive Officer pursuant to Sections 2439(c) of these procedures is a violation of Health and Safety Code Section 43013 and 43105 and shall subject the manufacturer, on a per engine basis, to any and all remedies available under Part 5, Division 26 of the Health and Safety Code, sections 43000 et seq.

(d) Extension of Time. The Executive Officer may extend any deadline in the plan if he or she finds in writing that a manufacturer has shown good cause for such extension.

(e) The Executive Officer may waive any or all of the requirements of these procedures if he or she determines that the requirement constitutes an unwarranted burden on the manufacturer without a corresponding emission reduction.

§1048.420 What in-use testing information must I report to EPA?
DELETE

§1048.425 What records must I keep?
DELETE

Subpart F—Test Procedures

§1048.501 How do I run a valid emission test?

§1048.505 How do I test engines using steady-state duty cycles, including ramped-modal testing?

§1048.510 Which duty cycles do I use for transient testing?

§1048.515 What are the field-testing procedures?

Subpart G—Compliance Provisions

§1048.601 What compliance provisions apply to these engines?

§1048.605 What provisions apply to engines certified under the motor-vehicle program?

§1048.610 What provisions apply to vehicles certified under the motor-vehicle program?

§1048.615 What are the provisions for exempting engines designed for lawn and garden applications?
DELETE

§1048.620 What are the provisions for exempting large engines fueled by natural gas?

§1048.625 What special provisions apply to engines using noncommercial fuels?

§1048.630 What are the provisions for exempting engines used solely for competition?

§1048.635 What special provisions apply to branded engines?

Subpart H—[Reserved]

Subpart I—Definitions and Other Reference Information

§1048.801 What definitions apply to this part?
The following definitions apply to this part. The definitions apply to all subparts unless we note otherwise. All undefined terms have the meaning the Act gives to them. The definitions follow:

*** * * * ***

All-terrain vehicle has the meaning given in 40 CFR 1051.801
DELETE AND REPLACE WITH: All-terrain vehicle has the meaning given in Title 13, California Code of Regulations, Chapter 9, Article 3, Off-Highway Recreational Vehicles and Engines.

*** * * * ***

Blue Sky Series engine
DELETE

*** * * * ***

Designated Compliance Officer means the Manager, Engine Programs Group (6405-J), U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., NW, Washington, DC 20460.
DELETE AND REPLACE WITH:
Designated Compliance Officer means the Executive Officer of the California Air Resources Board or a designee of the Executive Officer.

Designated Enforcement Officer means the Director, Air Enforcement Division (2242A), U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., NW, Washington, DC 20460.

DELETE AND REPLACE WITH:

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

*** * * * ***

High-cost warranted part means a component covered by the emission-related warranty with a replacement cost (at the time of certification) exceeding $400 (in 1998 dollars). Adjust this value using the most recent annual average consumer price index information published by the U.S. Bureau of Labor Statistics. For this definition, replacement cost includes the retail cost of the part plus labor and standard diagnosis.

DELETE AND REPLACE WITH:

High-cost warranted part means a component covered by the emission-related warranty with a replacement cost derived by the formula in section §1048.120(b)(3)(B).

*** * * * ***

Low-hour means relating to an engine with stabilized emissions and represents the undeteriorated emission level. This would generally involve less than 300 hours of operation.

DELETE

*** * * * ***

Small-volume engine manufacturer means a company with fewer than 200 employees. This includes any employees working for parent or subsidiary companies.

DELETE AND REPLACE WITH:

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 of America.

*** * * * ***

§1048.805 What symbols, acronyms, and abbreviations does this part use?

§1048.810 What materials does this part reference?

§1048.815 What provisions apply to confidential information?

DELETE AND REPLACE WITH:

(a) Clearly show what you consider confidential by marking, circling, bracketing, stamping, or some other method.

(b) We will store your confidential information as described in 40 CFR part 2. Also, we will disclose it only as specified in 40 CFR part 2. This applies both to any information you send us and to any information we collect from inspections, audits, or other site visits.
(c) If you send us a second copy without the confidential information, we will assume it contains nothing confidential whenever we need to release information from it.
(d) If you send us information without claiming it is confidential, we may make it available to the public without further notice to you, as described in 40 CFR 2.204.

§1048.820 How do I request a hearing from the executive officer of the ARB?
DELETE AND REPLACE WITH:
(a) You may request a hearing under certain circumstances, as described elsewhere in this part. To do this, you must file a written request, including a description of your objection and any supporting data, within 30 days after we make a decision.
(b) For a hearing you request under the provisions of this part, we will approve your request if we find that your request raises a substantial factual issue.
(c) If we agree to hold a hearing, we will use the procedures specified in §1048.15(b)(7).

Appendix I to Part 1048—Large Spark-ignition (SI) Transient Cycle for Constant-Speed Engines
Appendix II to Part 1048—Large Spark-ignition (SI) Composite Transient Cycle

State of California
AIR RESOURCES BOARD

CALIFORNIA EXHAUST AND EVAPORATIVE EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2010 AND LATER OFF-ROAD LARGE SPARK-IGNITION ENGINES

(2010 and Later Test Procedure 1048)

Adopted: March 2, 2007
Amended: November 21, 2008

NOTE: This document is printed in a style to indicate changes from the existing provisions. All existing language is indicated by plain type. All additions to language are indicated by underlined text. All deletions to language are indicated by ~~strikeout~~. Only those sections containing the suggested modifications from the existing language are included. All other portions remain unchanged and are indicated by the symbol "* * * * *" for reference.

PART 1048 – CONTROL OF EMISSIONS FROM NEW, LARGE NONROAD SPARK-IGNITION ENGINES

Subpart A—Overview and Applicability

*** * * * ***

§1048.101 What exhaust emission standards must my engines meet?

*** * * * ***

(a) (2) *Exhaust Emission Standards.* Exhaust emissions from off-road large spark-ignition engines manufactured for sale, sold, or offered for sale in California, or that are introduced, delivered or imported into California for introduction into commerce, must not exceed:

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

Model Year	Engine Displacement	Durability Period	HC + NO_x	Carbon Monoxide
2010 ~~and subsequent~~	≤ 1.0 liter	1,000 hours or 2 years	9.0 [12.0]	410 [549]
2011 and subsequent	≤ 825 cc	1,000 hours or 2 years	6.0 [8.0]	410 [549]
2011 - 2014	> 825 cc - ≤ 1.0 liter	1,000 hours or 2 years	4.8 [6.5]	280 [375]
2015 and subsequent	> 825 cc - ≤ 1.0 liter	1,000 hours or 2 years	0.6 [0.8]	15.4 [20.6]
2010 and subsequent(2)	> 1.0 liter	5000 hours or 7 years	0.6 [0.8]	15.4 [20.6]

Note: (1) Pollutant emissions reported to ARB by manufacturers must be in grams per kilowatt-hour.
(2) Small volume manufacturers are required to comply with these emission standards in 2013.

For severe-duty engines, the HC+NOx standard is 2.7 g/kW-hr and the CO standard is 130.0 g/kW-hr. The following engines are not subject to the transient standards in this paragraph (a):

A. High-load engines.
B. Engines with maximum engine power above 560 kW.
C. Engines with maximum test speed above 3400 rpm.
D. Constant-speed engines and severe-duty engines.

*** * * * ***

PART 13

INCORPORATED TEST PROCEDURES

Large Spark-Ignition Engines

(2010 and Later Model Years; Part 1048)

Note: This appendix shows the entirety of regulatory amendments to the test procedures titled below, which were approved by the Air Resources Board on December 16, 2011, and refined via subsequent conforming modifications authorized under Resolution 11-41. These amendments are formatted in a style to indicate changes from the existing test procedures. All existing language is indicated by plain type. All additions to the existing language are indicated by underlined type. All deletions to the existing language are indicated by ~~strikeout~~. Only those sections containing the modifications from the existing language are included. All other portions remain unchanged and are indicated by the notation [* * * * *] for reference. If there is any conflict between the provisions of this document and the California Health and Safety Code, Division 26, or Title 13 of the California Code of Regulations (CCR), the Health and Safety Code and Title 13 apply.

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State of California

AIR RESOURCES BOARD

CALIFORNIA EXHAUST AND EVAPORATIVE EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2010 AND LATER OFF-ROAD LARGE SPARK-IGNITION ENGINES

(2010 and Later Test Procedure 1048)

Adopted: March 2, 2007

Amended: November 21, 2008

Amended: October 25, 2012

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PART 1048 – CONTROL OF EMISSIONS FROM NEW, LARGE NONROAD SPARK-IGNITION ENGINES

* * * * *

Subpart B—Emission Standards and Related Requirements

§1048.101 What exhaust emission standards must my engines meet?

* * * * *

(e) Fuel tTypes and Test Fuel.

(1) Fuel tTypes

* * * * *

(2) Test Fuel.

(A) Except as outlined in (B), Iif 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 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as of January 1, 2006 (last amended August 4, 2005) incorporated by reference in Section 1961(d), Title 13, CCR). 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 1065, subpart H, the manufacturer shall demonstrate that the emission test results complies with these Test Procedures.

(B) For 2013-2019 model-year gasoline-fueled, large spark-ignition engines, the manufacturer has the option to use the fuel specified in (e)(2)(C).

(C) For 2020 and later gasoline-fueled, large spark-ignition engines: The certification test fuel for exhaust emission testing must be consistent with the fuel specifications as outlined in title 13, section 1961.2 and the “California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles,” adopted March 22, 2012, and incorporated by reference herein. The test fuel specifications should remain consistent from batch to batch. Optionally, manufacturers may use other renewable fuel blends under this paragraph that have been certified by ARB as yielding test results equivalent, or more stringent than, those resulting from the fuel specified by 13 CCR 1961.2, and which are appropriate for the certification of large spark-ignition engines.

~~(B)~~(D) 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 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as of January 1, 2006 (last amended August 4, 2005) incorporated by reference in Section 1961(d), Title 13, CCR). 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 1065, subpart H, the manufacturer shall demonstrate that the emission test results complies with these Test Procedures.

~~(C)~~(E) 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.

FINAL REGULATION ORDER, PART 2 (continued)

Adopt the incorporated "California Exhaust and Evaporative Emission Standards and Test Procedures for New 2007 and Later Off-Road Large Spark-Ignition Engines (Test Procedures 1065 and 1068)," to read:

State of California
AIR RESOURCES BOARD

CALIFORNIA EXHAUST AND EVAPORATIVE EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2007 AND LATER OFF-ROAD LARGE SPARK-IGNITION ENGINES

(TEST PROCEDURES 1065 AND 1068)

Adopted: March 2, 2007

NOTE: This document incorporates by reference 40 Code of Federal Regulations (CFR) Part 1065 – Engine-Testing Procedures, Subparts A, B, C, D, E, F, G, H, I, J, and K, as amended July 13, 2005, 40 CFR Part 1068, Subparts A, B, C, D, E, F, and G, including Appendix A to Subpart E and Appendix I and II to part 1068, as amended July 13, 2005, and the internally referenced subparts of 40 CFR Part 85, 40 CFR Part 86, and 40 CFR Part 1048. Sections that have been included in their entirety are set forth with the section number and title. California provisions that replace specific federal language provisions are denoted by the words "DELETE" for the federal language and "REPLACE WITH" or "ADD" for the California language. The symbols "* * * * *" and "..." mean that the remainder of the CFR text for a specific section is not shown in these procedures but has been incorporated by reference, with only the printed text changed. CFR sections that are not listed are not part of the test procedures. If there is any conflict between the provisions of this document and the California Health and Safety Code, Division 26, or Title 13 of the California Code of Regulations (CCR), the Health and Safety Code and Title 13 apply.

This document is all newly adopted text.

Table of Contents

CALIFORNIA EXHAUST AND EVAPORATIVE EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2007 AND LATER OFF-ROAD LARGE SPARK-IGNITION ENGINES

The following provisions of Part 1065, and Part 1068, Title 40, Code of Federal Regulations, as proposed by the United States Environmental Protection Agency on the date listed, are adopted and incorporated herein by this reference for 2007 model year and later off-road large spark-ignition engines as the California Exhaust Emission Standards and Test Procedures for New 2007 and Later Off-Road Large Spark-Ignition Engines, except as altered or replaced by the provisions set forth below.

PART 1065 – ENGINE-TESTING PROCEDURES

SOURCE: 70 FR 40516, July 13, 2005, unless otherwise noted.

Subpart A – Applicability and General Provisions

§ 1065.1 Applicability.

* * * * *

(a)(3) DELETE,
REPLACE WITH:
Off-road large spark-ignition engines regulated under Title 13, CCR, Chapter 9, Article 4.5, and subject to the emission standards in § 2433(b)(1) of that Article.

* * * * *

(g) DELETE.

§ 1065.2 Submitting information to ARB under this part.

* * * * *

§ 1065.5 Overview of this part 1065 and its relationship to the standard-setting part.

* * * * *

§ 1065.10 Other procedures.

* * * * *

§ 1065.12 Approval of alternate procedures.

* * * * *

§ 1065.15 Overview of procedures for laboratory and field testing.

* * * * *

§ 1065.20 Units of measure and overview of calculations.

* * * * *

§ 1065.25 Recordkeeping.

* * * * *

Subpart B – Equipment Specifications

§ 1065.101 Overview.

* * * * *

§ 1065.110 Work inputs and outputs, accessory work, and operator demand.

* * * * *

§ 1065.120 Fuel properties and fuel temperature and pressure.

* * * * *

§ 1065.122 Engine cooling and lubrication.

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§ 1065.125 Engine intake air.

* * * * *

§ 1065.127 Exhaust gas recirculation.

* * * * *

§ 1065.130 Engine exhaust.

* * * * *

§ 1065.140 Dilution for gaseous and PM constituents.

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§ 1065.145 Gaseous and PM probes, transfer lines, and sampling system components.

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§ 1065.150 Continuous sampling.

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§ 1065.170 Batch sampling for gaseous and PM constituents.

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§ 1065.190 PM-stabilization and weighing environments for gravimetric analysis.

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§ 1065.195 PM-stabilization environment for in-situ analyzers.

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Subpart C – Measurement Instruments

§ 1065.201 Overview and general provisions.

* * * * *

§ 1065.202 Data updating, recording, and control.

* * * * *

§ 1065.205 Performance specifications for measurement instruments.

* * * * *

Measurement of Engine Parameters and Ambient Conditions

§ 1065.210 Work input and output sensors.

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§ 1065.215 Pressure transducers, temperature sensors, and dewpoint sensors.

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Flow-Related Measurements

§ 1065.220 Fuel flow meter.

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§ 1065.225 Intake-air flow meter.

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§ 1065.230 Raw exhaust flow meter.

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§ 1065.240 Dilution air and diluted exhaust flow meters.

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§ 1065.245 Sample flow meter for batch sampling.

* * * * *

§ 1065.248 Gas divider.

* * * * *

CO and CO_2 Measurements

§ 1065.250 Nondispersive infra-red analyzer.

* * * * *

Hydrocarbon Measurements

§ 1065.260 Flame-ionization detector.

* * * * *

§ 1065.265 Nonmethane cutter.

* * * * *

§ 1065.267 Gas chromatograph.

* * * * *

NO_x Measurements

§ 1065.270 Chemiluminescent detector.

* * * * *

§ 1065.272 Nondispersive ultraviolet analyzer.

* * * * *

O_2 Measurements

§ 1065.280 Paramagnetic and magnetopneumatic O_2 detection analyzers.

* * * * *

Air-to-Fuel Ratio Measurements

§ 1065.284 Zirconia (ZrO_2) analyzer.

* * * * *

PM Measurements

§ 1065.290 PM gravimetric balance.

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§ 1065.295 PM inertial balance for field testing analysis.

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* * * * *

§ 1065.303 Summary of required calibration and verifications.

* * * * *

§ 1065.305 Verifications for accuracy, repeatability, and noise.

* * * * *

§ 1065.307 Linearity verification.

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§ 1065.308 Continuous gas analyzer system-response and updating-recording verification.

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§ 1065.309 Continuous gas analyzer uniform response verification.

* * * * *

Measurement of Engine Parameters and Ambient Conditions

§ 1065.310 Torque calibration.

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§ 1065.315 Pressure, temperature, and dewpoint calibration.

* * * * *

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§ 1065.320 Fuel-flow calibration.

* * * * *

§ 1065.325 Intake-flow calibration.

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§ 1065.340 Diluted exhaust flow (CVS) calibration.

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§ 1065.341 CVS and batch sampler verification (propane check).

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§ 1065.345 Vacuum-side leak verification.

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CO and CO_2 Measurements

§ 1065.350 H_2O interference verification for CO_2 NDIR analyzers.

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§ 1065.355 H_2O and CO_2 interference verification for CO NDIR analyzers.

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Hydrocarbon Measurements

§ 1065.360 FID optimization and verification.

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§ 1065.362 Non-stoichiometric raw exhaust FID O_2 interference verification.

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§ 1065.365 Nonmethane cutter penetration fractions.

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NO_x Measurements

§ 1065.370 CLD CO_2 and H_2O quench verification.

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§ 1065.372 NDUV analyzer HC and H_2O interference verification.

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§ 1065.376 Chiller NO_2 penetration.

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§ 1065.378 NO_2-to-NO converter conversion verification.

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PM Measurements

§ 1065.390 PM balance verifications and weighing process verification.

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§ 1065.395 Inertial PM balance verifications.

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Subpart E – Engine Selection, Preparation, and Maintenance

§ 1065.401 Test engine selection.

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ADD:
(c) 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 (c)(2) and (3) of this section.

(d) In lieu of testing an emission-data engine selected under paragraph (c) 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 certification application has previously been submitted.

(e) 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.

§ 1065.405 Test engine preparation and maintenance.

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§ 1065.410 Maintenance limits for stabilized test engines.

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§ 1065.415 Durability demonstration.

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ADD:
(c) (1) The engine manufacturer shall use good engineering practice to determine engine and emission durability.

(2) 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.

(3) In the absence of a manufacturer's specific service accumulation cycle, engine durability demonstration shall be conducted using multiple runs of the applicable duty cycles described in Sections 1048.505 and 1048.510 of Part 1048. 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.
(d) 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.

Subpart F –Performing an Emission Test in the Laboratory

§ 1065.501 Overview.

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§ 1065.510 Engine mapping.

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§ 1065.512 Duty cycle generation.

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§ 1065.514 Cycle-validation criteria.

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§ 1065.520 Pre-test verification procedures and pre-test data collection.

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§ 1065.525 Engine starting, restarting, and shutdown.

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§ 1065.530 Emission test sequence.

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§ 1065.545 Validation of proportional flow control for batch sampling.

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§ 1065.550 Gas analyzer range validation, drift validation, and drift correction.

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§ 1065.590 PM sample preconditioning and tare weighing.

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§ 1065.595 PM sample post-conditioning and total weighing.

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Subpart G –Calculations and Data Requirements

§ 1065.601 Overview.

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§ 1065.602 Statistics.

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§ 1065.610 Duty cycle generation.

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§ 1065.630 1980 international gravity formula.

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§ 1065.640 Flow meter calibration calculations.

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§ 1065.642 SSV, CFV, and PDP molar flow rate calculations.

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§ 1065.645 Amount of water in an ideal gas.

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§ 1065.650 Emission calculations.

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§ 1065.655 Chemical balances of fuel, intake air, and exhaust.

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§ 1065.659 Removed water correction.

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§ 1065.660 THC and NMHC determination.

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§ 1065.665 THCE and NMHCE determination.

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§ 1065.667 Dilution air background emission correction.

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§ 1065.670 NO_x intake-air humidity and temperature corrections.

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§ 1065.672 Drift correction.

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§ 1065.675 CLD quench verification calculations.

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§ 1065.690 Buoyancy correction for PM sample media.

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§ 1065.695 Data requirements.

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Subpart H –Engine Fluids, Test Fuels, Analytical Gases and Other Calibration Standards

§ 1065.701 General requirements for test fuels.

(a) DELETE,
REPLACE WITH:
(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 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles,” as adopted August 5, 1999, and last amended August 4, 2005, 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 1065, subpart H, 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 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium- Duty Vehicles,” as adopted August 5, 1999, and last amended August 4, 2005, 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 1065, subpart H, the manufacturer shall demonstrate that the emission test results complies with these Test Procedures.

(b) DELETE,
REPLACE WITH:
With Executive Officer approval, the certifying entity may use other test fuels so long as

they do not affect the demonstration of compliance.

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§ 1065.703 Distillate diesel fuel.

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§ 1065.705 Residual fuel [Reserved].

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§ 1065.710 Gasoline.

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§ 1065.715 Natural gas.

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§ 1065.720 Liquefied petroleum gas.

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§ 1065.740 Lubricants.

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ADD:
(c) 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.

§ 1065.745 Coolants.

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§ 1065.750 Analytical gases.

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§ 1065.790 Mass standards.

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Subpart I – Testing with Oxygenated Fuels

§ 1065.801 Applicability.

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§ 1065.805 Sampling system.

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§ 1065.845 Response factor determination.

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§ 1065.850 Calculations.

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Subpart J – Field Testing and Portable Emission Measurement Systems

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Subpart K – Definitions and Other Reference Information

§ 1065.1001 Definitions.

ADD:
The definitions in 40 CFR 1048.801 and 1068.30, as modified, apply with the following revisions.

ADD:
40 CFR part 1048 means Part 1048 and applicable subparts contained in these 2007 and Later Test procedures when referenced in unrevised sections.

ADD:
40 CFR part 1065 means Part 1065 and applicable subparts contained in these 2007 and Later Test procedures when referenced in unrevised sections.

40 CFR part 1068 means Part 1068 and applicable subparts contained in these 2007 and Later Test procedures when referenced in unrevised sections.

* * * * *

Act DELETE.

* * * * *

ADD:
Certificate of Conformity means an Executive Order issued in accordance with the California Health and Safety Code, Division 26, Part 5.

Certification DELETE,
REPLACE WITH:
Certification means, with respect to new off-road large spark-ignition engines, obtaining an executive order for an engine family complying with the off-road spark-ignition engine emission standards and requirements specified in the California Code of Regulations, Title 13, Chapter 9, Sections 2430-2439.

* * * * *

ADD:
Clean Air Act or the *Act* means California Health and Safety Code, Division 26, and corresponding regulations, except where the context indicates otherwise.

* * * * *

Designated Compliance Officer DELETE,
REPLACE WITH:
Designated Compliance Officer means the Executive Officer of the Air Resources Board, or a designee of the Executive Officer.

* * * * *

ADD:
EPA means Air Resources Board.

ADD:
Executive Order means an order issued by the Executive Officer of the Air Resources Board certifying engines for sale in California.

* * * * *

Nonroad engine DELETE,
REPLACE WITH:

Nonroad engine means an off-road engine as defined in this section.

* * * * *

ADD:
Off-road engine means:
(1) Except as discussed in paragraph (2) of this definition, any internal combustion engine:

(i) In or on a piece of equipment that is self-propelled or serves a dual purpose by both propelling itself and performing another function (such as garden tractors, off-highway mobile cranes, and bulldozers); or

(ii) In or on a piece of equipment that is intended to be propelled while performing its function (such as lawnmowers and string trimmers); or

(iii) That, by itself or in or on a piece of equipment, is portable or transportable, meaning designed to be and capable of being carried or moved from one location to another. Indicia of transportability include, but are not limited to, wheels, skids, carrying handles, dolly, trailer, or platform.

(2) An internal combustion engine is not an off-road engine if:

(i) The engine is used to propel a vehicle subject to the emissions standards contained in Title 13, California Code of Regulations, Sections 1950-1978, or a vehicle used solely for competition, or is subject to standards promulgated under section 202 of the federal Clean Air Act (42 U.S.C; or

(ii) The engine is regulated by a federal New Source Performance Standard promulgated under section 111 of the 1990 Clean Air Act (42 U.S.C. 7511); or

(iii) The engine otherwise included in paragraph (1)(iii) of this definition remains or will remain at a location for more than 12 consecutive months or a shorter period of time for an engine located at a seasonal source. A location is any site at a building, structure, facility, or installation. Any engine (or engines) that replaces an engine at a location and that is intended to perform the same or similar function as the engine replaced will be included in calculating the consecutive time period. An engine located at a seasonal source is an engine that remains at a seasonal source during the full annual operating period of the seasonal source. A seasonal source is a stationary source that remains in a single location on a permanent basis (i.e., at least two years) and that operates at that single location approximately three months (or more) each year. This paragraph does not apply to an engine after the engine is removed from the location.

* * * * *

We (us, our) DELETE,
REPLACE WITH:
We (us, our) means the Executive Officer of the Air Resources Board or a designee of the Executive Officer.

* * * * *

§ 1065.1005 Symbols, abbreviations, acronyms, and units of measure.

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§ 1065.1010 Reference materials.

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PART 1068 – GENERAL COMPLIANCE PROVISIONS FOR NONROAD PROGRAMS

SOURCE: 67 FR 68427, November 8, 2002, amended in 70 FR 40420, July 13, 2005, unless otherwise noted.

Subpart A – Applicability and Miscellaneous Provisions

§ 1068.1 Does this part apply to me?

* * * * *

(a)(1) DELETE,
REPLACE WITH:
Off-road large spark-ignition engines regulated under Title 13, California Code of Regulations, Chapter 9, Article 4.5, and subject to the emission standards in § 2433(b)(1) of that Article.

* * * * *

§ 1068.5 How must manufacturers apply good engineering judgment?

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§ 1068.10 What provisions apply to confidential information?

DELETE,
REPLACE WITH:
Any manufacturer may assert that some or all of the information submitted pursuant to Title 13, California Code of Regulations, Chapter 9, Article 4.5 (Off-Road Large Spark-Ignition Engines) is entitled to confidential treatment as provided by Title 17, CCR, §§ 91000-91022.

§ 1068.15 Who is authorized to represent the Air Resources Board?

* * * * *

§ 1068.20 May ARB enter my facilities for inspections?

DELETE,
REPLACE WITH:
(a) Any engine manufacturer affected by these regulations, upon receipt of prior notice must admit or cause to be admitted during operating hours any ARB Enforcement Officer that has presented proper credentials to any of the following:

(1) Any facility where tests or procedures or activities connected with such tests or procedures are or were performed.

(2) Any facility where any new off-road large spark-ignition engine is present and is being, has been, or will be tested.

(3) Any facility where a manufacturer constructs, assembles, modifies, or builds-up an engine into a certification engine that will be tested for certification.

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

(b) Upon admission to any facility referred to in paragraph (c)(1) of this Section, any ARB Enforcement Officer must be allowed:

(1) 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 break-in, maintenance, and engine storage procedures.

(2) To verify correlation or calibration of test equipment; and,

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

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

(c) To permit an ARB determination whether production off-road large spark-ignition engines conform in all material respects to the design specifications that apply to those engines described in the Executive Order certifying such engines and to standards prescribed herein. Engine manufacturers must, upon receipt of prior notice, admit any ARB Enforcement Officer, upon presentation of credentials, to:

(1) 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 or used for certification testing into production engines is located or carried on; and,

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

(3) Any California retail outlet where any off-road large spark-ignition engine is sold.

(d) On admission to any such facility referred to in this Section, any ARB Enforcement Officer must be allowed:

(1) To inspect and monitor any aspects of such manufacture or assembly and other procedures;

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

(3) To inspect and photograph any part or aspect of any such new off-road large spark-ignition engines and any component used in the assembly thereof that are reasonably related to the purpose of the Enforcement Officer’s entry.

(e) Any ARB Enforcement Officer must be furnished by those in charge of a facility being inspected with such reasonable assistance as may be necessary to 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 the ARB irrespective of whether or not the applicant controls the facility.

(f) 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 engine manufacturers and facilities. The ARB will not attempt to make any inspections that it has been informed that local law forbids. However, if local law makes it impossible to insure the accuracy of data generated at a facility, no informed judgment that an engine is certifiable or is covered by an Executive Order can properly be based on the data. It is the responsibility of the engine manufacturer to locate its testing and manufacturing facilities in jurisdictions where this situation will not arise.

(g) For purposes of this Section:

(1) "Presentation of credentials" means a display of a document designating a person to be an ARB Enforcement Officer.

(2) Where engine, component, or engine storage areas or facilities are concerned, "operating hours" means all times during which personnel are at work in the vicinity of the area or facility and have access to it.

(3) Where facilities or areas other than those covered by paragraph (g)(2) of this Section are concerned, "operating hours" means all times during which an assembly line is in operation or during which testing, maintenance, break-in procedure, production or compilation of records, or any other procedure or activity is being conducted related to certification testing, translation of designs from the test stage to the production stage, or engine manufacture or assembly.

(4) "Reasonable assistance" includes, but is not limited to, providing clerical, copying, interpretation and translation services; making personnel available upon request to inform the ARB Enforcement Officer of how the facility operates and to answer questions; and performing requested emissions tests on any engine that is being, has been, or will be used for certification testing. Such tests must be nondestructive, but may require appropriate break-in. The engine manufacturer must be compelled to cause the personal appearance of any employee at such a facility before an ARB Enforcement Officer, upon written request from the Executive Officer for the appearance of any employee of a facility, and service of such request upon the engine manufacturer. Any such employee who has been instructed by the engine manufacturer to appear will be entitled to be accompanied, represented, and advised by counsel.

§ 1068.25 What information must I give to ARB?

* * * * *

(b) DELETE,
REPLACE WITH:
Manufacturers subject to the requirements of this part must establish and maintain records, perform tests, make reports and provide additional information that the Executive Officer may reasonably require under the California Health and Safety Code, Division 26, and corresponding regulations. This also applies to engines that are exempt from emission standards.

ADD:
(c) (1) 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.

(2) 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.

(d) Any off-road LSI engine manufacturer obtaining certification under this part shall notify the E.O., 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.

§ 1068.27 May ARB conduct testing with my production engines?

* * * * *

§ 1068.30 What definitions apply to this part?

ADD:
The definitions in 40 CFR 1048.801 and 1065.1001, as modified, apply with the following revisions:

ADD:
40 CFR part 1048 means Part 1048 and applicable subparts contained in these 2007 and Later Test procedures when referenced in unrevised sections.

ADD:
40 CFR part 1065 means Part 1065 and applicable subparts contained in these 2007 and Later Test procedures when referenced in unrevised sections.

ADD:
40 CFR part 1068 means Part 1068 and applicable subparts contained in these 2007 and Later Test procedures when referenced in unrevised sections.

* * * * *

Act DELETE.

ADD:
Administrator means the Executive Officer of the Air Resources Board, or a designee of the Executive Officer.

* * * * *

Certificate holder DELETE,
REPLACE WITH:
Certificate holder means a manufacturer (including importers) with a valid Executive Order for at least one engine family in a given model year.

ADD:
Clean Air Act or the *Act* means California Health and Safety Code, Division 26, and corresponding regulations, except where the context indicates otherwise.

Designated Officer DELETE,
REPLACE WITH:
Designated Compliance Officer means the Executive Officer of the Air Resources Board, or a designee of the Executive Officer.

* * * * *

Nonroad engine DELETE,
REPLACE WITH:
Nonroad engine means an off-road engine as defined in this section.

ADD:
Off-road engine means:
(1) Except as discussed in paragraph (2) of this definition, any internal combustion engine:
(i) In or on a piece of equipment that is self-propelled or serves a dual purpose by both propelling itself and performing another function (such as garden tractors, off-highway mobile cranes, and bulldozers); or
(ii) In or on a piece of equipment that is intended to be propelled while performing its function (such as lawnmowers and string trimmers); or
(iii) That, by itself or in or on a piece of equipment, is portable or transportable,

meaning designed to be and capable of being carried or moved from one location to another. Indicia of transportability include, but are not limited to, wheels, skids, carrying handles, dolly, trailer, or platform.

(2) An internal combustion engine is not an off-road engine if:

(i) The engine is used to propel a vehicle subject to the emissions standards contained in Title 13, California Code of Regulations, Sections 1950-1978, or a vehicle used solely for competition, or is subject to standards promulgated under section 202 of the federal Clean Air Act (42 U.S.C; or

(ii) The engine is regulated by a federal New Source Performance Standard promulgated under section 111 of the 1990 Clean Air Act (42 U.S.C. 7511); or

(iii) The engine otherwise included in paragraph (1)(iii) of this definition remains or will remain at a location for more than 12 consecutive months or a shorter period of time for an engine located at a seasonal source. A location is any site at a building, structure, facility, or installation. Any engine (or engines) that replaces an engine at a location and that is intended to perform the same or similar function as the engine replaced will be included in calculating the consecutive time period. An engine located at a seasonal source is an engine that remains at a seasonal source during the full annual operating period of the seasonal source. A seasonal source is a stationary source that remains in a single location on a permanent basis (i.e., at least two years) and that operates at that single location approximately three months (or more) each year. This paragraph does not apply to an engine after the engine is removed from the location.

* * * * *

Standard-setting part DELETE,
REPLACE WITH:
Standard-setting part means the articles of the California Code of Regulations that define emission standards for a particular engine.

* * * * *

We (us, our) DELETE,
REPLACE WITH:
We (us, our) means the Executive Officer of the Air Resources Board or a designee of the Executive Officer.

* * * * *

§ 1068.35 What symbols, acronyms, and abbreviations does this part use?

* * * * *

Subpart B – Prohibited Actions and Related Requirements

§ 1068.101 What general actions does this regulation prohibit?

* * * * *

(a) DELETE,
REPLACE WITH:
The following prohibitions and requirements apply to manufacturers of new engines and manufacturers of equipment containing these engines, except as described in subparts C and D of this part:
(1) *Introduction into commerce*. New engines and equipment may not be sold, offered for sale, or introduced or delivered into commerce in California or imported into California unless it has a valid Executive Order for its model year and the required label or tag. The actions listed in the previous sentence may not be taken with respect to any equipment containing an engine subject to this part's provisions, unless the engine has a valid and appropriate Executive Order and the required engine label or tag. For purposes of this paragraph (a)(1), an appropriate Executive Order is one that applies for the same model year as the model year of the equipment (except as allowed by § 1068.105(a)), covers the appropriate category of engines, and conforms to all requirements specified for the equipment in the standard-setting part. The requirements of this paragraph (a)(1) also cover new engines that are produced solely to replace an older engine in a piece of equipment, unless the engine qualifies for the replacement-engine exemption in § 1068.240. Civil penalties my be assessed for each engine in violation under the requirements of the California Health and Safety Code, Division 26, and corresponding regulations.
(2) *Reporting and recordkeeping*. Manufacturers are required to record certain types of information to show that their engines are meeting California's standards. Manufacturers must comply with these requirements to make and maintain required records (including those described in § 1068.501), and may not deny ARB access to these records or the ability to copy these records for which ARB has the authority to examine upon request. The required reports and information must be provided to the ARB upon request without delay. Failure to comply with the requirements of this paragraph is prohibited. A violation of the requirements of this subpart is a violation of the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations, and is subject to the penalty provisions thereunder.
(3) *Testing and access to facilities*. Manufacturers may not prevent ARB or its delegated agents from entering the manufacturer's facility to inspect and/or perform authorized testing. Manufacturers must perform the tests we require (or have the tests performed by an outside source). Failure to perform this testing is prohibited. Civil penalties my be assessed for each engine in violation under the requirements of the California Health and Safety Code, Division 26, and corresponding regulations.

(b) DELETE,

REPLACE WITH:
The following prohibitions apply to all entities with respect to the engines to which this part applies:
(1) *Tampering*. No one may remove or disable a device or element of design that may affect an engine's emission levels. This restriction applies before and after the engine is placed in service. Section 1068.120 describes how this applies to rebuilding engines. A person or a manufacturer or dealer who violates this part is subject to a civil penalty as specified in the California Health and Safety Code, Division 26, and corresponding regulations This prohibition does not apply in any of the following situations:

(i) You need to repair an engine and you restore it to proper functioning when the repair is complete.

(ii) You need to modify an engine to respond to a temporary emergency and you restore it to proper functioning as soon as possible.

(iii) You modify a new engine that another manufacturer has already certified to meet emission standards and recertify it under your own engine family. In this case you must tell the original manufacturer not to include the modified engines in the original engine family.

(2) *Defeat devices*. A manufacturer may not knowingly manufacture, sell, offer to sell, or install, an engine part if it bypasses, impairs, defeats, or disables the engine's control the emissions of any pollutant. A violation of the requirements of this subpart is a violation of the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations, and is subject to the penalty provisions thereunder.
(3) *Stationary engines*. An engine that is excluded from any requirements of this chapter because it is a stationary engine may not be moved or installed in any mobile equipment except as allowed by the provisions of this chapter. The residence time requirements of paragraph (2)(iii) of the nonroad engine definition in § 1068.30 may not be intentionally circumvented. A violation of the requirements of this subpart is a violation of the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations, and is subject to the penalty provisions thereunder for each day you are in violation.
(4) *Competition engines*. An uncertified engine or piece of equipment that is excluded or exempted from any requirements of this chapter because it is to be used solely for competition may not be used in a manner that is inconsistent with use solely for competition. A violation of the requirements of this subpart is a violation of the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations, and is subject to the penalty provisions thereunder.
(5) *Importation*. An uncertified engine or piece of equipment may not be imported if it is defined to be new in the standard-setting part and it is built after emission standards start to apply in California. A violation of the requirements of this subpart is a violation of the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations, and is subject to the penalty provisions thereunder. Note the following:

(i) The definition of new is broad for imported engines; uncertified engines and equipment (including used engines and equipment) are generally considered to be new when imported.
(ii) Engines that were originally manufactured before applicable ARB standards became effective are generally not subject to emission standards.
(6) *Warranty*. Manufacturers must honor the emission-related warranty requirements under § 1068.115 and fulfill any applicable responsibilities to recall engines under § 1068.505. Failure to meet these obligations is prohibited. A violation of the requirements of this subpart is a violation of the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations, and is subject to the penalty provisions thereunder.

* * * * *

(e) DELETE,
REPLACE WITH:
Maximum penalty limits may be adjusted based on the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations.

ADD:
(f) Under § 43017 of the California Health and Safety Code, the Air Resources Board may enjoin any violation of any provision of Subpart B of this part 1068.

§ 1068.105 What other provisions apply to me specifically if I manufacture equipment needing certified engines?

* * * * *

(d) DELETE,
REPLACE WITH:
Producing off-road equipment certified to highway emission standards. A manufacturer may produce off-road equipment from complete or incomplete motor vehicles with the motor vehicle engine under the following conditions:
(1) The engine or vehicle is certified to California on-road requirements.
(2) The engine is not adjusted outside the manufacturer's specifications.
(3) The engine or vehicle is not modified in any way that may affect its emission control. This applies to evaporative emission controls, but not refueling emission controls.
(4) Additional restrictions may be imposed by the Executive Officer as determined necessary to ensure emission performance equity.

§ 1068.110 What other provisions apply to engines in service?

* * * * *

(b) DELETE,
REPLACE WITH:
Certifying aftermarket parts. The manufacturer or rebuilder of an aftermarket engine part shall be required to certify according to the requirements of Title 13, CCR, Chapter 4, Article 2. The aftermarket part rebuilder or manufacturer must keep all records showing how the part affects emissions, and shall provide this information to the Executive Officer within 30 calendar days upon request.

* * * * *

§ 1068.115 When must manufacturers honor emission-related warranty claims?

Introductory text DELETE,
REPLACE WITH:
Title 13, CCR, Chapter 9, Article 4.5, § 2435, requires certifying manufacturers of off-road spark-ignition engines to warrant to purchasers that their engines are designed, built, and equipped to conform at the time of sale to the applicable regulations for their full useful life, including a warranty that the engines are free from defects in materials and workmanship that would cause an engine to fail to conform to the applicable regulations during the specified warranty period. This section codifies the warranty requirements without intending to limit them.

* * * * *

§ 1068.120 What requirements must I follow to rebuild engines?

* * * * *

§ 1068.125 What happens if I violate the regulations?

DELETE,
REPLACE WITH:
A violation of the requirements of this subpart is a violation of the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations, and is subject to the penalty provisions thereunder.

Subpart C – Exemptions and Exclusions

§ 1068.201 Does ARB exempt or exclude any engines from the prohibited acts?

* * * * *

§ 1068.210 What are the provisions for exempting test engines?

* * * * *

§ 1068.215 What are the provisions for exempting manufacturer-owned engines?

* * * * *

(b) DELETE,
REPLACE WITH:
By provision of the California Health and Safety Code, Division 24, Part 5, Chapter 1, § 43014, a manufacturer may request the Executive Officer to issue an experimental permit for a nonconforming engine under the ownership and control of the manufacturer for the purposes of developing products, assessing production methods, or promoting engines in the marketplace. The engine shall not be loaned, leased, or sold to generate revenue, either by itself or in a piece of equipment.

* * * * *

(c)(3)(iv) DELETE,
REPLACE WITH:
The statement “THIS ENGINE IS COVERED BY AN EXPERIMENTAL PERMIT AND IS EXEMPT FROM MEETING CALIFORNIA EMISSION REQUIREMENTS.” The referencing of similar federal requirements in combination with California references under this provision is permitted.

§ 1068.220 What are the provisions for exempting display engines?

* * * * *

§ 1068.225 What are the provisions for exempting engines for national security?

* * * * *

§ 1068.230 What are the provisions for exempting engines for export?

* * * * *

§ 1068.235 What are the provisions for exempting engines used solely for competition?

* * * * *

§ 1068.240 What are the provisions for exempting new replacement engines?

DELETE,
REPLACE WITH:
Off-road large spark-ignition engines subject to provisions of Subpart C are subject to replacement engines regulations specified in Title 13, California Code of Regulations, Chapter 9, Articles 4.5, Section 2433(e).

§ 1068.245 What temporary provisions address hardship due to unusual circumstances?

* * * * *

§ 1068.250 What are the provisions for extending compliance deadlines for small-volume manufacturers under hardship?

* * * * *

§ 1068.255 What are the provisions for exempting engines for hardship for equipment manufacturers and secondary engine manufacturers?

* * * * *

(b)(4)(i) DELETE,
REPLACE WITH:
If the engine does not meet any emission standards: “THIS ENGINE IS EXEMPT UNDER 13 CCR 2433(e) FROM EMISSION STANDARDS AND RELATED REQUIREMENTS.” The referencing of similar federal requirements in combination with California references under this provision is permitted.

* * * * *

§ 1068.260 What are the provisions for temporarily exempting engines for delegated final assembly?

* * * * *

§ 1068.265 What provisions apply to engines that are conditionally exempted from certification?

* * * * *

Subpart D – Imports

§ 1068.301 Does this subpart apply to me?

* * * * *

§ 1068.305 How do I get an exemption or exclusion for imported engines?

* * * * *

ADD:
(f) For any engine whose destination is California, send the completed form to the Executive Officer of the Air Resources Board.

§ 1068.310 What are the exclusions for imported engines?

* * * * *

§ 1068.315 What are the permanent exemptions for imported engines?

* * * * *

§ 1068.320 How must I label an imported engine with a permanent exemption?

* * * * *

(b)(4) DELETE,
REPLACE WITH:
State: "THIS IMPORT ENGINE IS GRANTED A PERMANENT EXEMPTION FROM MEETING CURRENT YEAR CALIFORNIA OFF-ROAD LARGE SPARK-IGNITION ENGINES EMISSION REQUIREMENTS BY ALLOWANCE FOR [identify the permanent exemption category authorizing the exemption (for example, “NATIONAL SECURITY”)]. INSTALLING THIS ENGINE IN ANY DIFFERENT APPLICATION IS A VIOLATION OF CALIFORNIA LAW SUBJECT TO CIVIL PENALTY.” The referencing of similar federal requirements in combination with California references under this provision is permitted.

§ 1068.325 What are the temporary exemptions for imported engines?

* * * * *

§ 1068.330 How do I import engines requiring further assembly?

* * * * *

§ 1068.335 What are the penalties for violations?

* * * * *

ADD:
(c) Under § 43017 of the California Health and Safety Code, the Air Resources Board may enjoin any violation of any provision of Subpart D of this part 1068.

Subpart E – Selective Enforcement Auditing

DELETE,

Appendix A to Subpart E of Part 1068-Plans for Selective Enforcement Auditing

DELETE,

Subpart F – Reporting Defects and Recalling Engines

DELETE,
REPLACE WITH:
Off-road large spark-ignition engines subject to provisions of Subpart F are subject to recall regulations specified in Title 13, California Code of Regulations, Chapter 9, Articles 4.5, Section 2439, Procedures for In-Use Engine Recalls for Large Off-Road Spark-Ignition Engines with an Engine Displacement Greater Than 1.0 Liter.

Subpart G – Hearings

§ 1068.601 What are the procedures for hearings?

DELETE,
REPLACE WITH:
A manufacturer may request a hearing on an Executive Officer's decision regarding certification, as specified in Title 17, California Code of Regulations, Division 3, Chapter 1, Subchapter 1.25, Articles 1 and 2.

Appendix I to Part 1068 – Emission-Related Components

* * * * *

Appendix II to Part 1068 – Emission-Related Parameters and Specifications

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PART 12

FINAL REGULATION ORDER TEST PROCEDURES

Large Spark-Ignition Engines

(2007 and Later Model Years; Part 1065/1068)

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FINAL REGULATION ORDER TEST PROCEDURES

Note: This document incorporates by reference 40 Code of Federal Regulations (CFR) Part 1065 – Engine-Testing Procedures, Subparts A, B, C, D, E, F, G, H, I, J, and K, as amended July 13, 2005, 40 CFR Part 1068, Subparts A, B, C, D, E, F, and G, including Appendix A to Subpart E and Appendix I and II to part 1068, as amended July 13, 2005, and the internally referenced subparts of 40 CFR Part 85, 40 CFR Part 86, and 40 CFR Part 1048. These amendments are formatted in a style to indicate changes from the existing test procedures. All existing language is indicated by plain type. All additions to the existing language are indicated by underlined type. All deletions to the existing language are indicated by ~~strikeout~~. Only those sections containing the modifications from the existing language are included. All other portions remain unchanged and are indicated by the notation [* * * * *] for reference. If there is any conflict between the provisions of this document and the California Health and Safety Code, Division 26, or Title 13 of the California Code of Regulations (CCR), the Health and Safety Code and Title 13 apply.

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State of California

AIR RESOURCES BOARD

CALIFORNIA EXHAUST AND EVAPORATIVE EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2007 AND LATER OFF-ROAD LARGE SPARK-IGNITION ENGINES

(Test Procedures 1065 and 1068)

Adopted: March 2, 2007

Amended: October 25, 2012

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2007 AND LATER OFF-ROAD LARGE SPARK-IGNITION ENGINES

The following provisions of Part 1065, and Part 1068, Title 40, Code of Federal Regulations, as proposed by the United States Environmental Protection Agency on the date listed, are adopted and incorporated herein by this reference for 2007 model year and later off-road large spark-ignition engines as the California Exhaust Emission Standards and Test Procedures for New 2007 and Later Off-Road Large Spark-Ignition Engines, except as altered or replaced by the provisions set forth below.

PART 1065 – ENGINE-TESTING PROCEDURES

SOURCE: 70 FR 40516, July 13, 2005, unless otherwise noted.

* * * * *

Subpart H –Engine Fluids, Test Fuels, Analytical Gases and Other Calibration Standards

§ 1065.701 General requirements for test fuels.

(a) (1) Except as allowed in (2), ~~I~~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 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as adopted August 5, 1999, and last amended August 4, 2005, 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 1065, subpart H, the manufacturer shall demonstrate that the emission test results complies with these Test Procedures.

(2) For 2013-2019 model-year gasoline-fueled, large spark-ignition engines, the manufacturer has the option to use the fuel specified in (a)(3).

(3) For 2020 and later gasoline-fueled, large spark-ignition engines: The certification test fuel for exhaust emission testing must be consistent with the fuel specifications as outlined in title 13, section 1961.2 and the "California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," adopted <insert adoption date>, and incorporated by reference herein. The test fuel specifications should remain consistent from batch to batch. Optionally, manufacturers may use other renewable fuel blends under this paragraph that have been certified by ARB as yielding

test results equivalent, or more stringent than, those resulting from the fuel specified by 13 CCR 1961.2, and which are appropriate for the certification of large spark-ignition engines.

~~(2)~~(4) 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 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium- Duty Vehicles," as adopted August 5, 1999, and last amended August 4, 2005, 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 1065, subpart H, the manufacturer shall demonstrate that the emission test results complies with these Test Procedures.

* * * * *

§ 1065.710 Gasoline.

* * * * *

(b) Up to and including the 2012 model year, ~~T~~there are two grades of gasoline specified for use as a test fuel. If the standard-setting part requires testing with fuel appropriate for low temperatures, use the test fuel specified for low-temperature testing. Otherwise, use the test fuel specified for general testing. The two grades are specified in Table 1 of this section.

* * * * *

California Environmental Protection Agency

Air Resources Board

Small Off-Road Engine and Equipment Evaporative Emissions Test Procedure

TP - 901

Test Procedure for Determining Permeation Emissions from Small Off-Road Engines and Equipment Fuel Tanks

Adopted: July 26, 2004

TP-901
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LIST OF FIGURES

California Environmental Protection Agency
Air Resources Board

Small Off-Road Engine and Equipment Evaporative Emissions Test Procedure

TP-901

Test Procedure for Determining Permeation Emissions from Small Off-Road Engines and Equipment Fuel Tanks

A set of definitions common to all Certification and Test Procedures are in Title 13, California Code of Regulations (CCR), Section 2752 et seq.

For the purpose of this procedure, the term "CARB" refers to the California Air Resources Board, and the term "Executive Officer" refers to the CARB Executive Officer, or his or her authorized representative or designate.

1. APPLICABILITY

This Test Procedure, TP-901, is used by the Air Resources Board to determine the permeation rate from fuel tanks of equipment that use spark ignited small off-road engines and equipment. Small off-road engines (SORE) are defined in Title 13, California Code of Regulations (CCR), section 2401 et seq. This Test Procedure is proposed pursuant to Section 43824 of the California Health and Safety Code (CH&SC) and is applicable in all cases where equipment with fuel tanks subject to the maximum allowable permeation performance standard are sold, supplied, offered for sale, or manufactured for use in the State of California.

1.1 Requirement to Comply with All Other Applicable Codes and Regulations

Certification or approval of an equipment fuel tank by the Executive Officer does not exempt the fuel tank from compliance with other applicable codes and regulations such as state and federal safety codes and regulations.

1.2 Safety

This test procedure involves the use of flammable materials and operations and should only be used by or under the supervision of those familiar and experienced in the use of such materials and operations. Appropriate safety precautions should be observed at all times while performing this test procedure.

2. PERFORMANCE STANDARDS

The minimum performance standards for certification of evaporative emission control systems on small off-road engines or equipment that use small off-road engines are defined in CCR Title 13, Chapter 15, Article 1, Section 2755 and Section 2754.

3. PRINCIPLE AND SUMMARY OF TEST PROCEDURE

Prior to permeation testing of the fuel tank, durability testing is performed. Durability testing exposes the fuel tank to pressure and vacuum extremes, and fuel sloshing. After durability testing, the fuel tank outlet(s) are sealed and the tank is then filled with Phase II California Reformulated Certification (CERT) fuel or Indolene. Once filled, the tank is allowed to precondition at ambient temperature and pressure for a minimum of 20 weeks or until equilibrium is reached. Once preconditioning is complete, the tank is emptied, immediately refilled with CERT fuel, and allowed to equilibrate at 40 °C.

After the fuel temperature reaches 40 °C +/- 2 °C, an additional coupon of the same material as the tank is used to seal the tank inlet in place of the fuel cap. The tank is then leak tested, weighed, and subjected to a constant (40 °C) temperature. At the end of each 24-hour period, the tank is re-weighed and the weight loss in grams is calculated. The permeation rate is defined as the average steady state weight loss over time divided by the tank's internal surface area.

4. BIASES AND INTERFERENCES

To accurately quantify the losses attributable solely to permeation, each tank tested must be completely sealed. Tanks incorrectly sealed will emit evaporative emissions, which can affect the final weight loss calculations.

To ensure the losses attributed to permeation are accurately quantified during this test procedure, the tanks must remain exposed to the constant 40 °C temperature for each 24-hours ± 30 minutes period.

CERT fuel is required for both preconditioning and testing. CERT fuel does not contain alcohol. Fuels containing alcohol can significantly bias permeation results.

Relative humidity greater than 20% can bias the permeation results for certain plastics such as nylon. To identify bias due to humidity, relative humidity must be recorded daily.

5. SENSITIVITY AND RANGE

Range of mass measurement of filled tanks is approximately 100 grams to 32,000 grams depending on tank volume. For mass measurements more then 6200 grams, the minimum sensitivity of the balance must be 0.1 grams. For mass measurement between 1000 and 6200 grams, the minimum sensitivity of the balance must be 0.01 grams. For mass measurements less than 1000 grams, the minimum sensitivity of the balance must be 0.001 grams.

6. EQUIPMENT

6.1 A hand held thermostatically controlled teflon coated aluminum hot plate (hand held fusion welder) and coupons of the same material as the tank. Both the hand held fusion welder and coupons must be of sufficient diameter to completely cover the opening(s) of the tank. An alternative method to seal the tank may be used.

6.2 A top loading balance that meets the requirements of section 4-5 above.

6.3 A vented enclosure with a temperature conditioning system capable of controlling the internal enclosure air temperature to an average tolerance of +/-2.0°C over the duration of the test. Additionally, the instantaneous temperature shall not exceed +/- 3.0°C for more than 15 minutes each day of the test. Data confirming this performance shall be recorded at a rate no slower than once every 5 minutes.

6.4 A barometric pressure transducer capable of measuring atmospheric pressure to within 2.0 millimeters of mercury.

6.5 A temperature instrument capable of measuring ambient temperature to within +/- 0.2°C.

7. CALIBRATION PROCEDURE

All instruments and equipment used to measure permeation shall be calibrated prior to use per the manufacturer's specifications.

8. DURABILITY DEMONSTRATION

A durability demonstration is required prior to any testing to determine the performance of a fuel tank. These durability tests are designed to ensure that the fuel tank assembly remains effective throughout the useful life of the equipment. A durability demonstration consists of the following tests:

Pressure/Vacuum Test

The Pressure/Vacuum test is performed prior to any preconditioning of the fuel tank. Determine the fuel tank system's design pressure and vacuum limits under normal operating conditions considering the influence of any associated pressure/vacuum relief components. Pressurize the empty tank, sealed with the OEM fuel cap, or a modified OEM fuel cap as required, to within 10% of the system's normal high pressure operating limit and then evacuate to within 10% of the system's normal vacuum operating limit. If the fuel tank has no features that would cause positive or negative pressures during normal operation, then pressure/vacuum cycling is not required. The tank pressure/vacuum cycling shall be performed in a 49°C +/- 3°C ambient with compressed air of no less than 21°C. Repeat the pressure/vacuum process until the tank has been subjected to not less than 1000 cycles in 8 hours +/- 1 hour.

Tanks that have a secondary operation for drilling holes for insertion of fuel line and grommet system may have these eliminated for purposes of durability and permeation testing.

Slosh Test

The Slosh test can be performed during the preconditioning period. Perform a slosh test by filling the tank to 50 percent capacity with CERT fuel. Seal the tank using the OEM fuel cap or modified fuel cap and metal plugs for the fuel tank outlet(s). Use a laboratory sample orbital shaker table or similar device to subject the tank to a centripetal acceleration of at least 2.4 meter/second^2 at a frequency of 2 cycles per second +/- 0.25 for one million cycles. As an alternative, slosh testing may be performed using the method specified in 40 CFR Part 1051 §1051.515 (c).

Following these durability tests, each tank must be preconditioned to ensure a stable permeation rate. The period of slosh testing may be considered part of the preconditioning period provided each tank tested remains at least half filled with fuel and is never empty for more than one hour over the entire preconditioning period.

9. PRECONDITIONING PROCEDURE

After performing the durability tests, ensure that the fuel tank and any vent outlets are sealed and leak tight. This can be accomplished by fusion welding a coupon over the fuel outlet(s) or by inserting and clamping metal plugs into each outlet. Once sealed, fill the tank to its nominal capacity with CERT fuel and attach the OEM fuel cap. Place the tank in a suitable vented enclosure. Record the preconditioning start date on the field data sheet. Soak the tank at 30° C ± 10° C for not less than 140 days. Accelerated preconditioning of the tank can be accomplished by soaking the tank at an elevated temperature. Data documenting that the tank has reached equilibrium must be provided for tanks soaked less than 140 days.

10. SEALING PROCEDURE

10.1 After preconditioning, remove the tank from the enclosure to a well-ventilated area. Record the preconditioning end date on the field data sheet. Remove the cap and empty the tank. The tank must not remain empty for more than fifteen minutes. Immediately refill the tank to its nominal capacity with CERT fuel. Place the unsealed tank in a heated enclosure and allow it to equilibrate to 40° C ± 2° C for a minimum of two hours. After the fuel temperature has equilibrated to 40° C ± 2° C, seal the tank by fusion welding a coupon over the fuel fill neck opening to make a seal. Perform a leak check by submerging each tank in a water bath large enough to completely cover the tank plus six inches. Observe the tank for any leaks. Leak points will be visible as a bubble or stream of bubbles while immersed in the water bath. Alternative methods may be used to verify that the tank is sealed other than water submersion. If leaks are observed, remove and dry the tank and repair all leaks. Continue this process until no leaks are observed.

10.2 For materials that cannot be sealed using fusion welding, good engineering practices should be used to seal the tank. As an alternative, the technique used to seal tanks described in SAE 920164 "Permeation of Gasoline-Alcohol Fuel Blends Through High-Density Polyethylene Fuel Tanks with Different Barrier Technologies" may be used.

11. TEST PROCEDURE WITH TRIP BLANK CORRECTION

11.1 Two identical sealed tanks, one containing fuel and one remaining empty, are weighed concurrently. The mass changes documented by the empty tank are used to correct the tank containing fuel. Ensure that the exterior surface of each tank is clean, dry, and free of dirt and debris. Carefully place the full tank on the high capacity balance. Record the initial weight (W_{if}), date, relative humidity, barometric pressure, and start time on the field data sheet (Figure 1). Next, carefully place the empty tank on the high capacity balance. Record the initial weight (W_{ie}), date, and start time on the field data sheet.

11.2 Immediately place the two sealed tanks in the enclosure. Begin the 24-soak at 40° C ± 2° C. If more than thirty minutes elapses between the time the sealed tank was weighed and the initiation of the 24-hour soak, then both tanks must be re-weighed.

11.3 At the conclusion of the 24-hour soak period, immediately remove the tanks from the enclosure and ensure that the exterior surface is clean, dry, and free of dirt and debris. Carefully weigh each tank on the high capacity balance. Record the final weights (W_{ff}), (W_{fe}), date, relative humidity, barometric pressure, and end time on the field data sheet. If more than thirty minutes elapses between the conclusion of the 24-hour soak period and the final weighing of the sealed tank, the final weight is invalid and should not be used in future calculations. If this occurs, the test procedure must be reinitiated.

11.4 Calculate the difference between the initial weight (*Wi*) and the final weight (*Wf*) for each tank. Record the difference on the field data sheet. Refer to Section 14 for calculation.

11.5 Repeat this process until the correlation coefficient (R^2), from a plot of the cumulative daily weight loss versus time for ten consecutive 24-hour cycles, is 95% or greater.

12. QUALITY ASSURANCE / QUALITY CONTROL (QA/QC)

This section is reserved for future specification.

13. RECORDING DATA

Record data on field data sheet shown in figure 1.

14. CALCULATING PERMEATION RATE USING TRIP BLANK CORRECTION

The daily weight loss in grams is calculated for each 24-hour cycle as follows:

$$WI = W_{if} - D_f$$

Where:

WI	=	The weight loss in grams
W_{if}	=	The initial weight of the full tank in grams
W_{ff}	=	The final weight of the full tank in grams
D_f	=	$W_{ff} + D_e$
D_e	=	$W_{ie} - W_{fe}$
W_{ie}	=	The initial weight of the empty tank in grams
W_{fe}	=	The final weight of the empty tank in grams

Plot the cumulative daily weight loss (in grams) against the sampling time (days). Perform a linear regression on ten consecutive data points.

If the correlation coefficient is at least 95%, the permeation rate in grams per square meter per day is calculated by dividing the slope of the regression line (grams/day) by the tanks internal surface area (obtained from the tank manufacturer).

$$P_{rate} = Slope / A_{tank}$$

Where:

P_{rate}	=	The permeation rate in grams/meter^2/day
$Slope$	=	The slope of the regression line in grams/day
A_{tank}[1]	=	The tank's internal surface area in meter^2

[1] Report the tank's internal surface area in square-meters to at least three significant figures. The tank internal surfaces are those surfaces that are subjected to fuel liquid or vapor under normal operating conditions and have an opposing surface through the wall section that is in communication with the atmosphere. Internal webs and strengthening structures not in communication with the atmosphere are not considered internal surfaces for the purposes of this testing.

15. ALTERNATIVE TEST PROCEDURES

Test procedures, other than specified above, shall only be used if prior written approval is obtained from the ARB Executive Officer. In order to secure the ARB Executive Officer's approval of an alternative test procedure, the applicant is responsible for demonstrating to the ARB Executive Officer's satisfaction that the alternative test procedure is equivalent to this test procedure.

(1) Documentation of any such approvals, demonstrations, and approvals shall be maintained by the ARB Executive Officer and shall be made available upon request.

(2) Once approved for use, an alternative test procedure may be used and referenced by any manufacturer subject to the limitations and constraints in the Executive Order approving the alternative test procedure.

16. REFERENCES

Permeation of Gasoline-Alcohol Fuel Blends Through High-Density Polyethylene Fuel Tanks with Different Barrier Technologies, SAE Technical Paper Series 920124, International Congress & Exposition, Detroit Michigan, February 1992

17. FIGURES

Figure 1. Field Data Sheet (Trip Blank Correction)

Figure 1
Field Data Sheet
(Trip Blank Correction)

Tank Manufacturer:_____

Tank I.D:_____

Tested By:_____

Water Bath Test (pass/fail):_____

Tank Internal Surface Area (meter^2):_____

Full Tank Data

Date/Time Start		Date/Time End		Initial Weight W_{if} (grams)	Final Weight W_{ff} (grams)	Difference D_f (grams)	Weight Loss Wl (grams)

$Wl = (W_{if} - D_f)$, $D_f = (W_{ff} + D_e)$, $D_e = (W_{ie} - W_{fe})$

Empty Tank Data

Date/Time Start		Date/Time End		Initial Weight W_{ie} (grams)	Final Weight W_{fe} (grams)	Difference D_e (grams)	%RH	Baro. Pres.

California Environmental Protection Agency

Air Resources Board

Small Off-Road Engine and Equipment Evaporative Emissions Test Procedure

TP - 902

Test Procedure for Determining Diurnal Evaporative Emissions from Small Off-Road Engines and Equipment

Adopted: July 26, 2004

TP-902
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California Environmental Protection Agency
Air Resources Board

Small Off-Road Engine and Equipment Evaporative Emissions Test Procedure

TP-902

Test Procedure for Determining Diurnal Evaporative Emissions from Small Off-Road Engines and Equipment

A set of definitions common to all Certification and Test Procedures are in Title 13, California Code of Regulations (CCR), Section 2752 et seq.

For the purpose of this procedure, the term "CARB" refers to the California Air Resources Board, and the term "Executive Officer" refers to the CARB Executive Officer or his or her authorized representative or designate.

1. APPLICABILITY

This Test Procedure, TP-902, is used by the Air Resources Board to determine the diurnal and resting loss evaporative emissions from small off-road engines and equipment less than or equal to 19 kilowatts. Small off-road engines are defined in Title 13, California Code of Regulations (CCR), section 2401 et seq. This Test Procedure is proposed pursuant to Section 43824 of the California Health and Safety Code (CH&SC) and is applicable in all cases where small off-road engines are sold, supplied, offered for sale, or manufactured for use in the State of California.

1.1 Requirement to Comply with All Other Applicable Codes and Regulations

Certification or approval of any engine or evaporative emission control system by the Executive Officer does not exempt the engine or evaporative emission control system from compliance with other applicable codes and regulations such as state and federal safety codes and regulations.

1.2 Safety

This test procedure involves the use of flammable materials and operations and should only be used by or under the supervision of those familiar and experienced in the use of such materials and operations. Appropriate safety precautions should be observed at all times while performing this test procedure.

2. PERFORMANCE STANDARDS

The minimum performance standards for certification of evaporative emission control systems on small off-road engines or equipment that use small off-road engines is defined in CCR Title 13, Chapter 15, Article 1, Section 2754.

3. PRE-CERTIFICATION REQUIREMENTS

3.1 Durability

A demonstration of durability of the applicant's evaporative emission control system is required prior to performing an evaporative emissions test.

Prior to the commencement of a durability demonstration, the applicant is required to submit and obtain approval of an evaporative emission durability test procedure. Once approved, a manufacturer is not required to obtain a new approval for an evaporative emission durability demonstration unless changes result in new testing requirements.

Tanks that have a secondary operation for drilling holes for insertion of fuel line and grommet system may have these eliminated for purposes of durability demonstration.

Components shall be deemed acceptable if they remain functional after the durability demonstration prescribed below. Fuel tanks utilized for certification must have pressure/vacuum (if applicable) and slosh testing prior to certification testing.

The Executive Officer shall review the method based on the following requirements:

(a) The durability test must actuate control valves, cables, and linkages, where applicable, for a minimum of 5000 cycles.

(b) The Pressure/Vacuum test is performed prior to any preconditioning of the fuel tank. Determine the fuel tank system's design pressure and vacuum limits under normal operating conditions considering the influence of any associated pressure/vacuum relief components. Pressurize the empty tank, sealed with the OEM fuel cap, or a modified OEM fuel cap as required, to within 10% of the system's normal high pressure operating limit and then evacuate to within 10% of the system's normal vacuum operating limit. If the fuel tank has no features that would cause positive or negative pressures during normal operation, then pressure/vacuum cycling is not required. The tank pressure/vacuum cycling shall be performed in a 49° C+/- 3° C ambient with compressed air of no less than 21° C. Repeat the pressure/vacuum process until the tank has been subjected to not less than 1000 cycles in 8 hours +/- 1 hour.

(c) The durability test must include a slosh test of the engines fuel tank. The slosh test can be performed during the preconditioning period. A slosh test must be performed on a fuel tank filled to 50 percent capacity with CERT fuel. The fuel tank must be sealed with the OEM fuel cap. A laboratory orbital shaker table or similar device is then used to subject the tank to a peak horizontal centripetal acceleration of at least 2.4 meter/second^2 at a frequency of 2 cycles per second +/- 0.25 for one million cycles. As an alternative, slosh testing may be performed using the method specified in 40 CFR Part 1051 §1051.515 (c).

(d) For systems that utilize a carbon canister, the durability test procedure(s) shall include thermal cycling and vibration exposure of the canister.

(1) For thermal cycling, the test must subject the canister to 100 cycles of the following temperature profile:

(A) Heat and hold at 60°C ± 2°C for 30 minutes. (Up to 10 minutes is allowed for the temperature to rise and stabilize.)

(B) Cool and hold at 0°C ± 2°C for 30 minutes. (Up to 20 minutes is allowed for the temperature to reach 0°C during the cooling period.)

(2) For vibration exposure, at a minimum, the canister must be placed in a suitable test fixture while maintaining its specified orientation (as designed). Subject the fixture to a peak horizontal vibration force of 4.5G x 60Hz x 10^7 times.

3.2 Canister Working Capacity

(a) For evaporative emission control systems that only use a carbon canister and do not pressurize the fuel tank, the carbon canister must have a working capacity of at least 1.4 grams of vapor storage capacity per liter of nominal fuel tank volume for tanks greater than or equal to 3.78 liters, and 1.0 grams of vapor storage capacity per liter of nominal fuel tank volume for tanks less than 3.78 liters. For evaporative emission control systems that use a carbon canister and pressurized fuel tank, the working capacity must be specified by the applicant. For all systems utilizing actively purged carbon canisters, running loss emissions must be controlled from being emitted into the atmosphere.

(b) Working capacity is determined following the procedure in Attachment 1 of this test procedure. In lieu of the loading and purge rates specified in Attachment 1, the canister manufacturer's maximum loading and purge rates may be used.

3.3 Engine Purge

If a canister is used, the engine must actively purge the canister when the engine is running. This requirement may not apply to Small Production Volume Tanks specified in 13 CCR 2766.

4. GENERAL SUMMARY OF TEST PROCEDURE

A Sealed Housing for Evaporative Determination (SHED) is used to measure diurnal emissions. This method subjects test engines to a preprogrammed temperature profile while maintaining a constant pressure and continuously sampling for hydrocarbons with a Flame Ionization Detector (FID). The volume of a SHED enclosure can be accurately determined. The mass of total hydrocarbons that emanates from a test engine over the test period is calculated using the ideal gas equation.

This test procedure measures diurnal emissions from engines or equipment with complete evaporative emission control systems as defined in 13 CCR 2752 (a)(8) by subjecting them to a hot soak and diurnal test sequence. The engine with complete evaporative emission control system can be tested without the equipment chassis. The basic process is as follows:

- Fill the engine fuel tank with fuel and operate at maximum governed speed for 5-minutes
- Precondition the evaporative emission control and fuel delivery system
- Drain and fill fuel tank to 50% capacity with California certification fuel
- Purge carbon canister (if so equipped) with 400 bed volumes of nitrogen or dry air at the canister manufacturer's recommended rate
- Operate engine at the maximum governed speed for fifteen minutes

- Subject engine/equipment to a one-hour constant 95°F hot soak
- Soak engine/equipment for two hours at 65°F
- Subject engine/equipment to a 24-hour variable (65°F - 105°F - 65°F) temperature diurnal profile

The mass of total hydrocarbons measured by the SHED over the 24-hour diurnal profile is compared with the performance standards in CCR Title 13, Chapter 15, Article 1, Section 2754. Engines or equipment that meet the appropriate performance standard shall be considered compliant.

5. INSTRUMENTATION

The instrumentation necessary to perform evaporative emission testing for small off-road engines is the same instrumentation used for passenger cars and light duty vehicles, and is described in 40 CFR 86.107-96. The ARB will consider data generated with mini-SHEDs as valid if approved as an alternative test procedure.

5.1 Diurnal Evaporative Emission Measurement Enclosure

References to methanol in this test procedure can be disregarded.

The diurnal evaporative emissions measurement enclosure shall be equipped with an internal blower or blowers coupled with an air temperature management system (typically air to water heat exchangers and associated programmable temperature controls) to provide for air mixing and temperature control. The blower(s) shall provide a nominal total flow rate of 0.8 ± 0.2 ft^3/min per ft^3 of the nominal enclosure volume, V_n. The inlets and outlets of the air circulation blower(s) shall be configured to provide a well-dispersed air circulation pattern that produces effective internal mixing and avoids significant temperature or hydrocarbon and alcohol stratification. The discharge and intake air diffusers in the enclosure shall be configured and adjusted to eliminate localized high air velocities which could produce non-representative heat transfer rates between the engine fuel tank(s) and the air in the enclosure. The air circulation blower(s), plus any additional blowers if required, shall maintain a homogeneous mixture of air within the enclosure.

The enclosure temperature shall be taken with thermocouples located 3 feet above the floor at the approximate mid-length of each side wall of the enclosure and within 3 to 12 inches of each side wall. The temperature conditioning system shall be capable of controlling the internal enclosure air temperature to follow the prescribed temperature versus time cycle as specified in 40 CFR §86.133-90 as modified by paragraph III.D.10 (diurnal breathing loss test) of the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles" within an instantaneous tolerance of ± 3.0°F and an average tolerance of ± 2.0°F as measured by side wall thermocouples. The control system shall be tuned to provide a smooth temperature pattern, which has a minimum of overshoot, hunting, and instability about the desired long-term temperature profile.

The enclosure shall be of sufficient size to contain the test equipment with personnel access space. It shall use materials on its interior surfaces, which do not adsorb or desorb hydrocarbons, or alcohols (if the enclosure is used for alcohol-fueled vehicles). The enclosure shall be insulated to enable the test temperature profile to be achieved with a heating/cooling system, which has minimum surface temperatures in the enclosure no less than 25.0°F below the minimum diurnal temperature specification. The enclosure

shall be equipped with a pressure transducer with an accuracy and precision of ± 0.1 inches H_2O. The enclosure shall be constructed with a minimum number of seams and joints, which provide potential leakage paths. Particular attention shall be given to sealing and gasketing of such seams and joints to prevent leakage.

The enclosure shall be equipped with features, which provide for the effective enclosure volume to expand and contract in response to both the temperature changes of the air mass in the enclosure, and any fluctuations in the ambient barometric pressure during the duration of the test. Either a variable volume enclosure or a fixed volume enclosure may be used for diurnal emission testing.

A variable volume enclosure shall have the capability of latching or otherwise constraining the enclosed volume to a known, fixed value, V_n. The V_n shall be determined by measuring all pertinent dimensions of the enclosure in its latched configuration, including internal fixtures, based on a temperature of 84°F, to an accuracy of ± 1/8 inch (0.5 cm) and calculating the net V_n to the nearest 1 ft^3. In addition, V_n shall be measured based on a temperature of 65°F and 105°F. The latching system shall provide a fixed volume with an accuracy and repeatability of $0.005xV_n$. Two potential means of providing the volume accommodation capabilities are; a moveable ceiling which is joined to the enclosure walls with a flexure, or a flexible bag or bags of Tedlar or other suitable materials, which are installed in the enclosure and provided with flowpaths which communicate with the ambient air outside the enclosure. By moving air into and out of the bag(s), the contained volume can be adjusted dynamically. The total enclosure volume accommodation shall be sufficient to balance the volume changes produced by the difference between the extreme enclosure temperatures and the ambient laboratory temperature with the addition of a superimposed barometric pressure change of 0.8 in. Hg. A minimum total volume accommodation range of $\pm 0.07xV_n$ shall be used. The action of the enclosure volume accommodation system shall limit the differential between the enclosure internal pressure and the external ambient barometric pressure to a maximum value of ± 2.0 inches H_2O.

The fixed volume enclosure shall be constructed with rigid panels that maintain a fixed enclosure volume, which shall be referred to as V_n. V_n shall be determined by measuring all pertinent dimensions of the enclosure including internal fixtures to an accuracy of ± 1/8 inch (0.5 cm) and calculating the net V_n to the nearest 1 ft^3. The enclosure shall be equipped with an outlet flow stream that withdraws air at a low, constant rate and provides makeup air as needed, or by reversing the flow of air into and out of the enclosure in response to rising or falling temperatures. If inlet air is added continuously throughout the test, it must be filtered with activated carbon to provide a relatively constant hydrocarbon and alcohol level. Any method of volume accommodation shall maintain the differential between the enclosure internal pressure and the barometric pressure to a maximum value of ±2.0 inches of water. The equipment shall be capable of measuring the mass of hydrocarbon, and alcohol (if the enclosure is used for alcohol-fueled equipment) in the inlet and outlet flow streams with a resolution of 0.01 gram. A bag sampling system may be used to collect a proportional sample of the air withdrawn from and admitted to the enclosure. Alternatively, the inlet and outlet flow streams may be continuously analyzed using an on-line Flame Ionization Detector (FID) analyzer and integrated with the flow measurements to provide a continuous record of the mass hydrocarbon and alcohol removal.

An online computer system or strip chart recorder shall be used to record the following parameters during the diurnal evaporative emissions test sequence:

- Enclosure internal air temperature
- Diurnal ambient air temperature specified profile as defined in 40 CFR §86.133-90 as modified in paragraph III.D.10 of the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles" (diurnal breathing loss test).
- Enclosure internal pressure
- Enclosure temperature control system surface temperature(s)
- FID output voltage recording the following parameters for each sample analysis:

  - zero gas and span gas adjustments
  - zero gas reading
  - enclosure sample reading
  - zero gas and span gas readings

The data recording system shall have a time resolution of 30 seconds and shall provide a permanent record in magnetic, electronic or paper media of the above parameters for the duration of the test.

Other equipment configurations may be used if approved in advance by the Executive Officer. The Executive Officer shall approve alternative equipment configurations if the manufacturer demonstrates that the equipment will yield test results equivalent to those resulting from use of the specified equipment.

5.2 Calibrations

Evaporative emission enclosure calibrations are specified in 40 CFR §86.117-90. Methanol measurements may be omitted when methanol-fueled engines will not be tested in the evaporative enclosure. Amend 40 CFR §86.117-90 to include an additional subsection 1.1, to read:

The diurnal evaporative emission measurement enclosure calibration consists of the following parts: initial and periodic determination of enclosure background emissions, initial determination of enclosure volume, and periodic hydrocarbon (HC) and methanol retention check and calibration. Calibration for HC and methanol may be conducted in the same test run or in sequential test runs.

5.2.1 The initial and periodic determination of enclosure background emissions shall be conducted according to the procedures specified in §86.117-90(a)(1) through (a)(6). The enclosure shall be maintained at a nominal temperature of 105.0°F throughout the four-hour period. Variable volume enclosures may be operated either in the latched volume configuration, or with the variable volume feature active. Fixed volume enclosures shall be operated with inlet and outlet flow streams closed. The allowable enclosure background emissions of HC and/or methanol as calculated according to 40 CFR §86.117-90(a)(7) shall not be greater than 0.05 grams in 4 hours. The enclosure may be sealed and the mixing fan operated for a period of up to 12 hours before the initial HC concentration reading (C_{HCi}) and the initial methanol concentration reading (C_{CH3OHi}) is taken and the four-hour background measurement period begins.

5.2.2 The initial determination of enclosure internal volume shall be performed according to the procedures specified in paragraph I.A.1.3 of the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent

Model Motor Vehicles." If the enclosure will be used for hot soak determination, the determination of enclosure internal volume shall also be performed based on 105°F.

5.2.3 The HC and methanol measurement and retention checks shall evaluate the accuracy of enclosure HC and methanol mass measurements and the ability of the enclosure to retain trapped HC and methanol. The check shall be conducted over a 24-hour period with all of the normally functioning subsystems of the enclosure active. A known mass of propane and/or methanol shall be injected into the enclosure and an initial enclosure mass measurement(s) shall be made. The enclosure shall be subjected to the temperature cycling specified in paragraph III.D.10.1.7 of the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles" (revising 40 CFR §86.133-90(l)) for a 24-hour period. The temperature cycle shall begin at 105EF (hour 11) and continue according to the schedule until a full 24-hour cycle is completed. A final enclosure mass measurement(s) shall be made. The following procedure shall be performed prior to the introduction of the enclosure into service and following any modifications or repairs to the enclosure that may impact the integrity of this enclosure; otherwise, the following procedure shall be performed on a monthly basis. (If six consecutive monthly retention checks are successfully completed without corrective action, the following procedure may be determined quarterly thereafter as long as no corrective action is required.)

(A) Zero and span the HC analyzer.

(B) Purge the enclosure with atmospheric air until a stable enclosure HC level is attained.

(C) Turn on the enclosure air mixing and temperature control system and adjust it for an initial temperature of 105.0°F and a programmed temperature profile covering one diurnal cycle over a 24 hour period according to the profile specified in paragraph III.D.10.1.7. Of the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles" (revising 40 CFR §86.133-90). Close the enclosure door. On variable volume enclosures, latch the enclosure to the enclosure volume measured at 105°F. On fixed volume enclosures, close the outlet and inlet flow streams.

(D) When the enclosure temperature stabilizes at 105.0°F ± 3.0°F seal the enclosure; measure the enclosure background HC concentration (C_{HCe1}) and/or background methanol concentration (C_{CH3OH1}) and the temperature (T_1), and pressure (P_1) in the enclosure.

(E) Inject into the enclosure a known quantity of propane between 2 to 6 grams and a known quantity of methanol in gaseous form between 2 to 6 grams. For evaporative emission enclosures that will be used for testing equipment subject to the standards shown in Table 2-1, use a known amount of propane or gaseous methanol between 0.5 to 1.0 grams. The injection method shall use a critical flow orifice to meter the propane and/or methanol at a measured temperature and pressure for a measured time period. Techniques that provide an accuracy and precision of ± 0.5 percent of the injected mass are also acceptable. Allow the enclosure internal HC and/or methanol concentration to mix and stabilize for up to

300 seconds. Measure the enclosure HC concentration (C_{HCe2}) and/or the enclosure methanol concentration (C_{CH3OH2}). For fixed volume enclosures, measure the temperature (T_2) and pressure in the enclosure (P_2). On variable volume enclosures, unlatch the enclosure. On fixed volume enclosures, open the outlet and inlet flow streams. Start the temperature cycling function of the enclosure air mixing and temperature control system. These steps shall be completed within 900 seconds of sealing the enclosure.

(F) For fixed volume enclosures, calculate the initial recovered HC mass (M_{HCe1}) according to the following formula:

$$M_{HCe1} = (3.05 \times V \times 10^{-4} \times [P_2 (C_{HCe2} - rC_{CH3OH2})/T_2 - P_1 (C_{HCe1} - rC_{CH3OH1})/T_1])$$

Where:

V is the enclosure volume at 105°F (ft^3)
P_1 is the enclosure initial pressure (inches Hg absolute)
P_2 is the enclosure final pressure (inches Hg absolute)
C_{HCen} is the enclosure HC concentration at event n (ppm C)

C_{CH3OHn} is the enclosure methanol concentration calculated according to 40 CFR §86.117-90 (d)(2)(iii) at event n (ppm C)
r is the FID response factor to methanol
T_1 is the enclosure initial temperature (°R)
T_2 is the enclosure final temperature (°R)

For variable volume enclosures, calculate the initial recovered HC mass and initial recovered methanol mass according to the equations used above except that P_2 and T_2 shall equal P_1 and T_1.

Calculate the initial recovered methanol mass (M_{CH3OH1}) according to 40 CFR §86.117-96(d)(1), as amended March 24, 1993.

If the recovered HC mass agrees with the injected mass within 2.0 percent and/or the recovered methanol mass agrees with the injected mass within 6.0 percent, continue the test for the 24 hour temperature cycling period. If the recovered mass differs from the injected mass by greater than the acceptable percentage(s) for HC and/or methanol, repeat the enclosure concentration measurement in step (E) and recalculate the initial recovered HC mass (M_{HCe1}) and/or methanol mass (M_{CH3OH1}). If the recovered mass based on the latest concentration measurement agrees within the acceptable percentage(s) of the injected mass, continue the test for the 24-hour temperature cycling period and substitute this second enclosure concentration measurement for C_{HCe2} and/or C_{CH3OH2} in all subsequent calculations. In order to be a valid calibration, the final measurement of C_{HCe2} and C_{CH3OH2} shall be completed within the 900-second time limit outlined above. If the discrepancy persists, the test shall be terminated and the cause of the difference determined, followed by the correction of the problems(s) and the restart of the test.

(G) At the completion of the 24-hour temperature cycling period, measure the final enclosure HC concentration (C_{HCe3}) and/or the final enclosure

methanol concentration (C_{CH3OH3}). For fixed-volume enclosures, measure the final pressure (P_3) and final temperature (T_3) in the enclosure.

For fixed volume enclosures, calculate the final recovered HC mass (M_{HCe2}) as follows:

$$M_{HCe2} = [3.05 \times V \times 10^{-4} \times (P_3 (C_{HCe3} - rC_{CH3OH3})/T_3 - P_1 (C_{HCe1} - rC_{CH3OH1})/T_1)] + M_{HC,out} - M_{HC,in}$$

Where:

V is the enclosure volume at 105°F (ft^3)
P_1 is the enclosure initial pressure (inches Hg absolute)
P_3 is the enclosure final pressure (inches Hg absolute)
C_{HCe3} is the enclosure HC concentration at the end of the 24-hour temperature cycling period (ppm C)
C_{CH3OH3} is the enclosure methanol concentration at the end of the 24-hour temperature cycling period, calculated according to 40 CFR §86.117-90 (d)(2)(iii) (ppm C)
r is the FID response factor to methanol
T_1 is the enclosure initial temperature (°R)
T_3 is the enclosure final temperature (°R)
$M_{HC,out}$ is mass of HC exiting the enclosure, (grams)
$M_{HC,in}$ is mass of HC entering the enclosure, (grams)

For variable volume enclosures, calculate the final recovered HC mass and final recovered methanol mass according to the equations used above except that P_3 and T_3 shall equal P_1 and T_1, and $M_{HC,out}$ and $M_{HC,in}$ shall equal zero.

Calculate the final recovered methanol mass (M_{CH3OH2}) according to 40 CFR §86.117-96(d)(1), as amended March 24, 1993.

(H) If the calculated final recovered HC mass for the enclosures is not within 3 percent of the initial enclosure mass, or if the calculated final recovered methanol mass for the enclosures is not within 6 percent of the initial enclosure mass, then action shall be required to correct the error to the acceptable level.

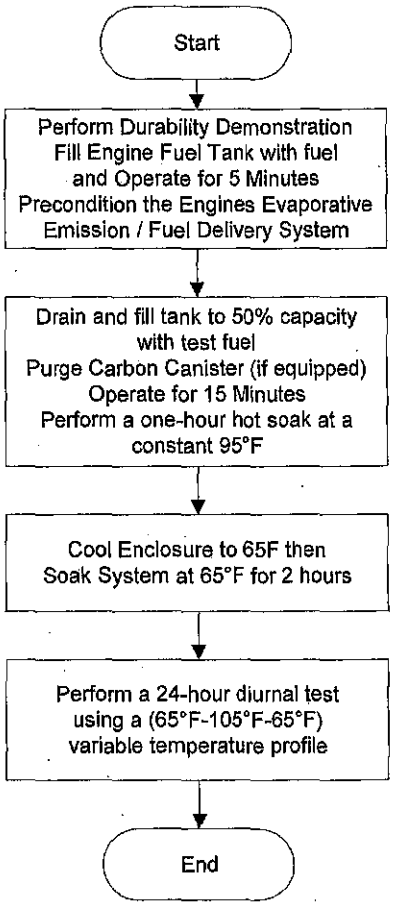
6. TEST PROCEDURE

The test sequence is shown graphically in Figure 1. Methanol measurements may be omitted when methanol-fueled equipment will not be tested in the evaporative enclosure. The temperatures monitored during testing shall be representative of those experienced by the equipment. The equipment shall be approximately level during all phases of the test sequence to prevent abnormal fuel distribution. The temperature tolerance of a soak period may be waived for up to 10 minutes to allow purging of the enclosure or transporting the equipment into the enclosure.

Testing a representative piece of equipment for each evaporative family and comparing the results to the appropriate performance standard determines compliance with requirements of CCR Title 13, Chapter 15, Article 1, Section 2754.

The 24-hour diurnal test sequence is shown in Figure 1.

Figure 1.



6.1 Fuel Tank / Fuel System Preconditioning

The purpose of the preconditioning period is to introduce gasoline into the fuel system and precondition all fuel system components. Precondition the tank and other fuel delivery system components by filling the tank to its nominal capacity with fresh test fuel as specified in Section 7 of these procedures. After filling the tank start the engine and allow it to run at rated speed (unloaded or blade load) for approximately five minutes. Soak the tank and other components at 30° C $\pm$ 10° C for not less than 140 days. Data documenting that the tank has reached equilibrium must be provided for tanks soaked less than 140 days. The period of slosh testing may be considered part of the preconditioning period provided each tank and all fuel system components tested remain filled with fuel and are never empty for more than one hour over the entire preconditioning period.

As an alternative, accelerated preconditioning of the tank and components can be accomplished by soaking both at an elevated temperature. Precondition the tank and other fuel delivery system components by filling the tank to its nominal capacity with fresh test fuel as specified in Section 7 of these procedures. After filling the tank start the engine and allow it to run at maximum governed speed (unloaded or blade load) for approximately five minutes. Begin soaking the tank and other components at 40° C $\pm$ 2° C. For engines with fuel tanks that have a nominal wall thickness of not greater than

0.15", soak the tank and all fuel system components for not less than 30 days. For engines with fuel tanks that have a nominal wall thickness of greater than 0.15" but less than or equal to 0.2", soak the tank and all fuel system components for not less than 60 days. For engines with fuel tanks that have a nominal wall thickness of greater than 0.2" data documenting that the tank and components have reached equilibrium must be provided for tanks soaked less than 140 days.

6.2 Refueling and Hot Soak

Following the preconditioning period, drain the fuel tank and refill to 50 percent of its nominal capacity with test fuel. For evaporative emission control systems that use a carbon canister, the canister must be purged following the preconditioning period but prior to initiating the hot soak test. Purging consists of drawing 400 bed volumes of nitrogen or dry air through the canister at the canister manufacturer's recommended purge rate. Operate the engine at its maximum governed speed for fifteen minutes. Immediately place the engine in the SHED enclosure preheated to 95°F. Perform a one-hour hot soak at a constant 95°F.

6.3 Forced Cooling

After the hot soak test, purge the enclosure to reduce the hydrocarbon concentration to background levels. Cool the enclosure to attain a wall temperature of 65°F. After cooling the enclosure to 65°F, soak the engine in the enclosure for two hours at 65°F.

6.4 24-Hour Diurnal Test

Immediately after soaking for two hours at 65°F, purge the enclosure to reduce the hydrocarbon concentration to background levels and perform a 24-hour diurnal test using the temperature profile shown in Table 6-1.

Table 6-1.
Diurnal Temperature Profile

Hour	0	1	2	3	4	5	6	7	8	9	10	11	12
(°F)	65.0	66.6	72.6	80.3	86.1	90.6	94.6	98.1	101.2	103.4	104.9	105.0	104.2
Hour	13	14	15	16	17	18	19	20	21	22	23	24	--
(°F)	101.1	95.3	88.8	84.4	80.8	77.8	75.3	72.0	70.0	68.2	66.5	65.0	--

6.5 Calculation of Mass of Diurnal Evaporative Emissions

The calculation of the mass of the diurnal evaporative emissions is as specified in Part III of the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles."

7. TEST FUEL

Evaporative emission test fuel is specified in Part II Section 100.3 of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles."

8. ALTERNATIVE TEST PROCEDURES

Test procedures, other than specified above, such as the use of a mini-SHED to measure diurnal evaporative emissions, shall only be used if prior written approval is obtained from the ARB Executive Officer. In order to secure the ARB Executive Officer's approval of an alternative test procedure, the applicant is responsible for demonstrating to the ARB Executive Officer's satisfaction that the alternative test procedure is equivalent to this test procedure.

(1) Documentation of any such approvals, demonstrations, and approvals shall be maintained by the ARB Executive Officer and shall be made available upon request.

(2) Once approved for use, an alternative test procedure may be used and referenced by any manufacturer subject to the limitations and constraints in the Executive Order approving the alternative test procedure.

9. REFERENCES

1. California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles, California Environmental Protection Agency, Air Resources Board, El Monte, CA, 2000.

2. California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles, California Environmental Protection Agency, Air Resources Board, El Monte, CA, 2002.

3. 40 CFR Part 86

Attachment 1 to TP-902

Procedure for Determining Carbon Canister Performance: Working Capacity

Attachment 1
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LIST OF FIGURES

Small Off-Road Engine Evaporative Emissions Test Procedure

Attachment 1

Procedure for
Determining Carbon Canister Performance:
Durability Demonstration and Working Capacity

A set of definitions common to all Certification and Test Procedures are in Title 13, California Code of Regulations (CCR), Section 2752 et seq.
For the purpose of this procedure, the term "CARB" refers to the California Air Resources Board, and the term "Executive Officer" refers to the CARB Executive Officer, or his or her authorized representative or designate.

1 APPLICABILITY

This Test Procedure is used by the Air Resources Board to determine the performance of carbon canisters used to control evaporative emission from equipment that use gasoline powered small off-road engines. Small off-road engines are defined in Title 13, California Code of Regulations (CCR), section 2401 et seq. This Test Procedure is proposed pursuant to Section 43824 of the California Health and Safety Code (CH&SC) and applies to engine or equipment manufacturers seeking an Executive Order for a evaporative control system utilizing a carbon canister.

1.1 Requirement to Comply with All Other Applicable Codes and Regulations

Approval of an evaporative emission control component, technology, or system by the Executive Officer does not exempt the same from compliance with other applicable codes and regulations such as state and federal safety codes and regulations.

1.2 Safety

This test procedure involves the use of flammable liquids and operations and should only be used by or under the supervision of those familiar and experienced in the use of such materials and operations. Appropriate safety precautions should be observed at all times while performing this test procedure.

2 PRINCIPLE AND SUMMARY OF TEST PROCEDURE

These test procedures are designed to provide consistent methods to evaluate the durability and working capacity of carbon canisters utilized on small engine powered equipment.

Working capacity is a defining parameter expressing the mass of hydrocarbons that can be stored in the canister under controlled conditions. The canister's working capacity is established by repeated canister loading and purging. This procedure involves a cycle that includes a 400 bed volume purge, a 5 minute pause, and then loading the canister with butane mixed 50/50 by volume with air or nitrogen to a measured breakthrough.

3 BIASES AND INTERFERENCES

To accurately quantify the working capacity the complete test system must be leak tight. Loose fittings and connectors may result in leaks that can significantly affect working capacity determinations.

Care should be taken to minimize or limit the humidity of the air or nitrogen used to purge the canister. Humid purge air can bias canister desorption weight measurements. Dryerite ($CaCl_2$), or other suitable dehumidification methods, must be used to control the humidity of the purge air.

4 SENSITIVITY AND RANGE

The minimum sensitivity of the balance must be selected using good engineering judgment.

5 EQUIPMENT CALIBRATIONS

Mass flow meters must undergo an annual multiple point calibration with a primary standard and have a R^2 coefficient of 0.99 or greater.

The top loading balance must be calibrated with ASTM Class I weights prior to use per the manufacturer specifications. Prior to use the balance must be challenged with weights above and below the range of mass measurements.

6 CARBON CANISTER WORKING CAPACITY DETERMINATION

6.1 Number of Test Cycles

Working capacity is determined through cyclic loading and purging of a carbon canister. Ten or more cycles may be required to stabilize new carbon. A minimum of three cycles is adequate if the carbon has a previous history of stabilization with butane or gasoline vapors. The "working capacity" value is the average of the butane mass supplied to the canister for last two repeatable cycles.

6. 2 Canister Purge

The sequence starts by first purging the canister with 400 bed volumes of dry air or nitrogen in 30 minutes at laboratory conditions. Bed volume is the design volume of the carbon contained in the canister. Purge for all the canister models is defined as a 400 bed volume purge in approximately 30 minutes. The purge rate will therefore vary with canister size. Purge may be accomplished by drawing a vacuum at the tank or purge port, or by pushing air or N2 into the atmospheric vent.

6.3 Pause

Pause testing for approximately 5 minutes between both purge and load and also load and purge sequences.

6.4 Measurement

Weigh the test canister before and after each canister load sequence.

6.5 Canister Load

Load the test canister with butane mixed 50/50 by volume with air or nitrogen until the specified breakthrough criteria has been met. The canister load is accomplished by flowing the butane mixture into the canister via the tank fitting. The butane load rates and breakthrough criteria are determined by canister's bed volume. In order to accommodate the expected wide range of canister bed volumes expected in the small engine powered equipment, four ranges of canister loading and breakthrough criteria are defined: small (< 99cc), medium (100 to 249cc) large (249 to 550cc) and extra large (> 550cc). The load and breakthrough criteria are defined as follows:

Carbon Canister Bed Volume	Small < 99cc	Medium 100 to 249cc	Large 249cc to 550	Extra Large >550
Butane Load Rate [grams C_4H_{10} / hour]	5.0	10.0	15.0	15.0
Break-through limit [grams](*)	2.0	2.0	2.0	2.0

(*). If the canister shows weight loss prior to the 2.0 grams breakthrough then an alternate lower breakthough limit can be used.

7 CALCULATING RESULTS

The working capacity is the average test canister weight gain in grams determined from the last two load cycles. The resultant working capacity is expressed in grams of C_4H_{10}

8 QUALITY ASSURANCE / QUALITY CONTROL (QA/QC)

This section is reserved for future specification.

9 RECORDING DATA

Record data on a form similar to the one shown in Figure 1 (see page 7).

10 FIGURES

Figure 1. Canister Data Sheet

Figure 1
Canister Data Sheet

Canister Manufacturer:

Canister I.D:

Tested By:

Canister Volume [cc]:

Canister Purge Data

Time Start/End		Duration [seconds]	Flow Rate Q [LPM]	Initial Weight W_i [grams]	Final Weight W_f [grams]	Weight Loss W_l [grams]

Canister Load Data

Time Start/End		Duration [seconds]	Butane Rate Q_b [g/hr]	Initial Weight W_i [grams]	Final Weight W_f [grams]	Break-Through W_b [grams]	Weight Gain W_g [grams]
					Working Capacity [grams C_4H_{10}]		

California Environmental Protection Agency

Air Resources Board

Small Off-Road Engine Evaporative Emission Control System Certification Procedure

CP - 901

Certification And Approval Procedure for Small Off-Road Engine Fuel Tanks

Adopted: July 26, 2004

CP-901
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California Environmental Protection Agency
Air Resources Board

Small Off-Road Engine Evaporative Emission Control System Certification Procedure

CP-901

Certification and Approval Procedure for Small Off-Road Engine Fuel Tanks

A set of definitions common to all Certification and Test Procedures are in Title 13, California Code of Regulations (CCR), Section 2752 et seq.

For the purpose of this procedure, the term "ARB" refers to the California Air Resources Board, and the term "Executive Officer" refers to the ARB Executive Officer, or his or her authorized representative or designate.

1. GENERAL INFORMATION AND APPLICABILITY

This document contains the procedures for evaluating and certifying fuel tanks used on equipment that use small off-road engines with displacements less than or equal to 80 cc. This Certification Procedure, CP-901, is proposed pursuant to Section 43824 of the California Health and Safety Code (CH&SC). Small off-road engines are defined in Title 13, California Code of Regulations (CCR), Section 2401 et seq.

1.1 Requirement to Comply with Applicable Codes and Regulations

Certification of any equipment fuel tank by the Executive Officer does not exempt the fuel tank from compliance with other applicable codes and regulations such as state and federal safety codes and regulations.

2. PERFORMANCE STANDARDS AND SPECIFICATIONS

2.1 Performance Standards

A performance standard defines the minimum performance requirements for an equipment fuel tank. Compliance with the performance standard must be demonstrated in order to obtain certification under these Certification Procedures. Title 13, CCR, Section 2755 identifies the performance standard and the affected model year.

3. OPTIONAL PERFORMANCE STANDARDS

Optional performance standards are emission targets that are more stringent than the normal performance standards. Manufacturers that certify equipment fuel tanks to these

optional standards are allowed to affix a unique label to their equipment, which identifies it as low polluting. Title 13, CCR, Section 2757 identifies the optional performance standards.

4. CERTIFICATION OVERVIEW

Fuel tanks of equipment that use spark ignited (SI) small off-road engines with displacements of less than or equal to 80 cc must be certified by the California Air Resources Board (ARB) to be legal for sale and use in California. Executive Orders certifying equipment fuel tanks to the maximum allowable permeation emissions performance standard are valid for only one model year of production. New Executive Orders in each subsequent model year must be obtained from ARB to be legal for sale and use in California. Selling equipment in California before receiving an ARB certification will subject the manufacturer and the selling dealers to ARB enforcement actions as authorized by state laws.

Manufacturers' that certify equipment fuel tanks under these procedures are required to submit test data that documents compliance with the maximum allowable permeation emissions performance standard. A manufacturer must submit permeation test data for every family for which certification is requested. The fuel tank selected for testing must be of a configuration and material composition such that it is expected to yield the highest permeation emissions within an engine family. The test procedures used to determine compliance with maximum allowable permeation emissions performance standard are described in TP-901, "Test Procedure for Determining Permeation Emissions from Small Off-Road Engine Equipment Fuel Tanks".

5. CERTIFICATION

5.1 Certification Process

5.1.1 Emission-Compliant Fuel Tanks: For each engine family, the equipment manufacturer must select and test an equipment fuel tank to show compliance with the maximum allowable permeation emissions performance standard. The equipment fuel tank selected must use the same method of permeation control and be constructed of the same material as specified in the certification application. In addition, the equipment fuel tank shall be selected such that the fuel tank is expected to exhibit worst-case emissions, (e.g., highest permeation emissions) of all the fuel tanks within the applicable engine family. A manufacturer may test its fuel tank with the most surface area for all evaporative families with the same material/process in all tank/exhaust families. These results may be used for all tanks in all other tank/exhaust families made of the same material/process. The ARB may direct the manufacturer to conduct a retest if the original test results indicate marginal (within 5% of the standard) compliance.

5.1.2 Application for Certification: As part of the exhaust emission certification application set forth in "California Exhaust Emission Standards and Test Procedures for 1995–2004 Small Off-Road Engines," adopted March 20, 1992, and last amended September 25, 2003, the manufacturer must submit to ARB information and permeation test data in the ARB-specified format. To expedite the certification approval, requests for ARB approval of anti-tampering devices,

labels, the emission warranty statement, and any modification to the test procedure should be submitted in advance of the application.

5.2 Certification Responsibilities

Under these procedures, equipment manufacturers are required to obtain ARB certification for small off-road engine equipment fuel tanks that are required to adhere to the maximum allowable permeation emissions performance standard and are held liable for complying with all of ARB's certification and emission warranty requirements.

5.3 Certification Testing

Prior to the time of production, the fuel tank selected for testing is durability tested and preconditioned as specified in TP-901 to stabilize the permeation emissions. An emission test is then conducted using TP-901 and the results submitted to ARB as part of the certification application. If, after review of the application for certification including all test data submitted by the manufacturer and any other pertinent data or information the Executive Officer determines is necessary, the Executive Officer determines that the application has satisfied the conditions set forth in these procedures, the Executive Officer may approve the application and issue an Executive Order.

5.4 Data Carryover and Carryacross

Subject to ARB approval, the certification permeation emissions data may be carried over, in lieu of new tests, to similar fuel tanks in other engine families in following model years, provided there have been no changes to the equipment fuel tank that could affect the overall permeation emissions. Similar fuel tanks must be manufactured using the same manufacturing process, be of a volume no greater than the certified tank, and use identical materials and additives. Also, subject to ARB approval, the permeation emissions data may be carried across, in lieu of new tests, to a different engine family in the same model year if similar tanks as defined above are used.

6. GENERAL INSTRUCTIONS – FUEL TANK CERTIFICATION

These instructions provide guidance regarding the preparation, submission, and revision of small off-road engine fuel tank certification applications. Only information essential for certification is required in this format. Other information required by the test procedures (e.g., test equipment build records, test and maintenance records, etc.) must be maintained by the manufacturer and made available to the ARB within **30 days** upon request. An application submitted in accordance with these instructions will enable an expedited review by the ARB. Manufacturers must submit all revisions to the application to the ARB for approval. This section covers the following subject matter:

- Where To Submit Applications for Certification
- Letter of Intent (LOI)
- Cover Letter
- Equipment Labeling
- Test Procedure
- Modified Test Procedures
- Certification Test Fuels
- Amendments to the Application

- Running Changes and Field Fixes
- Confidentiality

6.1 Where to Submit Applications For Certification

All certification-related applications and correspondence should be forwarded to:

Mobile Source Operations Division
Air Resources Board
9480 Telstar Avenue, Suite 4
El Monte, California 91731-2988
Attn: Division Chief

6.2 Letter of Intent (LOI)

As part of the exhaust emission certification application set forth in "California Exhaust Emission Standards and Test Procedures for 1995-2004 Small Off-Road Engines," adopted March 20, 1992, and last amended September 25, 2003, a manufacturer shall include information regarding the application for certification for the model-year. This additional information should list planned engine families and the projected dates when the applications will be submitted. The manufacturer's phase-in compliance plan for the Model Year should also be included. Any certification or testing issues that could delay the certification process of any fuel tank may be included in the exhaust emission certification application. Any updates to the manufacturer's certification plan should be submitted in a timely manner. Manufacturers can combine the exhaust and evaporative Letter of Intent together.

6.3 Cover Letter

As part of the exhaust emission certification application set forth in "California Exhaust Emission Standards and Test Procedures for 1995-2004 Small Off-Road Engines," adopted March 20, 1992, and last amended September 25, 2003, a cover letter, signed by the manufacturer's authorized representative, must accompany each application. The cover letter should recap highlights about the equipment fuel tank and the engine family, such as its new or carry-over test data status, the use of a new emission control technology, the use of a modified test procedure, or the anticipated start date of production.

6.4 Equipment Labeling

The permeation emissions certification label is an important ARB requirement for identifying certified and legal equipment from those uncertified. The labels are used to assist enforcement activities. The permeation emissions certification label may be integrated with the exhaust emission label and must include an unconditional statement of conformance with the maximum allowable permeation standard and uniquely identify the manufacturer and the engine displacement.

Manufacturers are required to submit samples of the permeation emissions certification labels (or drawings) for each evaporative family to ARB for review and approval of the format, content and placement location. The ARB retains the right to request actual labels on a case by case basis. Labels must be readily legible and visible on the engine

per Title13 CCR Article 1, Section 2404. The proposed location(s) must be shown by either a drawing or photograph. Detailed written explanations of the label locations are also acceptable. Label samples and proposed label locations may be submitted to ARB for approval in advance of the actual certification application to prevent any certification delay.

6.5 Test Procedures

The test procedures used to determine compliance with the Performance Standards, including equipment provisions and emission test procedures, are specified in TP-901, Test Procedure for Determining Permeation Emissions from Small Off-Road Engine Equipment Fuel Tanks, adopted September 25, 2003.

6.6 Modified Test Procedures

Any modifications to the prescribed test equipment and/or test procedure due to unique equipment fuel tank designs, laboratory equipment arrangements, facility limitations, etc. must be approved in advance by the Executive Officer and described in the certification application. The use of unapproved test equipment or procedures may result in rejection of generated test data by the Executive Officer.

6.7 Certification Test Fuel

The fuel for emission testing must meet the specifications in the test procedure to reduce emission variations. Testing with unauthorized fuel will result in rejection of the test results. The allowable test fuel specified in TP-901 is Phase II California Reformulated Certification (CERT) or Indolene Clear. The specifications of this certification gasoline are provided in "California Exhaust Emission Standards and Test Procedures For 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles", (Reference #3, Part II, Section 100.3.1).

6.8 Amendments to the Application

Any revisions to an application due to typographical errors, corrections, running changes or field fixes, new test data, or additional information must be submitted to ARB. If the changes affect the Certification Summary, the entire application shall be resubmitted to ARB. For the other parts of the application, only the revised information on the affected application pages must be submitted, together with the following for identification purposes:

- Manufacturer Name
- Model Year
- Engine Family
- Process Code (e.g., correction, running change)
- Engine Displacement
- Comments Field (describing the update or change)
- The fields that have been changed or corrected.

6.9 Running Changes and Field-Fixes

Any factory change to an equipment fuel tank during the model-year production that

could potentially affect the permeation emissions must be approved by ARB via a manufacturer's submitted running change request. In addition, any post assembly line change to an equipment fuel tank (e.g., at factory warehouses, distribution centers, dealers) must be approved by ARB via a manufacturer's submitted field fix request. A field fix request typically occurs after the model-year production has ended. Running changes and field fixes not approved by ARB will render any affected engine family uncertified and subject the manufacturer to ARB enforcement actions. If the change affects the permeation emissions or results in a new worst-case emissions equipment fuel tank, new test data will be required to demonstrate that the engine family will remain in compliance and a new certification application must be submitted. If the change does not affect the permeation emissions or result in a new worst-case engine family fuel tank, only the affected pages and information fields of the certification application need to be submitted.

6.10 Confidentiality

Any information that is designated by the manufacturer as confidential may not receive automatic treatment for confidentiality unless the manufacturer can justify that the information is truly privileged, confidential business information. California guidelines (Sections 91000-91002, Title 17, California Code of Regulations, and Health and Safety Code Section 39660(e)) will be followed in the handling of confidential information.

6.11 Summary of Certification Process

The applicant shall prepare a summary of the certification process for each certified engine family fuel tank. It shall contain documentation of the successful completion of all applicable portions of the requirements contained in this Certification Procedure including but not limited to the following:

- All problems encountered throughout the certification process,
- The types of testing performed, and
- The frequency and/or duration of any testing, as appropriate.

Any other pertinent information about the evaluation process shall be contained in the summary.

7. APPLICATION FORMAT INSTRUCTIONS

For information regarding the format of the certification application please see the exhaust emission certification application set forth in "California Exhaust Emission Standards and Test Procedures for 1995-2004 Small Off-Road Engines," adopted March 20, 1992, and last amended September 25, 2003.

8. DOCUMENTATION OF CERTIFICATION

Documentation of certification shall be in the form of an Executive Order.

The certification Executive Order shall include, at a minimum, the following items.

- A list of approved engines/model(s) under the engine family.
- Applicable Performance Standard and Test Procedures.

- Applicable Operating Parameters and Limitations.
- Tank Volume and Internal Surface Area
- Tank Material (Resin and Additives)
- Tank Treatment Type
- Unique Properties
- Warranty period(s).
- Factory testing requirements, if applicable.

9. CONDITIONS OF CERTIFICATION

Equipment fuel tank certifications shall specify the duration and conditions by which the certification is issued and include a list of all engine or equipment models covered by the certification.

9.1 Duration of System Certification

Equipment fuel tanks shall be certified for a period of one model-year.

9.2 Performance Monitoring

During the certification period, any deficiencies identified through complaint investigations, certification or compliance tests, etc., shall be noted in the performance section of the certification file and brought to the attention of the equipment manufacturer. If the deficiencies result in emissions in excess of the applicable standard, the manufacturer may be subject to remedial actions that are accepted and approved by ARB.

10. APPROVAL OF APPLICATION FOR CERTIFICATION

The Executive Officer shall certify only those equipment fuel tanks that can be expected to comply with the performance standard.

After a review of the complete application for certification and any other information that the Executive Officer requires, the Executive Officer will approve the application for certification if all the foregoing conditions are satisfied.

REFERENCES

1. Title 13, California Code of Regulations, (13 CCR) Sections 2400,2401, and 2752.

2. California Exhaust Emission Standards and Test Procedures For 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles, California Environmental Protection Agency, Air Resources Board, El Monte CA, 2000.

3. California Exhaust Emission Standards and Test Procedures for 1995-2004 Small Off-Road Engines, California Environmental Protection Agency, Air Resources Board, El Monte CA, 2003.

4. Test Procedure for Determining Permeation Emissions from Small Off-Road Engine Equipment Fuel Tanks, TP-901, California Environmental Protection Agency, Air Resources Board, Sacramento, CA, 2002.

California Environmental Protection Agency

Air Resources Board

Small Off-Road Engine Evaporative Emission Control System Certification Procedure

CP - 902

Certification And Approval Procedure for Evaporative Emission Control Systems

Adopted: July 26, 2004

CP-902
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California Environmental Protection Agency
Air Resources Board

Small Off-Road Engine Evaporative Emission Control System Certification Procedures

CP-902

Certification and Approval Procedures for Evaporative Emission Control Systems

A set of definitions common to all Certification and Test Procedures are in Title 13, California Code of Regulations (CCR), Section 2752 et seq.

For the purpose of this procedure, the term "ARB" refers to the California Air Resources Board, and the term "Executive Officer" refers to the ARB Executive Officer, or his or her authorized representative or designate.

1. GENERAL INFORMATION AND APPLICABILITY

This document describes the procedures for evaluating and certifying evaporative emission control systems on small off-road engines > 80 cc or equipment that use small off-road engines > 80 cc. By definition, evaporative emission control systems are fuel system components that are designed to reduce evaporative and permeation emissions. Fuel system components may include fuel tanks, fuel lines and any or all associated fittings, mechanisms to control fuel tank venting, tethered fuel caps, and any other equipment, components, or technology necessary for the control of evaporative and permeation emissions.

These Certification Procedures, CP-902, are proposed pursuant to Section 43824 of the California Health and Safety Code (CH&SC) and describe the process required to certify evaporative emission control systems on small off-road engines (SORE) or equipment that use small off-road engines to evaporative emission performance standards. Small off-road engines are defined in Title 13, California Code of Regulations (CCR), Section 2401 et seq.

1.1 Requirement to Comply with Applicable Codes and Regulations

Certification of any evaporative emission control system by the Executive Officer does not exempt the same from compliance with other applicable codes and regulations such as state and federal safety codes and regulations.

2. PERFORMANCE STANDARDS, SPECIFICATIONS, AND DESIGN STANDARDS

2.1 Performance Standards

A performance standard defines the minimum performance requirements for certification of an evaporative emission control system, including any or all associated components. Compliance with all applicable performance standards must be demonstrated in order to

obtain certification as described in these procedures. Title 13, CCR, Section 2754 identifies the performance standards and the affected model years.

2.2 Performance Specifications

A performance specification is an engineering requirement that relates to the proper operation of a specific system or component used in a small off-road engine evaporative emission control system. Performance specifications shall be identified in the application for certification. Compliance with the minimum level of performance specifications identified herein must be demonstrated in the application for certification and specified in the certification Executive Orders. The performance specification to which a system or component is certified shall be the minimum allowable level of performance the evaporative emission control system is required to meet.

2.3 Design Requirements

A design requirement is an engineering specification that sets the minimum performance requirement for a component. Setting design requirements for specific evaporative emission control system components is intended to control evaporative emissions from complete engines or equipment.

3. OPTIONAL PERFORMANCE STANDARDS

Optional performance standards are emission targets that are more stringent than the normal performance standards. Manufacturers that certify to these optional standards are allowed to affix a unique label to their engines or equipment that identifies them as low polluting. Title 13, CCR, Section 2757 identifies the optional performance standards.

4. CERTIFICATION OVERVIEW

For certification purposes, small off-road engines (SORE) are grouped into three categories. The first category includes all walk-behind mowers with displacements greater than 80 cc to less than 225 cc. The second includes all other SI engines with displacements greater than 80 cc to less than 225 cc. The third and final category includes SI engines with displacements greater than or equal to 225 cc. Executive Orders certifying the evaporative emission control system on engines or equipment are valid for only one model-year of production. New Executive Orders in each subsequent model year must be obtained from ARB for any small off-road engine or equipment subject to any of the performance standards or design requirements prescribed herein.

Evaporative emission control systems may be grouped into evaporative families for certification and other implementation purposes (e.g., testing, recall). An evaporative family includes engine or equipment models that share similar fuel systems, engine designs, and emission control features such that the equipment can be expected to exhibit similar evaporative emission characteristics. Attachment 1 of these procedures defines the classification criteria and codes for determining evaporative families. Any engine certified as a complete (both exhaust and evaporative emissions) unit can be certified using one common exhaust and evaporative family name. At the manufacturers option, the two letters identifying the evaporative control system can be part of the family name or be placed elsewhere on the emission label.

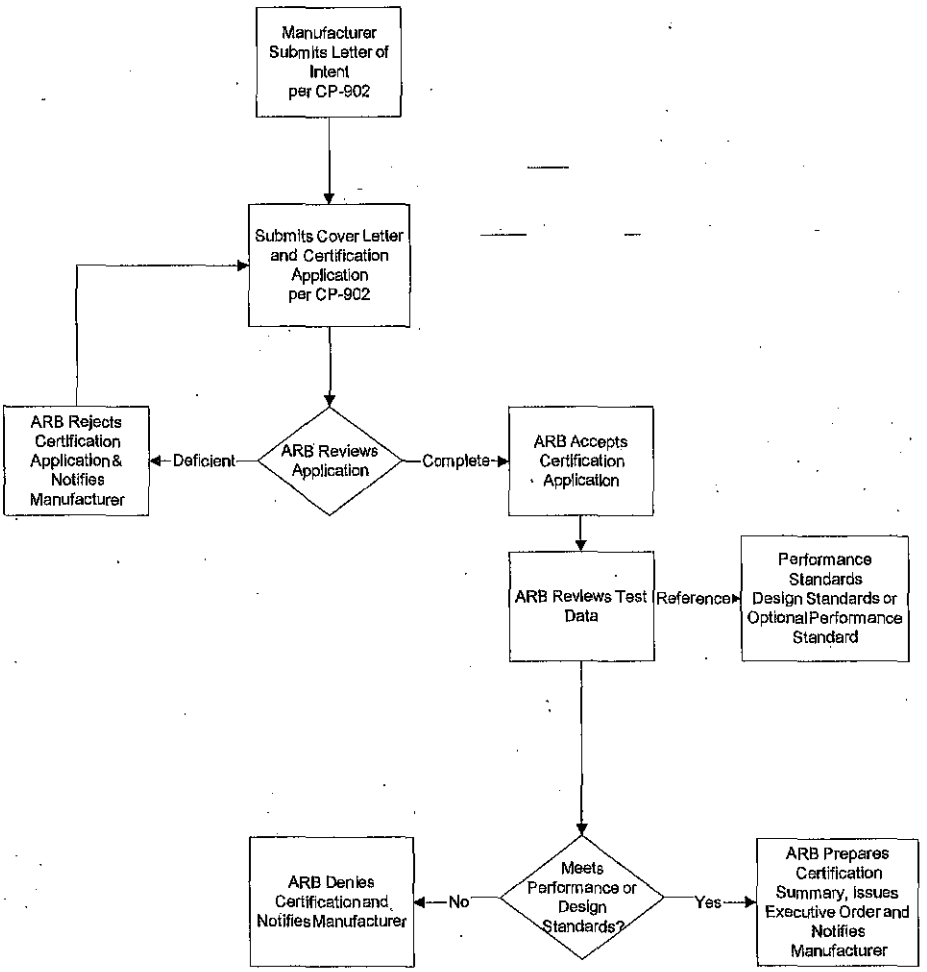
Manufacturers that certify evaporative emission control systems under these procedures are required to submit test data that documents compliance with the applicable diurnal evaporative emission standard. Manufacturers certifying to diurnal evaporative emission standards must test a minimum of one engine model or equipment for every evaporative family for which certification is requested. The engine or equipment selected for testing must be of a configuration that is expected to yield the highest evaporative emissions within an evaporative family. The test procedures used to determine compliance with applicable diurnal evaporative emission standards are described in TP-902, "Test Procedure for Determining Diurnal Evaporative Emissions from Small Off-Road Engines".

Manufacturers certifying to the design standards in 13 CCR Section 2754(b) must provide test data for each component on the test engine or equipment selected for each evaporative family. Alternatively, manufacturers can submit the Executive Order number approving the component per 13 CCR section 2767.1 in lieu of component test data. Evaporative system components on the test engine or equipment must be tested per the applicable test procedure. The model year test engine or equipment selected for testing must be of a configuration that is expected to yield the highest evaporative emissions within an evaporative family.

Figure I provides a graphic overview of the certification process.

Figure I

Evaporative Emission Control System Certification Process



5. CERTIFICATION OF ENGINES AND EQUIPMENT

5.1 Certification Process

5.1.1 Certifying Emission-Compliant Engines and/or Equipment to 13 CCR Section 2754: For each evaporative family, the manufacturer must select and test a certification engine or equipment. The certification engine or equipment must contain a complete and functional evaporative emission control system. The system shall include all emission control systems and components that are specified in the certification application. The official certification engine or equipment is one that has been selected and stabilized as to show compliance with the appropriate diurnal evaporative emission performance standard. In addition, the evaporative family test engine or equipment shall be selected such that the evaporative emission control system is expected to exhibit worst-case emissions, (e.g., highest diurnal evaporative emissions) of all engines or equipment within the evaporative family.

Manufacturers certifying to the design standards in 13 CCR Section 2754(b) must provide test data for the fuel line permeation, fuel tank permeation, and canister on the test engine or equipment selected for each evaporative family. Evaporative system components on the test engine or equipment must be tested per the applicable test procedure. Alternatively, manufacturers can submit the Executive Order number approving the component per 13 CCR section 2767.1 in lieu of component test data.

The ARB may direct the manufacturer to conduct a retest if the original test results indicate marginal (within 5% of the standard) compliance. The retest must be performed on the same engine and/or equipment that generated the original test results. The retest may be performed omitting the preconditioning and durability portions of the test procedure if the test engine or equipment has continuously contained fuel subsequent to the original test. Any anti-tampering devices that will be installed on production engines for protection against unauthorized adjustments of emission-related adjustable parameters must be approved by ARB. The manufacturer's format for the certification label and the location where the label is affixed to the production engine must be approved by the ARB. The manufacturer's emission warranty statement provided with each production engine must also be approved by ARB.

5.1.2 Application for Certification: For each evaporative family, the manufacturer must submit to ARB an application for certification containing all the required information and/or test data in the ARB-specified format. The ARB is required to approve or disapprove an application within **90 days** after receipt of the complete application. The normal processing time is about 4-6 weeks. To expedite the certification approval, requests for ARB approval of anti-tampering devices, labels, the emission warranty statement, and any modification to the test procedure should be submitted in advance of the application.

5.2 Certification Responsibilities

Under these procedures, manufacturers are required to obtain ARB certification for evaporative emission control systems on small off-road engines or equipment that use small off-road engines. Manufacturers applying for certification are held liable for complying with all of ARB's certification and emission warranty requirements.

5.3 Certification Testing

Prior to the time of production, an evaporative family test engine or equipment is durability tested and preconditioned as specified in TP-902 to stabilize the evaporative and permeation emissions. An emission test is then conducted using TP-902 and the results submitted to ARB as part of the certification application. If, after review of the application for certification including all test data submitted by the manufacturer, and any other pertinent data or information the Executive Officer determines is necessary, the Executive Officer determines that the application has satisfied the conditions set forth in these procedures, the Executive Officer may approve the application and issue an Executive Order.

5.4 Data Carryover and Carryacross

Subject to approval by the Executive Officer, certification test data of an evaporative family test engine or equipment may be carried over, in lieu of new tests, to subsequent evaporative families in following model years, provided there have been no changes to the evaporative emission control system or to any evaporative emission control system component(s). Also, subject to ARB approval, the certification test data of an evaporative family certification engine or equipment may be carried across, in lieu of new tests, to a different evaporative family in the same model year if the manufacturer adequately demonstrates to the satisfaction of the ARB that the emission data is representative of the new evaporative family.

6. CERTIFICATION OF EVAPORATIVE EMISSION CONTROL SYSTEMS

6.1 Certification Options

There are two options for certifying evaporative emission control systems. They are:

- Option one allows an engine manufacturer to certify a complete evaporative emission control system installed on a small off-road engine.
- Option two allows an equipment manufacturer to certify a complete evaporative emission control system installed on equipment that uses a small off-road engine.

Option one is intended for engine manufacturers that sell engines with complete evaporative emission control systems.

Option two is intended for equipment manufacturers that purchase engines without evaporative emission control systems. In this case, equipment manufacturers independently install and certify complete evaporative emission control systems on equipment they intend to sell.

6.2 Evaporative Emission Control System Modifications

The evaporative emission control system components used to certify the system are defined as nominal components. Modification to the evaporative emission control system's fuel tank and/or fuel line is allowed without affecting the original certification of the engine or equipment only in cases where the fuel tank and/or fuel line are equivalent to the nominal fuel tank and/or fuel line, or as approved by the Executive Officer.

7. GENERAL INSTRUCTIONS – EVAPORATIVE EMISSION CERTIFICATION

These instructions provide guidance regarding the preparation, submission and revision of small off-road engine evaporative emission certification applications for 2007 and subsequent model year small off-road engines. Only information essential for certification is required in this format. Other information required by the test procedures (e.g., test equipment build records, test and maintenance records, etc.) must be maintained by the manufacturer and made available to the ARB within **30 days** upon request. An application submitted in accordance with these instructions would enable an expedited review and approval by the ARB. Manufacturers must submit all revisions to the application to the ARB for approval. This Section covers the following subject matter:

- Where To Submit Applications for Certification
- Letter of Intent (LOI)
- Cover Letter
- Engine Labeling
- Engineering Description of Evaporative Emission System
- Certification Summary Sheet
- Certification Database Form (Paper and/or electronic copies)
- Emission Warranty
- Test Procedures
- Modified Test Procedures
- Nominal Fuel Tank and/or Fuel Line (if applicable)
- Adjustable Parameters and Anti-Tampering Devices
- Certification Test Fuels
- Amendments to the Application
- Running Changes and Field Fixes
- Confidentiality
- Summary of Certification Process

7.1 Where To Submit Applications For Certification

All certification-related applications and correspondence should be forwarded to:

Mobile Source Operations Division
Air Resources Board
9480 Telstar Avenue, Suite 4
El Monte, California 91731-2988
Attn: Division Chief

7.2 Letter of Intent (LOI)

ARB staff uses the information provided in the LOI to plan ahead for the certification year and to resolve issues in advance so that manufacturers' anticipated certification schedules can be met. A LOI should be submitted to the ARB at least 30 days prior to the first application for certification for the model-year. The LOI should list planned evaporative families and the projected dates when the applications will be submitted. The manufacturer's phase-in compliance plan for the Model Year should also be included in the LOI. Any certification or testing issues that could delay the certification process of any evaporative family may be included in the LOI. Any updates to the manufacturer's certification plan should be submitted in a timely manner.

7.3 Cover Letter

A cover letter, signed by the manufacturer's authorized representative, must accompany each evaporative family application. The cover letter should recap highlights about the evaporative family, such as its new or carry-over test data status, the use of a new emission control technology, the use of a modified test procedure, or the anticipated start date of production. The cover letter can combine cover letter information and submission with exhaust certification. The following statements of compliance must be provided in the letter:

- Conformance with the general standards regarding an increase in emissions and unsafe conditions as required by Section 5 of the "California Exhaust Emission Standards and Test Procedures for 1995 and Later Small Off-Road Engines", adopted March 20, 1992, and amended March 26, 1998.

- Conformance with the specifications for the emission control label per 13 CCR, Section 2759.

7.4 Equipment Labeling

The evaporative emission certification label is an important ARB requirement for identifying certified and legal equipment from those uncertified. The labels are used to assist enforcement activities. The evaporative emission certification label may be integrated with the exhaust emission label and must include an unconditional statement of conformance with applicable standards. Labeling requirements are specified in 13 CCR, Section 2759.

Manufacturers are required to submit samples of the evaporative emission certification labels (or drawings) for each evaporative family to ARB for review and approval of the format, content and placement location. The ARB retains the right to request actual labels on a case by case basis. The proposed location(s) must be shown by either a drawing or photograph. Detailed written explanations of the label locations are also acceptable. Label samples and proposed label locations may be submitted to ARB for approval in advance of the actual certification application to prevent any certification delay.

7.5 Engineering Description of Evaporative Emission System

An engineering description of the technology used to control evaporative emission. The description should include the method used to control running loss emissions.

7.6 Certification Summary Sheet (A sample is provided as Attachment 2)

7.7 Certification Database Form (A sample is provided as Attachment 3)

7.8 Emission Warranty

A copy of the manufacturer's emission warranty statement for the small off-road engine evaporative emission control system and/or components must be submitted for ARB review and approval. The warranty requirements are specified in 13 CCR, Section 2760.

7.9 Test Procedures

The test procedures used to determine compliance with the Performance Standards, or Design Standards, including equipment provisions and emission test procedures, are specified in TP-901, Test Procedure for Determining Permeation Emissions from Small Off-Road Engine, adopted July 26, 2004, TP-902, Test Procedure for Determining Diurnal Evaporative Emissions from Small Off-Road Engines, adopted July 26, 2004, and in 13 CCR section 2752(a)(6).

7.10 Modified Test Procedures

Any modifications to the prescribed test equipment and/or test procedures due to unique engine designs, laboratory equipment arrangements, facility limitations, etc. must be approved in advance by the Executive Officer and described in the certification application. The use of unapproved test equipment or procedures may result in rejection of generated test data by the Executive Officer.

7.11 Adjustable Parameters and Anti-Tampering Devices

A manufacturer shall utilize good engineering practice to prevent unauthorized or in-use adjustments of any adjustable parameter of an evaporative emission control system. These may include the use of anti-tampering devices. Samples of a manufacturer's proposed anti-tampering measure to prevent unauthorized or in-use adjustments or other such devices, should be submitted in advance of the application to ARB for approval. In-use adjustments of adjustable parameters of an evaporative emission control system are allowed if the adjustments do not invalidate a system's compliance. All adjustable parameters and the corresponding ARB approval number must be reported in the application. If the parameter or method of tamper-resistance is subsequently modified, a new ARB approval will be required.

7.12 Certification Test Fuels

The fuel for emission testing must meet the specifications in the test procedures to reduce emission variations. Testing with unauthorized fuel will result in rejection of the test results. The allowable test fuels are the same as the allowable test fuels for on-road cars and light-duty vehicles (Reference 3). The test fuel specifications are listed here for manufacturer's convenience.

Gasoline. Two test fuels are allowed:

(i) Indolene Clear. This certification gasoline is specified in the Code of Federal Regulations, Title 40, Part 86, Section 113-94(a)(1). [40 CFR 86.113-94(a)(1)].

(ii) California Phase 2 Gasoline (Cleaner Burning Gasoline). The specifications of this certification gasoline are provided in "California Exhaust Emission Standards and Test Procedures For 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles", (Reference #3, Part II, Section 100.3.1). This gasoline may be used as an option to Indolene Clear.

7.13 Amendments to the Application

Any revisions to an application due to typographical errors, corrections, running changes or field fixes, new test data, or additional information must be submitted to ARB. If the changes affect the Certification Summary, the entire application or only those pages affected shall be resubmitted to ARB. For the other parts of the application, only the revised information on the affected application pages must be submitted, together with the following for identification purposes as applicable:

- Manufacturer Name
- Model Year
- Evaporative Family
- Engine Family
- Process Code (e.g., correction, running change)
- Engine Displacement
- Comments Field (describing the update or change)
- The fields that have been changed or corrected.

7.14 Running Changes and Field-Fixes

Any factory change to an evaporative family during the model-year production that could potentially affect the evaporative emissions must be approved by ARB via a manufacturer's submitted running change request. In addition, any post assembly line change that could potentially affect the evaporative emissions (e.g., at factory warehouses, distribution centers, dealers) must be approved by ARB via a manufacturer's submitted field fix request; a field fix request typically occurs after the model-year production has ended. Running changes and field fixes not approved by ARB will render an affected evaporative family uncertified and subject the manufacturer to ARB enforcement actions. If the change affects an emission-related part or results in a new evaporative family test engine or equipment, new test data and engineering evaluations will be required to demonstrate that the evaporative family will remain in compliance and a new certification application must be submitted. If the change does not result in a new evaporative family test engine or equipment, only the affected pages and information fields of the certification application need to be submitted.

7.15 Confidentiality

Any other information that is designated by the manufacturer as confidential may not receive automatic treatment for confidentiality unless the manufacturer can justify that the information is truly privileged, confidential business information. California guidelines (Sections 91000-91002, Title 17, California Code of Regulations, and Health and Safety Code Section 39660(e)) will be followed in the handling of confidential information.

7.16 Summary of Certification Process

The applicant shall prepare a summary of the certification process for each certified evaporative family. It shall contain documentation of the successful completion of all applicable portions of the requirements contained in this Certification Procedure including but not limited to the following:

- All problems encountered throughout the certification process,
- The types of testing performed, and
- The frequency and/or duration of any testing, as appropriate.

Any other pertinent information about the evaluation process shall be contained in the summary.

8. APPLICATION FORMAT INSTRUCTIONS

For information regarding the format of the certification application please see Attachment 2.

9. DOCUMENTATION OF CERTIFICATION

Documentation of certification shall be in the form of an Executive Order.

The certification Executive Order shall include, at a minimum, the following items.

- A list of approved engines or equipment model(s) under the evaporative family.
- A list of components certified for use with the evaporative family including component specifications.
- Applicable Performance Standards, Performance Specifications, Design Standards, and Test Procedures.
- Applicable Operating Parameters and Limitations.
- Warranty period(s).
- Factory testing requirements, if applicable.

10. CONDITIONS OF CERTIFICATION

Evaporative family certifications shall specify the duration and conditions by which the certification is issued and include a list of all engine or equipment models covered by the certification.

10.1 Duration of System Certification

Evaporative families shall be certified for a period of one model-year.

10.2 Performance Monitoring

During the certification period, any deficiencies identified through complaint investigations, certification or compliance tests, etc., shall be noted in the performance section of the certification file and brought to the attention of the engine or equipment manufacturer. If the deficiencies result in emissions in excess of the applicable standard, the manufacturer may be subject to remedial actions that are accepted and approved by ARB.

11. APPROVAL OF APPLICATION FOR CERTIFICATION

The Executive Officer shall certify only those evaporative families that can be expected to comply with the performance standards.

After a review of the complete application for certification and any other information that the Executive Officer requires, the Executive Officer will approve the application for certification if all the foregoing conditions are satisfied.

REFERENCES

1. Title 13, California Code of Regulations, (13 CCR) Section 2400.

2. 13 CCR, Sections 2401 and 2752.

3. California Exhaust Emission Standards and Test Procedures For 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles, California Environmental Protection Agency, Air Resources Board, El Monte CA, 2000.

4. California Exhaust Emission Standards and Test Procedures for 1995 and Later Small Off-Road Engines, California Environmental Protection Agency, Air Resources Board, El Monte CA, 1998.

5. Test Procedure for Determining Permeation Emissions from Small Off-Road Engine Equipment Fuel Tanks, TP-901, California Environmental Protection Agency, Air Resources Board, Sacramento, CA, 2003.

6. Test Procedure for Determining Diurnal Evaporative Emissions from Small Off-Road Engines, TP-902, California Environmental Protection Agency, Air Resources Board, Sacramento, CA, 2003.

7. SAE J1737, Test Procedure to Determine Hydrocarbon Losses from Fuel Tubes, Hoses, Fittings, and Fuel Line Assemblies by Recirculation, Issued August 1997

8. Title 40, Code of Federal Regulations, Part 86

Attachment 1
SORE Evaporative Family Classification Criteria

Venting Control		*Tank Barrier*	
Type	Code	Type	Code
Canister	C	Metal	M
Sealed Tank	S	Treated	P
		HDPE or PE	
		Coextruded	C
		Selar	L
		Nylon	N
		Acetal	A
Other	O	Other	O

Manufacturers must group their equipment into evaporative families based on the above criteria and coding.

For example:

A 2006 model year mower with the following characteristics:

- sealed tank venting control system
- fluorinated HDPE fuel tank

The evaporative family code would be "SP".

An equipment manufacturer must list all the models of equipment they produce into distinct evaporative families. Equipment models falling under a particular evaporative family code may be certified or approved with one application.

Attachment 2
SMALL OFF-ROAD EQUIPMENT CERTIFICATION
Certification Summary Sheet

Model Year: **Application Type:**
Manufacturer: **Executive Order:**
Evaporative Family Name:
Engine families within the evaporative family above:

Certification for Diurnal Emissions:
a) New Testing? _____ if carry over/carry across, from evaporative family:_____
b) Test Engine or Equipment Model: _____ Test Equipment ID: _____
c) Test Fuel: _____
d) Running Loss Vented Emissions Controlled (yes/no):
e) Test Procedure: _____
f) Declared Evaporative Family Emissions Limit Differential (EFELD) in grams HC/day:

Special Test Equipment

For Systems Certified to Performance Standards

Test No. And Type (Certification CTG or Confirmatory RTG)	Official 24-Hour Diurnal Test Results, g/day	
	Certification Test Result (g/day)	Standard (g/day)

For Systems Certified by Design

	Official Design Declaration	
	Measured Design Value or Executive Order Number	Regulatory Design Requirement
Fuel Hose Permeation		
Fuel Tank Permeation		
Carbon Canister Butane Working Capacity		

Remarks:

Equipment Types e.g. Walk-Behind Mowers, Lawn Tractors etc.:

Processed By: Date Processed Reviewed By: Date Reviewed:

Attachment 3
Certification Database Form
(Supplementary Information)

S1. MODEL SUMMARY (Use an asterisk (*) to identify "worst-case" equipment model used for certification testing.)

S2. Engine or Equipment Model	S3. Sales Codes (Check all appropriate)			S4. Engine Class (I or II)	S5. Fuel System (FI or Carb)	S6. Fuel Tank Vol. (liters)	S7. Fuel Tank Internal Surf. Area (m^2)	S8. Fuel Line Type	S9. Fuel Line Length (mm)	S10. Fuel Line Inside Dia. (mm)
	Calif. Only	49-State	50-State							

S11. LABELING:

Evaporative emission label format approved? No____ Yes ___ If yes, reference approval:_____

Sample label attached? No____ Yes (put label in #S13)____

S12. WARRANTY: Evaporative emission warranty approved? No___ (Provide full warranty statement in #S15)

Yes ___ (Reference approval: _____)

Have any changes been made since the last approval? No____ Yes ____ If yes, provide an explanation of the changes:

_____

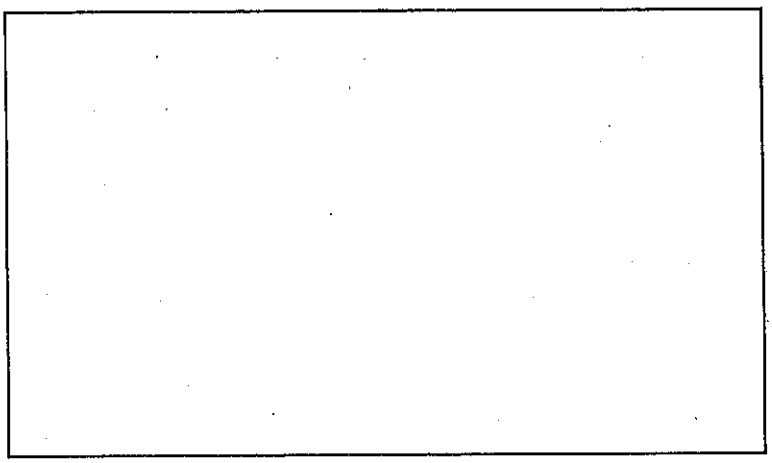
_____

_____

_____

_____

S13. EVAPORATIVE EMISSION LABEL INFORMATION



S14. ADJUSTABLE PARAMETERS AND ANTI-TAMPERING MEASURES

Parameter	Adjustable Range (or N/A)	Tamper Resistance Method (or N/A)	Approval Reference

S15. EVAPORATIVE EMISSION WARRANTY STATEMENT

S16. ADDITIONAL INFORMATION AND COMMENTS

State of California
AIR RESOURCES BOARD

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 2005 AND LATER SMALL OFF-ROAD ENGINES

Adopted: July 26, 2004
Amended: February 24, 2010

NOTE: This document is printed in a style to indicate changes from the existing provisions.

All existing language in Subpart B and Subpart D is indicated by plain type. All proposed additions to language in Subpart B and Subpart D are indicated by underlined text. All proposed deletions to language are indicated by ~~strikeout~~. Only those portions containing the suggested modifications from the existing language are included. All other portions remain unchanged and are indicated by the symbol "* * * * *" for reference.

The numbering convention employed in this document, in order of priority, is: I.1.a.1.i.A.

Table of Contents

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES
FOR 2005 AND LATER SMALL OFF-ROAD ENGINES

The following provisions of Part 90, Title 40, Code of Federal Regulations, as adopted or amended by the United State Environmental Protection Agency on the date listed, are adopted and incorporated herein by this reference for 2005 model year and later small off-road engines as the California Exhaust Emission Standards and Test Procedures for 2005 and Later Small Off-Road Engines, except as altered or replaced by the provisions set forth below.

PART 90 – CONTROL OF EMISSIONS FROM NONROAD SPARK-IGNITION ENGINES

* * * * *

Subpart B – Emission Standards and Certification Provisions

* * * * *

§ 90.107 Application for certification.

* * * * *

(d) (12) Projected California sales data of the engine family for which certification is requested. Such estimated sales data must include an explanation of the method used to make the estimate.

(13) For zero-emission small off-road equipment, the certification application shall include the following:

(i) Identification and description of the equipment covered by the application.

(ii) Identification of the power source system weight (e.g., battery weight) and gross equipment weight rating of the equipment.

(iii) Identification and description of the power source system for the equipment.

(iv) Results of energy density test.

(~~i~~v) Projected California sales.

(v<u>i</u>) All information necessary for proper and safe operation and maintenance of the equipment, including recharging information and other relevant information as determined by the Executive Officer.

(vi<u>i</u>) A copy of the owner's manual must be submitted during certification for approval by the Executive Officer. The manual must include the information as required by subsections (i), (ii), (iii), and (v<u>i</u>) above.

* * * * *

Subpart D – Emission Test Equipment Provisions

§ 90.308 Lubricating oil and test fuels.

* * * * *

(b) (1) DELETE,
REPLACE WITH:
(b) (1) (i) (A) Except as allowed in (B), tThe certification test fuel used for emission testing must be consistent with the fuel specifications as outlined in the California Code of Regulations, Title 13, Section 1960.1, and the latest amendment of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles", incorporated by reference herein. The test fuel specification should remain consistent from batch to batch. If a particular engine requires a different octane (or cetane) fuel, test records should indicate the fuel used.

(B) A manufacturer may choose to use a test fuel with up to ten percent ethanol by volume for certification testing, provided that the same fuel has been approved for federal certification testing.

(ii) Alcohol-based fuels. Alcohol-based fuels must be allowed for emission test purposes when the appropriate emission standards with respect to such fuels are a part of these provisions. Such fuels must be as specified in subparagraph (b)(1)(i) above.

* * * * *

PART 2

INCORPORATED TEST PROCEDURE

(2005 – 2012 Model Years)

Small Off-Road Engines

State of California

AIR RESOURCES BOARD

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES

FOR 2005-2012 ~~AND LATER~~ SMALL OFF-ROAD ENGINES

Adopted: July 26, 2004

Amended: February 24, 2010

Amended: October 25, 2012

Note: All existing language is indicated by plain type. All additions to the existing language are indicated by underlined type. All deletions to the existing language are indicated by ~~strikeout~~. All other portions of this test procedure remain unchanged and are The symbols "* * * * * " mean that the remainder text is unchanged. .

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES
FOR 2005-2012 ~~AND LATER~~ SMALL OFF-ROAD ENGINES

The following provisions of Part 90, Title 40, Code of Federal Regulations, as adopted or amended by the United State Environmental Protection Agency on the date listed, are adopted and incorporated herein by this reference for 2005 – 2012 model year ~~and later~~ small off-road engines as the California Exhaust Emission Standards and Test Procedures for 2005-2012 ~~and Later~~ Small Off-Road Engines, except as altered or replaced by the provisions set forth below.

PART 90 – CONTROL OF EMISSIONS FROM NONROAD SPARK-IGNITION ENGINES

SOURCE: 65 FR 24306, April 25, 2000, unless otherwise noted.

Subpart A – General

§ 90.1 Applicability.

DELETE,
REPLACE WITH:

(a) These provisions apply to 2005-2012 ~~and later~~ model year spark-ignition small off-road engines, and any equipment that use such engines. These provisions do not apply to 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.

* * * * *

PART 3

FINAL REGULATION ORDER TEST PROCEDURES
(Part 1054)

Small Off-Road Engines

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FINAL REGULATION ORDER TEST PROCEDURES

Note: This appendix shows the entirety of regulatory amendments to the test procedures titled below, which were approved by the Air Resources Board on December 16, 2011, and refined via subsequent conforming modifications authorized under Resolution 11-41. Incorporated by reference into these test procedures are portions of Title 40 of the Code of Federal Regulations (CFR) Part 1054 – Control of Emissions from New, Small Nonroad Spark-Ignition Engines and Equipment, including Subparts A, B, C, D, E, F, G, H and I, as amended November 8, 2010; and, the internally referenced sections of Title 40 CFR, Parts 60, 80, 86, 90, and 1065. Sections that have been included in their entirety are set forth with the section number and title. California provisions that replace specific federal language provisions are denoted by the words “DELETE” for the federal language and “REPLACE WITH” or “ADD” for the California language. The notation [* * * * *] or [...] means that the remainder of the CFR text for a specific section is not shown in these procedures but has been incorporated by reference, with only the printed text changed. CFR sections that are not listed are not part of the test procedures. If there is any conflict between the provisions of this document and the California Health and Safety Code, Division 26, or Title 13 of the California Code of Regulations (CCR), the Health and Safety Code and Title 13 apply.

This document is all newly adopted text.

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State of California
AIR RESOURCES BOARD

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2013 AND LATER SMALL OFF-ROAD ENGINES

ENGINE-TESTING PROCEDURES (PART 1054)

Adopted: October 25, 2012

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2013 AND LATER SMALL OFF-ROAD ENGINES

The following provisions of Part 1054, Title 40, Code of Federal Regulations, as proposed by the United States Environmental Protection Agency on the date listed, are adopted and incorporated herein by this reference for 2013 model year and later small off-road engines as the California Exhaust Emission Standards and Test Procedures for New 2013 and Later Small Off-Road Engines, except as altered or replaced by the provisions set forth below.

PART 1054 – CONTROL OF EMISSION FROM NEW, SMALL NONROAD SPARK-IGNITION ENGINES AND EQUIPMENT

SOURCE: 75 FR 59259, November 8, 2010, unless otherwise noted.

Subpart A – Overview and Applicability

§ 1054.1 Does this part apply for my engines and equipment?

* * * * *

(a) (2) DELETE,
REPLACE WITH:
The requirements of this part related to evaporative emissions apply as specified in Title 13, California Code of Regulations, Chapter 15, Article 1 to fuel systems used with engines subject to exhaust emission standards in this part if the engines use a volatile liquid fuel (such as gasoline).

(a) (3) DELETE,
REPLACE WITH:
This part 1054 applies starting with the 2013 model year for all small spark-ignition off-road engines and equipment.

(a) (4) DELETE,
REPLACE WITH:
The provisions of CCR 2403(f) currently apply for new engines used in emergency rescue equipment.

(a) (5) DELETE.

(b) DELETE.

(c) DELETE,
REPLACE WITH:
See California Exhaust Emission Standards and Test Procedures for 2005 – 2012 Small Off-Road Engines for requirements that apply to engines not yet subject to the requirements of this part 1054.

(d) DELETE.

(e) DELETE.

§ 1054.2 Who is responsible for compliance?

DELETE,
REPLACE WITH:
The requirements and prohibitions of this part apply to manufacturers of engines and equipment, as described in §1054.1. The requirements of this part are generally addressed to manufacturers subject to this part's requirements. The term “you” generally means the certifying manufacturer. For provisions related to exhaust emissions, this generally means the engine manufacturer, especially for issues related to certification (including production-line testing, reporting, etc.).

For provisions related to certification with respect to evaporative emissions, this generally means the equipment manufacturer. Equipment manufacturers must meet applicable requirements as described in Title 13, California Code of Regulations, Chapter 15, Article 1. Engine manufacturers that assemble an engine's complete fuel system are considered to be the equipment manufacturer with respect to evaporative emissions.

§ 1054.5 Which nonroad engines are excluded from this part's requirements?

DELETE,
REPLACE WITH:
This part does not apply to the engines that are excluded in the “small off-road engine” definition found in Title 13, section 2401.

§ 1054.10 How is this part organized?

* * * * *

§ 1054.15 Do any other CFR parts apply to me?

(a) DELETE.

* * * * *

(c) DELETE.

* * * * *

§ 1054.20 What requirements apply to my equipment?

* * * * *

(b) DELETE,
REPLACE WITH:
All equipment subject to the exhaust standards of Title 13, California Code of Regulations, Chapter 9, Article 1, must also meet the evaporative emission standards of Title 13, California Code of Regulations, Chapter 15, Article 1.

(c) DELETE,
REPLACE WITH:
You must identify and label equipment you produce under 40 CFR part 1054 consistent with the requirements of Title 13, California Code of Regulations, Chapter 9, Article 1, Section 2404 and Chapter 15, Article 1, Section 2759.

(d) DELETE,
REPLACE WITH:
You must certify your equipment or fuel systems as described in Title 13, California Code of Regulations, Chapter 15, Article 1.

(e) DELETE,
REPLACE WITH:
You must follow all emission-related installation instructions from the certifying manufacturers as described in §1054.130, and Title 13, California Code of Regulations, Chapters 9 and 15. Failure to follow these instructions may subject you to civil penalties.

(f) DELETE.

§ 1054.30 Submission of information.

(a) DELETE,
REPLACE WITH:
This part includes various requirements to record data or other information. Refer to §1054.825 and Title 13, California Code of Regulations, Chapters 9 and 15 regarding recordkeeping requirements. If recordkeeping requirements are not specified, store these records in any format and on any media and keep them readily available for one model year after you send an associated application for certification, or one year after you generate the data if they do not support an application for certification. You must promptly send us organized, written records in English if we ask for them. We may review them at any time.

(b) DELETE,

REPLACE WITH:
The regulations in §1054.255 describe your obligation to report truthful and complete information and the consequences of failing to meet this obligation. This includes information not related to certification.

* * * * *

Subpart B—Emission Standards and Related Requirements

§ 1054.101 What emission standards and requirements must my engines meet?

(a) DELETE,
REPLACE WITH:
(a)(1) *Exhaust emissions.* All engines must meet the requirements in §1054.115. Exhaust emissions from small off-road spark-ignition engines manufactured for sale, sold, offered for sale in California, or that are introduced, delivered or imported into California for introduction into commerce, must not exceed:

Exhaust Emission Standards for Spark-Ignition Engines
(grams per kilowatt-hour)

Model Year	Displacement Category	Durability Periods (hours)	Hydrocarbon plus Oxides of Nitrogen[(1)(3)]	Carbon Monoxide	Particulate
2005 and subsequent	<50 cc	50/125/300	50	536	2.0[(2)]
	50-80 cc, inclusive	50/125/300	72	536	2.0[(2)]
2008 and subsequent	>80 cc - <225 cc	125/250/500	10.0	549	
	≥ 225 cc	125/250/500/1000	8.0	549	

(1) The Executive Officer may allow gaseous-fueled (i.e., propane, natural gas) engine families, that satisfy the requirements of the regulations, to certify to either the hydrocarbon plus oxides of nitrogen or hydrocarbon emission standard, as applicable, on the basis of the non-methane hydrocarbon (NMHC) portion of the total hydrocarbon emissions.
(2) Applicable to all two-stroke engines.
(3) Engines used exclusively to power products which are used exclusively in wintertime, at the option of the engine manufacturer, may comply with the provisions in Part 1054.101(a)(2)(ii).

(2) (i) Two-stroke engines used to power snowthrowers may meet the emission standards for engines at or less than 80 cc in displacement.
(ii) Engines used exclusively to power products which are used exclusively in wintertime, such as snowthrowers and ice augers, at the option of the engine manufacturer, need not certify to or comply with standards regulating emissions of $HC+NO_x$ or $NMHC+NO_x$, as applicable. If the manufacturer exercises the option to certify to standards regulating such emissions, such engines must meet such standards. If the engine is to be used in any equipment or vehicle other than an exclusively wintertime product such as a snowthrower or ice auger, it must be certified to the applicable standard regulating emissions of $HC+NO_x$ or $NMHC+NO_x$ as applicable.
(3) Low-emitting Blue Sky Series engine requirements.
Voluntary standards. Engines may be designated “Blue Sky Series” engines by meeting:
(i) All applicable requirements of this Article, and

(ii) The following voluntary exhaust emission standards, which apply to all certification and compliance testing. Blue Sky Series engines shall not be included in the averaging, banking, and trading program. Zero-emission small off-road equipment may certify to the Blue Sky Series emission standards. Manufacturers of zero-emission small off-road equipment are not required to perform emissions testing, but must file an application of certification and comply with the administrative requirements outlined in these procedures.

Voluntary Emission Standards
(grams per kilowatt-hour)

Model Year	Displacement Category	Hydrocarbon plus Oxides of Nitrogen	Carbon Monoxide	Particulate*
2005 and subsequent	<50 cc	25	536	2.0
	50 - 80 cc, inclusive	36	536	2.0
2007 and subsequent	>80 cc - <225 cc	5.0	549	
2008 and subsequent	≥225 cc	4.0	549	

* Applicable to all two-stroke engines

(b) DELETE,
REPLACE WITH:
Evaporative emissions. Except as specified in §1054.20, new equipment using engines that run on a volatile liquid fuel (such as gasoline) must meet the evaporative emission requirements as specified in Title 13, California Code of Regulations, Chapter 15, Article 1.

* * * * *

(d) DELETE.

(e) DELETE.

* * * * *

§ 1054.103 What exhaust emission standards must my handheld engines meet?

(a) DELETE,
REPLACE WITH:
Emission standards. The exhaust emissions from your engines may not exceed the emission standards that are specified in §1054.101. Measure emissions

using the applicable steady-state test procedures described in subpart F of this part.

(b) DELETE,
REPLACE WITH:
Averaging, banking, and trading. You may generate or use emission credits under the averaging, banking, and trading (ABT) program for $HC+NO_X$ emissions and Particulate Matter emissions as described in Title 13, California Code of Regulations, Chapter 9, Article 1.

* * * * *

(e) DELETE,
REPLACE WITH:
Applicability for testing. The emission standards in Title 13, California Code of Regulations, Chapter 9, Article 1 apply to all testing, including certification, production-line, in-use, and new engine compliance testing.

§ 1054.105 What exhaust emission standards must my nonhandheld engines meet?

(a) DELETE,
REPLACE WITH:
Emission standards. Exhaust emissions from your engines may not exceed the emission standards that are specified in §1054.101. Measure emissions using the applicable steady-state test procedures described in subpart F of this part.

(b) DELETE,
REPLACE WITH:
Averaging, banking, and trading. You may generate or use emission credits under the averaging, banking, and trading (ABT) program for $HC+NO_X$ emissions and Particulate Matter emissions as described in Title 13, California Code of Regulations, Chapter 9, Article 1.

* * * * *

(e) DELETE,
REPLACE WITH:
Applicability for testing. The emission standards in Title 13, California Code of Regulations, Chapter 9, Article 1 apply to all testing, including certification, production-line, in-use, and new engine compliance testing.

§ 1054.107 What is the useful life period for meeting exhaust emission standards?

* * * * *

(a) (1) DELETE,
RELACE WITH:
The useful life period for exhaust requirements is the number of engine operating hours from Title 13, California Code of Regulations, Chapter 9, Article 1, Section 2404 that most closely matches the expected median in-use life of your engines. The median in-use life of your engine is the shorter of the following values:

(i) The median in-use life of equipment into which the engine is expected to be installed.

(ii) The median in-use life of the engine without being scrapped or rebuilt.

(2) DELETE.

(3) DELETE.

* * * * *

§ 1054.110 What evaporative emission standards must my handheld equipment meet?

DELETE,
REPLACE WITH:
All equipment must meet the evaporative emission requirements as specified in Title 13, California Code of Regulations, Chapter 15, Article 1. The evaporative emission requirements apply for handheld equipment over a useful life of five years.

§ 1054.112 What evaporative emission standards must my nonhandheld equipment meet?

DELETE,
REPLACE WITH:
All equipment must meet the evaporative emission requirements as specified in Title 13, California Code of Regulations, Chapter 15, Article 1. The evaporative emission requirements apply for nonhandheld equipment over a useful life of five years.

§ 1054.115 What other requirements apply?

* * * * *

(b) DELETE,
REPLACE WITH:
Adjustable parameters. Engines that have adjustable parameters must meet all the requirements of this part for any adjustment in the physically adjustable range. An operating parameter is not considered adjustable if you permanently

seal it or if it is not normally accessible using ordinary tools. We may require that you set adjustable parameters to any specification within the adjustable ranges during any testing including certification testing, production-line testing, in-use testing, or new engine compliance testing.

(c) DELETE,
REPLACE WITH:
Altitude adjustments. Engines must meet applicable emission standards for valid tests conducted under the ambient conditions specified in 40 CRF 1065.520. Engines must meet applicable emission standards at all specified atmospheric pressures except: (i) engines with displacements ≤80 cc for atmospheric pressures below 96.0 kPa; and, (ii) engines with displacements >80 cc may rely on an altitude kit for atmospheric pressures below 94.0 kPa if you meet the requirements specified in 1054.205(r). If you rely on an altitude kit for certification, you must identify in the owners manual the altitude range for which you expect proper engine performance and emission control with and without the altitude kit; you must also state in the owners manual that operating the engine with the wrong engine configuration at a given altitude may increase its emissions and decrease fuel efficiency and performance. In your application for certification, identify the altitude above which you rely on an altitude kit to meet emission standards and describe your plan for making information and parts available such that you would reasonably expect that altitude kits would be widely used at all such altitudes.

* * * * *

§ 1054.120 What emission-related warranty requirements apply to me?

DELETE,
REPLACE WITH:
The requirements of this section and Title 13, CCR, Chapter 9, Article 1 apply to the manufacturer certifying with respect to exhaust emissions. See Title 13, CCR, Chapter 15, Article 1 for the warranty requirements related to evaporative emissions.

* * * * *

(b) (1) DELETE,
REPLACE WITH:
The minimum warranty period is two years.

(b) (2) DELETE.

(b) (3) DELETE.

(c) DELETE,

REPLACE WITH:
Components covered. The emission-related warranty covers all components whose failure would increase an engine's emissions of any regulated pollutant, including components listed in Title 13, California Code of Regulations, Chapters 9 and 15, and components from any other system you develop to control emissions. The emission-related warranty covers these components even if another company produces the component. Your emission-related warranty does not cover components whose failure would not increase an engine's emissions of any regulated pollutant.

(d) DELETE.

* * * * *

(f) (3) (i) DELETE,
REPLACE WITH:
If you have authorized service centers in all California population centers with a population of 100,000 or more based on the 2010 census, you may limit warranty repairs to these service providers.

(f) (3) (ii) DELETE,
REPLACE WITH:
You may limit warranty repairs to authorized service centers for owners located within 100 miles of an authorized service center. For owners located more than 100 miles from an authorized service center, you must state in your warranty that you will either pay for shipping costs to and from an authorized service center, provide for a service technician to come to the owner to make the warranty repair, or pay for the repair to be made at a local non-authorized service center.

(f) (3) (iii) DELETE,
REPLACE WITH:
You must have at least one authorized service center in California.

(f) (4) DELETE.

§ 1054.125 What maintenance instructions must I give to buyers?

DELETE,
REPLACE WITH:
Give the ultimate purchaser of each new engine written instructions for properly maintaining and using the engine, including the emission control system as described in this section. The maintenance instructions also apply to service accumulation on your emission-data engines as described in §1054.245 and in 40 CFR part 1065. Note that for engines with a displacement of less than or equal to 80 cc you may perform maintenance on emission-data engines during

service accumulation provided that exhaust emission tests are performed before and after the maintenance is performed.

* * * * *

(d) DELETE,
REPLACE WITH:
Noncritical emission-related maintenance. Subject to the provisions of this paragraph (d), you may schedule any amount of emission-related inspection or maintenance that is not covered by paragraph (a) of this section (i.e., maintenance that is neither explicitly identified as critical emission-related maintenance, nor that we approve as critical emission-related maintenance). Noncritical emission-related maintenance generally includes re-seating valves, removing combustion chamber deposits, or any other emission-related maintenance on the components we specify in Title 13, California Code of Regulations, Chapters 9 and 15 that is not covered in paragraph (a) of this section. You must state in the owner's manual that these steps are not necessary to keep the emission-related warranty valid. If operators fail to do this maintenance, this does not allow you to disqualify those engines from in-use testing or deny a warranty claim. Do not take these inspection or maintenance steps during service accumulation on your emission-data engines.

* * * * *

§ 1054.130 What installation instructions must I give to equipment manufacturers?

* * * * *

(b) (2) DELETE,
REPLACE WITH:
State: "Failing to follow these instructions when installing a certified engine in off-road equipment violates California law, subject to penalties as described in Title 13, California Code of Regulations."

* * * * *

(b) (4) DELETE,
REPLACE WITH:
Describe the steps needed to control evaporative emissions in accordance with Executive Order that you hold. Include instructions for connecting fuel lines as needed to prevent running loss emissions, if applicable. Such instructions must include sufficient detail to ensure that running loss control will not cause the engine to exceed exhaust emission standards. For example, you may specify a maximum vapor flow rate under normal operating conditions. Also include

notification that the installer must meet the requirements of §1054.112 and Title 13, California Code of Regulations, Chapter 15, Article 1.

* * * * *

(b) (7) DELETE,
REPLACE WITH:
State: “If you install the engine in a way that makes the engine's emission control information label hard to read during normal engine maintenance, you must place a duplicate label on the equipment, as described in Title 13, California Code of Regulations, Chapter 9, Article 1, Section 2404.”

* * * * *

§ 1054.135 How must I label and identify the engines I produce?

DELETE,
REPLACE WITH:
The label shall meet the requirements specified in Section 2404, Title 13 of the California Code of Regulations.

§ 1054.140 What is my engine's maximum engine power and displacement?

* * * * *

(a) DELETE,
REPLACE WITH:
An engine configuration's maximum engine power is the maximum brake power point on the nominal power curve for the engine configuration, as defined in this section. Round the power value to the nearest 0.1 kilowatts for nonhandheld engines and to the nearest 0.01 kilowatts for handheld engines. The nominal power curve of an engine configuration is the relationship between maximum available engine brake power and engine speed for an engine, using the mapping procedures of 40 CFR part 1065, based on the manufacturer's design and production specifications for the engine. For handheld engines, we may allow manufacturers to base the nominal power curve on other mapping procedures. This information may also be expressed by a torque curve that relates maximum available engine torque with engine speed. Note that maximum engine power is based on engines and installed engine governors; equipment designs that further limit engine operation do not change maximum engine power.

* * * * *

§ 1054.145 Are there interim provisions that apply only for a limited time?

* * * * *

(a) DELETE.

(b) DELETE.

(c) DELETE.

(d) DELETE.

(e) DELETE.

(f) DELETE.

(g) DELETE.

(h) DELETE.

(i) DELETE.

(j) DELETE,
REPLACE WITH:
Continued use of California Exhaust Emission Standards and Test Procedures for 2005 through 2012 Small Off-Road Engines. You may use the test procedures for measuring exhaust emissions in the California Exhaust Emission Standards and Test Procedures for 2005 through 2012 Small Off-Road Engines instead of those in subpart F of this part for the 2013 through 2014 model years. This applies for certification, production-line, and in-use testing. You may continue to use data based on the test procedures in the California Exhaust Emission Standards and Test Procedures for 2005 through 2012 Small Off-Road Engines for engine families in 2014 and later model years, provided that we allow you to use carryover emission data under 40 CFR 1054.235(d) for your engine family. You may also use the test procedures for measuring exhaust emissions in the California Exhaust Emission Standards and Test Procedures for 2005 to 2012 Small Off-Road Engines for production-line testing with any engine family whose certification is based on testing with those procedures.

(k) DELETE.

* * * * *

(m) DELETE.

(n) DELETE.

(o) DELETE.

Subpart C—Certifying Emission Families

§ 1054.201 What are the general requirements for obtaining a certificate of conformity?

DELETE,
REPLACE WITH:
Engine manufacturers must certify their engines with respect to the exhaust emission standards in Title 13, CCR, Chapter 9, Article 1, Section 2403. Manufacturers of engines, equipment, or fuel-system components may need to certify their products with respect to evaporative emission standards as described in Title 13, CCR, Chapter 15, Article 1. The following general requirements apply for obtaining an Executive Order:

(a) DELETE,
REPLACE WITH:
You must send us a separate application for an Executive Order for each engine family. An Executive Order is not valid for any production after December 31 of the model year for which it is issued. If you certify with respect to both exhaust and evaporative emissions, you must submit separate applications.

* * * * *

(d) DELETE.

* * * * *

(h) DELETE.

ADD:
(i) The Executive Officer may request notification, prior to the initial model year submission of an engine manufacturer's certification application(s), of the engine manufacturer's intent to seek engine family certification (i.e., a letter of intent) so that the Executive Officer can adequately allocate resources required for reviewing such certification applications in a timely manner. Such letters of intent must provide the engine manufacturer's best estimate of general information for the applicable model-year certification, such as identification of each engine family, date of expected submission, etc.

§ 1054.205 What must I include in my application?

DELETE,
REPLACE WITH:

This section specifies the information that must be in your application, unless we ask you to include less information under §1054.201(c). We may require you to provide additional information to evaluate your application. The provisions of this section apply to the manufacturer that is to be granted an Executive Order.

(a) DELETE,
REPLACE WITH:
Describe the engine family's specifications and other basic parameters of the engine's design and emission controls (i.e., catalyst specifications). List the fuel type on which your engines are designed to operate (for example, all-season gasoline). List each distinguishable engine configuration in the engine family.

* * * * *

(i) DELETE,
REPLACE WITH:
Include the maintenance and warranty instructions you will give to the ultimate purchaser of each new engine (see §§1054.120 and 1054.125). Describe your basis for meeting the warranty-assurance provisions in §1054.120(f). Describe your recall repair network if it is different than your warranty repair network.

* * * * *

(l) DELETE,
REPLACE WITH:
Identify the emission standards or FELs for the engine family. Include a statement indicating whether the manufacturer intends to include the engine family in a corporate average, and, if so, an estimate of the overall corporate average emissions for that model year.

* * * * *

(p) (1) DELETE,
REPLACE WITH:
Report all test results involving measurement of pollutants for which emission standards apply. Include test results from invalid tests and from any other tests, whether or not they were conducted according to the test procedures of subpart F of this part. We may ask you to send other information to confirm that your tests were valid under the requirements of this part; Title 13, CCR, Chapters 9 and 15; and 40 CFR 1065.

(2) DELETE,
REPLACE WITH:
Report measured CO_2, N_2O, and CH_4 as described in §1054.235.

* * * * *

ADD:
(q) (5) Information including but not limited to part numbers, technical specifications, schematics, and photographs of physical samples.

(r) DELETE,
REPLACE WITH:
Describe how your engines with a displacement of greater than 80 cc comply with emission standards at varying atmospheric pressures. Include a description of altitude kits you designed to comply with the requirements of §1054.115(c). Identify the part number of each component you describe. Identify the altitude range for which you expect proper engine performance and emission control with and without the altitude kit. State that your engines will comply with applicable emission standards throughout the useful life with the altitude kit installed according to your instructions. Describe any relevant testing, engineering analysis, or other information in sufficient detail to support your statement. In addition, describe your plan for making information and parts available such that you would reasonably expect that altitude kits would be widely used in the high-altitude counties. For example, engine owners should have ready access to information describing when an altitude kit is needed and how to obtain this service. Similarly, parts and service information should be available to qualified service facilities in addition to authorized service centers if that is needed for owners to have such altitude kits installed locally.

(s) DELETE.

* * * * *

(u) DELETE,
REPLACE WITH:
Unconditionally certify that all the engines in the engine family comply with the requirements of this part, other referenced parts of the CFR as incorporated and modified herein, California's Health and Safety Code, and CCR 2400-2409.

(v) DELETE,
REPLACE WITH:
Include good-faith estimates of California-directed production volumes. Include a justification for the estimated production volumes if they are substantially different than actual production volumes in earlier years for similar models. Also indicate whether you expect the engine family to contain only off-road engines, only stationary engines, or both.

(w) DELETE.

(x) DELETE,
REPLACE WITH:
Include the information required by other subparts of this part.

(y) DELETE,
REPLACE WITH:
Include other applicable information, such as information specified in this part related to requests for exemptions.

* * * * *

§ 1054.210 May I get preliminary approval before I complete my application?

DELETE.

§ 1054.220 How do I amend the maintenance instructions in my application?

* * * * *

§ 1054.225 How do I amend my application for certification to include new or modified engines or fuel systems or change an FEL?

* * * * *

(a) (3) DELETE.

* * * * *

(f) DELETE.

§ 1054.230 How do I select emission families?

(a) DELETE,
REPLACE WITH:
For purposes of certification, divide your product line into families of engines that are expected to have similar emission characteristics throughout their useful life as described in this section. Your engine family is limited to a single model year. For evaporative emissions, group engines into emission families as described in the California Code of Regulations, Chapter 15, Article 1.

* * * * *

(d) (1) DELETE.

(d) (2) DELETE.

* * * * *

§ 1054.235 What exhaust emission testing must I perform for my application for a certificate of conformity?

* * * * *

(a) DELETE,
REPLACE WITH:
Select an emission-data engine from each engine family for testing as described in 40 CFR 1065.401. Select a configuration that is most likely to exceed the $HC+NO_X$ standard. Configurations must be tested as they will be produced, including installed governors, if applicable.

* * * * *

(c) (3) DELETE,
REPLACE WITH:
For engines with adjustable parameters, manufacturers must test the engines at both extremes of the adjustment, as applicable.

* * * * *

(g) DELETE,
REPLACE WITH:
Measure $CO_2$and $CH_4$with each low-hour certification test using the procedures specified in 40 CFR part 1065 starting in the 2013 model year. Also measure N_2O with each low-hour certification test using the procedures specified in 40 CFR part 1065 starting in the 2013 model year for any engine family that depends on NOx aftertreatment to meet emission standards. Use the same units and modal calculations as for your other results to report a single weighted value for each constituent. Round the final values as follows:

(1) Round $CO_2$to the nearest 1 g/kW-hr.

(2) Round N_2O to the nearest 0.001 g/kW-hr.

(3) Round $CH_4$to the nearest 0.001 g/kW-hr.

ADD:
(h) The use of auxiliary fans for engine cooling must be indicated in the application for certification. The manufacturer must justify to the satisfaction of the Executive Officer in the application for certification the need for and use of such fans. The manufacturer must also demonstrate that the supplemental cooling resulting from the use of the fans is representative of in-use engine operation.

§ 1054.240 How do I demonstrate that my emission family complies with exhaust emission standards?

(a) DELETE,
REPLACE WITH:
For purposes of certification, your engine family is considered in compliance with the emission standards in §1054.101(a) if all emission-data engines representing that family have test results showing deteriorated emission levels at or below these standards. This includes all test points over the course of the durability demonstration. Note that your FELs are considered to be the applicable emission standards with which you must comply if you participate in the ABT program.

* * * * *

(c) DELETE,
REPLACE WITH:
Determine a deterioration factor to compare emission levels from the emission-data engine with the applicable emission standards. Section 1054.245 specifies how to test engines to develop deterioration factors that represent the expected deterioration in emissions over your engines' full useful life. Calculate a multiplicative deterioration factor as described in §1054.245. If the deterioration factor is less than one, use one. Specify the deterioration factor to one more significant figure than the emission standard.

* * * * *

§ 1054.245 How do I determine deterioration factors from exhaust durability testing?

DELETE,
REPLACE WITH:
(a) Small-volume engine manufacturers may, at their option, use deterioration factors (DF) for $HC+NO_x$ ($NMHC+NO_x$) and CO from Table 1 or Table 2 of this paragraph (a) or they may calculate deterioration factors for $HC+NO_x$ ($NMHC+NO_x$) and CO according to the process described in paragraph (d) of this section. For technologies that are not addressed in Table 1 or Table 2 of this paragraph (a), the manufacturer may ask the Executive Officer to assign a deterioration factor prior to the time of certification.

(b) Table 1 follows:

TABLE 1: ENGINES GREATER THAN 80 CC $HC+NO_x$ ($NMHC+NO_x$) AND CO ASSIGNED DETERIORATION FACTORS FOR SMALL VOLUME ENGINE MANUFACTURERS

Displacement Category	Side valve engines		Overhead valve engines		Engines with aftertreatment
	$HC+NO_x$ ($NMHC+NO_x$)	CO	$HC+NO_x$ ($NMHC+NO_x$)	CO	
>80 cc-<225 cc	2.1	1.1	1.5	1.1	DFs must be calculated using the formula in Subsection (d) below
≥ 225 cc	1.6	1.1	1.4	1.1	

(c) Table 2 follows:

TABLE 2. ENGINES AT OR BELOW 80 CC HC+NOx (NMHC+NOx) AND CO ASSIGNED DETERIORATION FACTORS FOR SMALL VOLUME ENGINE MANUFACUTURERS

Displacement category	Two-stroke engines[1]		Four-stroke engines		Engines with aftertreatment
	$HC+NO_x$ ($NMHC+NO_x$)	CO	$HC+NO_x$ ($NMHC+NO_x$)	CO	
0-80 cc, inclusive	1.1	1.1	1.5	1.1	DFs must be calculated using the formula in Subsection (d) below

[1] Two-stroke technologies to which these assigned deterioration factors apply include conventional two-strokes, compression wave designs, and stratified scavenging designs.

(d) Formula for calculating deterioration factors for engines with aftertreatment:

$$DF = [(NE * EDF) – (CC * F)]/(NE – CC)$$

Where:

DF = deterioration factor.
NE = new engine emission levels prior to the catalyst (g/kW-hr).
EDF = deterioration factor for engines without catalyst as shown in Table 1 or Table 2 of this paragraph.
CC = amount converted at 0 hours in g/kW-hr.
F = 0.8 for HC (NMHC), 1.0 for NOx, and 0.8 for CO for all classes of engines.

(e)(1) Manufacturers shall obtain an assigned DF or calculate a DF, as appropriate, for each regulated pollutant for all engine families. Such DF shall be used for certification, production line testing, and Selective Enforcement Auditing.

(2) For engines not using assigned deterioration factors from Table 1 or Table 2 of paragraph (a) of this section, deterioration factors shall be determined as follows:

(i) The new prototype engine must be emissions tested at zero hour (break-in) with all emission control systems (e.g., EGR, catalysts, etc.) installed.

(ii) The engine must be aged on the emissions durability cycle to the first test point. The manufacturer must choose its test points that are equally divided (same number of hours $\pm$ 2 hours). An emissions test is conducted at half the emissions durability period $\pm$ 2 hours.

(iii) The prototype engine must be emissions tested at each test point. Following testing the durability cycle must be continued to the next point.

(iv) Only specified maintenance may be performed during durability cycle testing. In addition, an emission test must be performed before and after the maintenance is performed.

(v) When the prototype engine has been aged on the durability cycle to the full emissions durability cycle, a final emissions test must be conducted.

(vi) For each pollutant, a line must be fitted to the data points treating the initial test as occurring at hour=0, and using the method of least-squares. The deterioration factor is the calculated emissions at the end of the emissions durability period divided by the calculated emissions at zero hours.

(vii) If the engine manufacturer conducts more than one test at a test point, the number of tests at every test point must be the same. All tests must be used in a linear regression analysis as separate points to determine the deterioration factor.

(viii) Additional engines identical to the original test engine may be tested with prior approval from the Executive Officer. In such cases, data collection must remain consistent for all test engines. The testing of multiple engines requires the determination of separate deterioration factors for each test engine. The official deterioration factor shall be the average of the separate deterioration factors for each test engine.

(ix) The product of the zero-hour (break-in) results from the engine multiplied by the deterioration factor is the emissions certification value for that engine family and pollutant. In the case of multiple zero-hour tests on a single engine, the engine manufacturer must select the last zero-hour test as the official zero-hour test upon which the deterioration factor is applied. If multiple engines are tested, the manufacturer must select the highest zero-hour result among the last zero-hour test of each engine as the official zero-hour test upon which the deterioration factor is applied.

(3) ARB may reject a DF if it has evidence that the DF is not appropriate for that engine family within 30 days of receipt from the manufacturer. The manufacturer must retain actual emission test data to support its choice of DF and furnish that data to the Executive Officer upon request. Manufacturers may request approval by the Executive Officer of alternative procedures for determining deterioration. Any submitted DF not rejected by ARB within 30 days shall be deemed to have been approved.

(4) Calculated deterioration factors may cover families and model years in addition to the one upon which they were generated if the manufacturer submits a justification acceptable to the Executive Officer in advance of certification that the affected engine families can be reasonably expected to have similar emission deterioration characteristics.

(5) Engine families that undergo running changes need not generate a new DF, if the manufacturer submits a justification acceptable to the Executive Officer concurrent with the running change that the affected engine families can be reasonably expected to have similar emission deterioration characteristics.

§ 1054.250 What records must I keep and what reports must I send to EPA?

(a) DELETE,
REPLACE WITH:
Send to the Chief, Mobile Source Operations Division, 9528 Telstar Avenue, El Monte, CA, 91731, information related to your California-directed production volumes as described in §1054.345. In addition, within 45 days after the end of the model year, you must send ARB a report describing information about engines you produced during the model year as follows:

(a) (1) DELETE,
REPLACE WITH:
State the total California and Federal production volume for each engine family.

(a) (2) DELETE.

(a) (3) DELETE.

(a) (4) DELETE.

* * * * *

§ 1054.255 What decisions may EPA make regarding my certificate of conformity?

(a) DELETE,
REPLACE WITH:
If we determine your application is complete and shows that the engine family meets all the requirements of 40 CFR part 1054, the California Health and Safety Code, and Title 13, California Code of Regulations, Chapters 9 and 15, we will issue an Executive Order for your engine family for that model year. We may make the approval subject to additional conditions.

(b) DELETE,

REPLACE WITH:
We may deny your application for certification if we determine that your engine family fails to comply with emission standards or other requirements of 40 CFR part 1054 or the California Health and Safety Code or Title 13, California Code of Regulations, Chapters 9 and 15. We will base our decision on all available information. If we deny your application, we will explain why in writing.

* * * * *

(c) (4) DELETE,
REPLACE WITH:
Deny us from completing authorized activities (see subsections (i) through (vi) below). This includes a failure to provide reasonable assistance.

(i) We may inspect your testing, manufacturing processes, storage facilities (including port facilities for imported engines and equipment or other relevant facilities), or records, as authorized by California law, to enforce the provisions of 40 CFR part 1054. Inspectors will have authorizing credentials and will limit inspections to reasonable times—usually, normal operating hours.

(ii) If we come to inspect, we may or may not have a warrant or court order.

(A) If we do not have a warrant or court order, you may deny us entry.

(B) If we have a warrant or court order, you must allow us to enter the facility and carry out the activities it describes.

(iii) We may seek a warrant or court order authorizing an inspection described in this section whether or not we first tried to get your permission to inspect.

(iv) We may select any facility to do any of the following:

(A) Inspect and monitor any aspect of engine or equipment manufacturing, assembly, storage, or other procedures, and any facilities where you do them.

(B) Inspect and monitor any aspect of engine or equipment test procedures or test-related activities, including test engine/equipment selection, preparation, service accumulation, emission duty cycles, and maintenance and verification of your test equipment's calibration.

(C) Inspect and copy records or documents related to assembling, storing, selecting, and testing an engine or piece of equipment.

(D) Inspect and photograph any part or aspect of engines or equipment and components you use for assembly.

(v) You must give us reasonable help without charge during an inspection authorized by California law, including but not limited to the Health and Safety Code. For example, you may need to help us arrange an inspection with the facility's managers, including clerical support, copying, and translation. You may also need to show us how the facility operates and answer other questions. If we ask in writing to see a particular employee at the inspection, you must ensure that he or she is present (legal counsel may accompany the employee).

(vi) If you have facilities in other countries, we expect you to locate them in places where local law does not keep us from inspecting as described in this section. We will not try to inspect if we learn that local law prohibits it, but we may suspend your certificate if we are not allowed to inspect.

* * * * *

(c) (7) DELETE,
REPLACE WITH:
Take any action that otherwise circumvents the intent of the California Health and Safety Code, or 40 CFR part 1054 or Title 13, California Code of Regulations, Chapters 9 and 15.

(d) DELETE,
REPLACE WITH:
We may void your certificate if you do not keep the records we require or do not give us information as required under 40 CFR part 1054 or the California Health and Safety Code, or Title 13, California Code of Regulations, Chapters 9 and 15.

* * * * *

Subpart D—Production-Line Testing

§1054.300
DELETE,
REPLACE WITH:
§1054.300 General provisions.
Upon the Executive Officer's request, the manufacturer must supply a reasonable number of production engines for testing and evaluation. These engines must be representative of typical production and supplied for testing at such time and place and for such reasonable periods as the Executive Officer may require. Manufacturers must comply with the production-line testing provisions as specified in Title 13, California Code of Regulations, Section 2407.

Subpart E—In-use Testing

§ 1054.401 General provisions.

* * * * *

Subpart F—Test Procedures

§ 1054.501 How do I run a valid emission test?

* * * * *

(b) (2) (ii) DELETE,
REPLACE WITH:
For engines with a displacement of greater than eighty cubic centimeters, you may use the blended fuel for certifying engines under this part without our advance approval. If you use the blended fuel for certifying a given engine family, you must also use it for production-line testing or any other testing you perform for that engine family under this part. If the certification of all your engine families in a given model year is based on test data collected using the blended fuel, we will also use the blended fuel for testing your engines. If the certification of some but not all of your engine families in a given model year is based on test data collected using the blended fuel, we may use the blended fuel or the specified gasoline test fuel for testing any of your engines.

* * * * *

(b) (3) (ii) DELETE,
REPLACE WITH:
Intake air temperature. Measure engine intake air temperature as described in 40 CFR 1065.125, and control it if necessary. For example, since the purpose of this requirement is to ensure that the measured air temperature is consistent with the intake air temperature that would occur during in-use operation at the same ambient temperature, do not cool the intake air and do not measure air temperature at a point where engine heat affects the temperature measurement.

* * * * *

ADD:
(b) (8) Engine service accumulation and stabilization procedure. Use the service accumulation procedure determined by the manufacturer for exhaust emission stabilizing of an engine, consistent with good engineering practice.

(i) The manufacturer determines, for each engine family, the number of hours at which the engine exhaust emission control system combination is stabilized for emission testing. However, this stabilization procedure may not exceed 12 hours. The manufacturer must maintain, and provide to the Executive Officer upon request, a record of the rationale used in making this determination. If the manufacturer can document that at some time prior to the full 12 hour service accumulation period the engine emissions are decreasing for the remainder of the 12 hours, the service accumulation may be completed at that time. The

manufacturer may elect to accumulate 12 hours on each test engine within an engine family without making this determination.

(ii) During service accumulation, the fuel and lubricants specified in 40 CFR 1065 must be used.

(iii) Engine maintenance during service accumulation is allowed only in accordance with 40 CFR 1065.

(9) Engine pre-test preparation.

(i) Drain and charge the fuel tank(s) with the specified test fuel to 50 percent of the tank's nominal capacity. If an external fuel tank is used, the engine fuel inlet system pressure must be typical of what the engine will see in use.

(ii) If you are using the raw gas sampling method, operate the engine on the dynamometer measuring the fuel consumption and torque before and after the emission sampling equipment is installed, including the sample probe.

(10) Analyzer pre-test procedures.

(i) If necessary, warm up and stabilize the analyzer(s) before calibrations are performed.

(ii) Replace or clean the filter elements and then leak check the system as required by 40 CRF 1065. If necessary, allow the heated sample line, filters and pumps to reach operating temperature.

(iii) Perform the following system checks:

(A) If necessary, check the sample line temperature. Heated FID sample line temperature must be maintained between 110°C and 230°C; a heated NOx sample line temperature must be maintained between 60°C and 230°C.

(B) Check that the system response time has been accounted for prior to sample collection data recording.

(C) A HC hang-up check is permitted.

(iv) Check analyzer zero and span before and after each test at a minimum. Further, check analyzer zero and span any time a range change is made or at the maximum demonstrated time span for stability for each analyzer used.

(11) Check system flow rates and pressures and reset, if necessary.

* * * * *

(c) (2) DELETE,
REPLACE WITH:
Describe in your application for certification any specially designed fixtures or other hardware if they are needed for proper testing of your engines. (Note: You do not need to specify the size or performance characteristics of engine dynamometers.) You must send us these fixtures or other hardware if we ask for them. We may waive the requirement of §1054.205(aa) to identify a test facility in the United States for such engine families as long as the projected California-directed production volume of all your engine families using the provisions of this paragraph (c)(2) is less than 5 percent of your total production volume from all engine families certified under this part 1054.

(d) DELETE,
REPLACE WITH:
Wintertime engines. You may test wintertime engines at the ambient temperatures specified in 40 CFR 1065.520, even though this does not represent in-use operation for these engines (40 CFR 1065.10(c)(1)). In this case, you may modify the test engine as needed to achieve intake temperatures that are analogous to in-use conditions. You may also test wintertime engines at reduced ambient temperatures as specified in 40 CFR 1051.505. Use the gasoline specified for low-temperature testing only if you test your engines at ambient temperatures below 20 °C.

§ 1054.505 How do I test engines?

(a) DELETE,
REPLACE WITH:
This section describes how to test engines under steady-state conditions. For engines with a displacement of less than or equal to eighty cubic centimeters you must perform tests with discrete-mode sampling. For engines with a displacement of greater than eighty cubic centimeters we allow you to perform tests with either discrete-mode or ramped-modal testing methods. You must use the same modal testing method for certification and all other testing you perform for an engine family. If we test your engines to confirm that they meet emission standards, we will use the modal testing method you select for your own testing. If you submit certification test data collected with both discrete-mode and ramped-modal testing (either in your original application or in an amendment to your application), either method may be used for subsequent testing. We may also perform other testing as allowed by the California's Health and Safety Code. Conduct duty-cycle testing as follows:

* * * * *

(a) (2) DELETE,
REPLACE WITH:

For ramped-modal testing, start sampling at the beginning of the first mode and continue sampling until the end of the last mode. Calculate emissions and cycle statistics the same as for transient testing as specified in 40 CFR part 1065. Unless we specify otherwise, you may simulate the governor for ramped-modal testing.

* * * * *

§ 1054.520 What testing must I perform to establish deterioration factors?

* * * * *

Subpart G—Special Compliance Provisions

§ 1054.601 What compliance provisions apply?

(a) DELETE,
REPLACE WITH:
Engine and equipment manufacturers, as well as owners, operators, and rebuilders of engines subject to the requirements of this part, and all other persons, must observe the provisions of this part and the provisions of California's Health and Safety Code.

* * * * *

(c) (1) DELETE,
REPLACE WITH:
You must label the engine as specified in Title 13, Chapter 9, Article 1, Section 2404.

* * * * *

§ 1054.610 What is the exemption for delegated final assembly?

DELETE.

§ 1054.612 What special provisions apply for equipment manufacturers modifying certified nonhandheld engines?

DELETE.

§ 1054.615 What is the exemption for engines certified to standards for Large SI engines?

DELETE.

§ 1054.620 What are the provisions for exempting engines used solely for competition?

DELETE.

§ 1054.625 What requirements apply under the Transition Program for Equipment Manufacturers?

DELETE.

§ 1054.626 What special provisions apply to equipment imported under the Transition Program for Equipment Manufacturers?

DELETE.

§ 1054.630 What provisions apply for importation of individual items for personal use?

DELETE.

§ 1054.635 What special provisions apply for small-volume engine and equipment manufacturers?

DELETE,
REPLACE WITH:
This section describes how we apply the special provisions in this part for small-volume engine and equipment manufacturers. Small-volume engine and equipment manufacturers may use assigned deterioration factors. See §1054.245.

§ 1054.640 What special provisions apply to branded engines?

* * * * *

§ 1054.645 What special provisions apply for converting an engine to use an alternate fuel?
DELETE,
REPLACE WITH:
An Executive Order is no longer valid for an engine if the engine is modified such that it is not in a configuration covered by the Executive Order. Such engines may need to be recertified as specified in 40 CFR part 1054 if the Executive Order is no longer valid for that engine.

DELETE.

§ 1054.650 What special provisions apply for adding or changing governors?

* * * * *

(b) DELETE.

§ 1054.655 What special provisions apply for installing and removing altitude kits?
DELETE,
REPLACE WITH:

An action for the purpose of installing or modifying altitude kits and performing other changes to compensate for changing altitude is not considered a prohibited act as long as it is done consistent with the manufacturer's instructions.

§ 1054.660 What are the provisions for exempting emergency rescue equipment?
DELETE,
REPLACE WITH:
Fire and police departments and other entities that specialize in emergency response may purchase emergency equipment powered by a non-California certified engine under the provisions specified in Title 13, Chapter 9, Article 1, Section 2403(f).

§ 1054.690 What bond requirements apply for certified engines?
DELETE.

Subpart H—Averaging, Banking and Trading for Certification

§1054.701 General Provisions.

DELETE,
REPLACE WITH:
Each manufacturer must comply with all provisions of the averaging, banking, and trading program outlined in Title 13, California Code of Regulations, Sections 2408-2409, for each engine family participating in that program.

Subpart I—Definitions and Other Reference Information

§ 1054.801 What definitions apply to this part?
DELETE,
REPLACE WITH:
The following definitions apply to this part. The definitions apply to all subparts unless we note otherwise. All undefined terms have the meaning California's Health and Safety Code gives to them. The definitions follow:

Adjustable parameter DELETE,
REPLACE WITH:
Adjustable parameter means any device, system, or element of design that someone can adjust (including those which are difficult to access) and that, if adjusted, may affect emissions or engine performance during emission testing or normal in-use operation.

* * * * *

Alcohol-fueled engine DELETE.

Amphibious vehicle DELETE.

Applicable emission standard or *applicable standard* DELETE,
REPLACE WITH:
Applicable emission standard or *applicable standard* means an emission standard to which an engine (or equipment) is subject. Additionally, if an engine (or equipment) has been or is being certified to another standard or FEL, *applicable emission standard* means the FEL or other standard to which the engine (or equipment) has been or is being certified.

* * * * *

ADD:
Certificate of Conformity means an Executive Order issued in accordance with the California Health and Safety Code, Division 26, Part 5 chapters 1 and 2.

Certification DELETE,
REPLACE WITH:
Certification means, with respect to new small off-road engines, obtaining an executive order for an engine family complying with the small off-road engine emission standards and requirements specified in the California Code of Regulations, Title 13, chapter 9, Sections 2400-2409.

Certified emission level DELETE.

Class I DELETE.

Class II DELETE.

Class III DELETE.

Class IV DELETE.

Class V DELETE.

Clean Air Act DELETE.

Cold-weather equipment DELETE.

Crankcase emissions DELETE.

* * * * *

Date of manufacture DELETE.

Days DELETE,
REPLACE WITH:
Days means calendar days unless otherwise specified. For example, when we specify working days we mean calendar days, excluding weekends and California state holidays.

Designated Compliance Officer DELETE,
REPLACE WITH:
Designated Compliance Officer means the Executive Officer of the Air Resources Board or a designee of the Executive Officer.

Designated Enforcement Officer DELETE.

* * * * *

Deterioration factor DELETE,
REPLACE WITH:
Deterioration factor means the relationship between emissions at the end of useful life and emissions at the low-hour test point (see §§1054.240 and 1054.245), expressed as the ratio of emissions at the end of useful life to emissions at the low-hour test point.

* * * * *

Dry weight DELETE.

* * * * *

Emission control system DELETE.

* * * * *

Engine DELETE,
REPLACE WITH:
Engine as used in this part, refers to small off-road engine.

* * * * *

Engine manufacturer DELETE.

ADD:
EPA means Air Resources Board.

* * * * *

Equipment manufacturer DELETE,
REPLACE WITH:
Equipment manufacturer means a manufacturer of equipment with an engine . All such equipment manufacturing entities under the control of the same person are considered to be a single equipment manufacturer.

Evaporative DELETE,
REPLACE WITH:
Evaporative means relating to fuel emissions controlled by Title 13, California Code of Regulations, Chapter 15, Article 1. This generally includes emissions that result from permeation of fuel through the fuel-system materials or from ventilation of the fuel system.

Excluded DELETE.

ADD:
Executive Order means an order issued by the Executive Officer of the Air Resources Board or his or her delegate certifying engines for sale in California.

Exempted DELETE.

* * * * *

Family emission limit (FEL) DELETE,
REPLACE WITH:
Family emission limit (FEL) means an emission level declared by the manufacturer that will be used in the ABT program. The family emission level will take the place of an otherwise applicable emission standard. The family emission limit must be expressed to the same number of decimal places as the

emission standard it replaces. The family emission limit serves as the emission standard for the engine family (exhaust) or emission family (evaporative) with respect to all required testing.

* * * * *

Fuel line DELETE.

* * * * *

Good engineering judgment DELETE.

Handheld DELETE,
REPLACE WITH:
Handheld means equipment that contains an engine with a displacement of less than 80cc.

* * * * *

Integrated equipment manufacturer DELETE.

* * * * *

Manufacturer DELETE.

Marine engine DELETE.

Marine generator engine DELETE.

Marine vessel DELETE.

* * * * *

Maximum test torque DELETE.

Model year DELETE.

Motor vehicle DELETE.

New nonroad engine DELETE.

New nonroad equipment DELETE.

Noncompliant engine or noncompliant equipment DELETE.

Nonconforming engine or nonconforming equipment DELETE.

* * * * *

Nonintegrated equipment manufacturer DELETE.

Nonmethane hydrocarbon DELETE,
REPLACE WITH:
Nonmethane hydrocarbon (NMHC) means the sum of all hydrocarbon species except methane. Refer to §1065.660 for NMHC determination.

* * * * *

Nonroad DELETE.

Nonroad engine DELETE,
REPLACE WITH:
Nonroad engine means a small off-road engine as defined in the California Code of Regulations, Title 13, Chapter 9, Section 2401.

* * * * *

Permeation emissions DELETE.

Phase 1 DELETE.

Phase 2 DELETE.

Phase 3 DELETE.

* * * * *

Pressurized oil system DELETE.

* * * * *

Rated-speed equipment DELETE
REPLACE WITH:
Rated-speed equipment means equipment in which the installed engine is intended for operation at a rated speed that is nominally 3600 rpm or higher.

Recreational application DELETE.

* * * * *

Revoke DELETE.

* * * * *

Running loss emissions DELETE.

* * * * *

Small-volume emission family DELETE.

Small-volume engine manufacturer DELETE,
REPLACE WITH:
Small-volume engine manufacturer means any engine manufacturer whose total production of small off-road engines slated for sale in California are projected at the time of certification of a given model year to be nor more than 500 engines.

Small-volume equipment manufacturer DELETE.

* * * * *

Structurally integrated nylon fuel tank DELETE.

Subchapter U DELETE.

Suspend DELETE.

* * * * *

Tethered gas cap DELETE.

* * * * *

Total hydrocarbon DELETE,
REPLACE WITH:
Total hydrocarbon (THC) means the combined mass of organic compounds measured by the specified procedure for measuring total hydrocarbon, expressed as a hydrocarbon with a hydrogen-to-carbon mass ratio of 1.85:1.
Total hydrocarbon equivalent DELETE,
REPLACE WITH:
Total hydrocarbon equivalent (THCE) means the sum of the carbon mass contributions of non-oxygenated hydrocarbons, alcohols and aldehydes, or other organic compounds that are measured separately as contained in a gas sample, expressed as exhaust hydrocarbon from petroleum-fueled engines. The hydrogen-to-carbon ratio of the equivalent hydrocarbon is 1.85:1.

* * * * *

Ultimate purchaser DELETE,
REPLACE WITH:

Ultimate purchaser means, with respect to any new small off-road equipment or new small off-road engine, the first person who in good faith purchases such new off-road equipment or new off-road engine for purposes other than resale.

United States DELETE.

Upcoming model year DELETE.

U.S.-directed production volume DELETE.

Useful life DELETE,
REPLACE WITH:
Useful life means the period during which the engine and equipment are designed to properly function in terms of power output and intended function, without being remanufactured, specified as a number of hours of operation or calendar years, whichever comes first. It is the period during which an off-road engine must comply with all applicable emission standards. If an engine has no hour meter, the specified number of hours does not limit the period during which an in-use engine is required to comply with emission standards unless the degree of service accumulation can be verified separately.

* * * * *

Vessel DELETE.

Void DELETE.

* * * * *

We (us, our) DELETE:
REPLACE WITH:
We (us, our) means the Air Resources Board and any authorized representatives.

* * * * *

§ 1054.805 What symbols, acronyms, and abbreviations does this part use?

* * * * *

§ 1054.815 What provisions apply to confidential information?
DELETE,
REPLACE WITH:
(a) Clearly show what you consider confidential by marking, circling, bracketing, stamping, or some other method.

(b) We will handle your confidential information as described in Title 17, California Code of Regulations, Section 91000-91022.

(c) If you send us information without claiming it is confidential, we may make it available to the public without further notice to you.

§ 1054.820 How do I request a hearing?
DELETE,
REPLACE WITH:
The hearing procedure set forth in Subchapter 1.25, Title 17, California Code of Regulations, Section 60040, et seq. apply to this subpart.

ADD:
§ 1054.821 Right of entry and access.

(a) Any engine manufacturer affected by these regulations, upon receipt of prior notice must admit or cause to be admitted during operating hours any ARB Enforcement Officer that has presented proper credentials to any of the following:

(1) Any facility where tests or procedures or activities connected with such tests or procedures are or were performed.

(2) Any facility where any new small off-road engine is present and is being, has been, or will be tested.

(3) Any facility where a manufacturer constructs, assembles, modifies, or builds-up an engine into a certification engine that will be tested for certification.

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

(b) Upon admission to any facility referred to in paragraph (c)(1) of this Section, any ARB Enforcement Officer must be allowed:

(1) 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 break-in, maintenance, and engine storage procedures.

(2) To verify correlation or calibration of test equipment; and,

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

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

(c) To permit an ARB determination whether production small off-road engines conform in all material respects to the design specifications that apply to those engines described in the Executive Order certifying such engines and to standards prescribed herein. Engine manufacturers must, upon receipt of prior notice, admit any ARB Enforcement Officer, upon presentation of credentials, to:

(1) 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 or used for certification testing into production engines is located or carried on; and,

(2) Any facility where any small off-road engines to be introduced into commerce are manufactured or assembled.

(3) Any California retail outlet where any small off-road engine is sold.

(d) On admission to any such facility referred to in this Section, any ARB Enforcement Officer must be allowed:

(1) To inspect and monitor any aspects of such manufacture or assembly and other procedures;

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

(3) To inspect and photograph any part or aspect of any such new small off-road engines and any component used in the assembly thereof that are reasonably related to the purpose of the Enforcement Officer's entry.

(e) Any ARB Enforcement Officer must be furnished by those in charge of a facility being inspected with such reasonable assistance as may be necessary to 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 the ARB irrespective of whether or not the applicant controls the facility.

(f) 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 engine manufacturers and facilities. The ARB will not attempt to make any inspections that it has been informed that local law forbids. However, if local law makes it impossible to insure the accuracy of data generated at a facility, no informed judgment that an engine is certifiable or is covered by an Executive Order can properly be based on the data. It is the responsibility of the engine manufacturer to locate its testing and manufacturing facilities in jurisdictions where this situation will not arise.

(g) For purposes of this Section:

(1) “Presentation of credentials” means a display of a document designating a person to be an ARB Enforcement Officer.

(2) Where engine, component, or engine storage areas or facilities are concerned, “operating hours” means all times during which personnel are at work in the vicinity of the area or facility and have access to it.

(3) Where facilities or areas other than those covered by paragraph (g)(2) of this Section are concerned, “operating hours” means all times during which an assembly line is in operation or during which testing, maintenance, break-in procedure, production or compilation of records, or any other procedure or activity is being conducted related to certification testing, translation of designs from the test stage to the production stage, or engine manufacture or assembly.

(4) “Reasonable assistance” includes, but is not limited to, providing clerical, copying, interpretation and translation services; making personnel available upon request to inform the ARB Enforcement Officer of how the facility operates and to answer questions; and performing requested emissions tests on any engine that is being, has been, or will be used for certification testing. Such tests must be nondestructive, but may require appropriate break-in. The engine manufacturer must be compelled to cause the personal appearance of any employee at such a facility before an ARB Enforcement Officer, upon written request from the Executive Officer for the appearance of any employee of a facility, and service of such request upon the engine manufacturer. Any such employee who has been instructed by the engine manufacturer to appear will be entitled to be accompanied, represented, and advised by counsel.

§ 1054.825 What reporting and recordkeeping requirements apply under this part?
DELETE,
REPLACE WITH:
The following items illustrate the kind of reporting and recordkeeping we require for engines and equipment regulated under this part:

* * * * *

(a) (1) DELETE.

(a) (2) DELETE.

(a) (3) DELETE.

(a) (4) DELETE.

(a) (5) DELETE.

* * * * *

(a) (8) DELETE.

(b) DELETE.

* * * * *

(d) DELETE.

Appendix II to Part 1054—Duty Cycles for Laboratory Testing

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PART 4

FINAL REGULATION ORDER TEST PROCEDURES
(Part 1065)

Small Off-Road Engines

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FINAL REGULATION ORDER TEST PROCEDURES

Note: This appendix shows the entirety of regulatory amendments to the test procedures titled below, which were approved by the Air Resources Board on December 16, 2011, and refined via subsequent conforming modifications authorized under Resolution 11-41. Incorporated by reference into these test procedures are portions of Title 40 of the Code of Federal Regulations (CFR) Part 1065 – Engine-Testing Procedures, Subparts A through K inclusive, as amended June 28, 2011; and, the internally referenced sections of Title 40 CFR, Parts 60, 80, 86, 90, 1054, and 1068. Sections that have been included in their entirety are set forth with the section number and title. California provisions that replace specific federal language provisions are denoted by the words "DELETE" for the federal language and "REPLACE WITH" or "ADD" for the California language. The notation [* * * * *] or [...] means that the remainder of the CFR text for a specific section is not shown in these procedures but has been incorporated by reference, with only the printed text changed. CFR sections that are not listed are not part of California's test procedures. If there is any conflict between the provisions of this document and the California Health and Safety Code, Division 26, or Title 13 of the California Code of Regulations (CCR), the Health and Safety Code and Title 13 apply.

This document is all newly adopted text.

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State of California
AIR RESOURCES BOARD

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2013 AND LATER SMALL OFF-ROAD ENGINES

ENGINE-TESTING PROCEDURES (PART 1065)

Adopted: October 25, 2012

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2013 AND LATER SMALL OFF-ROAD ENGINES

The following provisions of Part 1065, Title 40, Code of Federal Regulations, as promulgated by the United States Environmental Protection Agency on the date listed, are adopted and incorporated herein by this reference for 2013 model year and later small off-road engines as the California Exhaust Emission Standards and Test Procedures for New 2013 and Later Small Off-Road Engines, except as altered or replaced by the provisions set forth below.

PART 1065 – ENGINE-TESTING PROCEDURES

SOURCE: 76 FR 37977, June 28, 2011, unless otherwise noted.

Subpart A – Applicability and General Provisions

§ 1065.1 Applicability.

* * * * *

(a) DELETE,
REPLACE WITH:
(a) (1) This part applies to 2013 and later model year small off-road engines regulated under Title 13, California Code of Regulations, Chapter 9, Article 1, and subject to the emission standards in § 2403(b)(1) of that Article. These provisions do not apply to 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.

(2) Every new small off-road engine that is manufactured for sale, sold, offered for sale, introduced or delivered or imported into California for introduction into commerce and that is subject to any of the standards prescribed herein is required to be covered by an Executive Order issued pursuant to Article 1, Chapter 9, Title 13, California Code of Regulations, including these Test Procedures.

* * * * *

(d) DELETE,
REPLACE WITH:
Paragraph (a) of this section identifies the parts of the CFR that define emission standards and other requirements for particular types of engines. In this part, we refer

to each section of the Article 1, Chapter 9, Title 13, California Code of Regulations, and the incorporated CFR part 1054, generically as the ”standard-setting part.”

* * * * *

(g) DELETE,
REPLACE WITH:
For additional information regarding these test procedures, visit our Web site at http://www.arb.ca.gov/msprog/offroad/sore/sore.htm

§ 1065.2 Submitting information to ARB under this part.

* * * * *

§ 1065.5 Overview of this part 1065 and its relationship to the standard-setting part.

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§ 1065.10 Other procedures.

* * * * *

§ 1065.12 Approval of alternate procedures.

* * * * *

§ 1065.15 Overview of procedures for laboratory and field testing.`

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§ 1065.20 Units of measure and overview of calculations.

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§ 1065.25 Recordkeeping.

* * * * *

Subpart B – Equipment Specifications

§ 1065.101 Overview.

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§ 1065.110 Work inputs and outputs, accessory work, and operator demand.

* * * * *

§ 1065.120 Fuel properties and fuel temperature and pressure.

* * * * *

§ 1065.122 Engine cooling and lubrication.

(a) DELETE,
REPLACE WITH:
The use of auxiliary fans for engine cooling must be indicated in the application for certification. The manufacturer must detail the use of such fans and demonstrate that the supplemental cooling resulting from the use of the fans is representative of in-use engine operation. The records must be maintained by the manufacturer and must be made available to the Executive Officer upon request.

(b) DELETE

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§ 1065.125 Engine intake air.

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§ 1065.127 Exhaust gas recirculation.

* * * * *

§ 1065.130 Engine exhaust.

* * * * *

(g) DELETE

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§ 1065.140 Dilution for gaseous and PM constituents.

* * * * *

§ 1065.145 Gaseous and PM probes, transfer lines, and sampling system components.

* * * * *

§ 1065.150 Continuous sampling.

* * * * *

§ 1065.170 Batch sampling for gaseous and PM constituents.

* * * * *

§ 1065.190 PM-stabilization and weighing environments for gravimetric analysis.

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§ 1065.195 PM-stabilization environment for in-situ analyzers.

* * * * *

Subpart C – Measurement Instruments

§ 1065.201 Overview and general provisions.

* * * * *

§ 1065.202 Data updating, recording, and control.

* * * * *

§ 1065.205 Performance specifications for measurement instruments.

* * * * *

Measurement of Engine Parameters and Ambient Conditions

§ 1065.210 Work input and output sensors.

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§ 1065.215 Pressure transducers, temperature sensors, and dewpoint sensors.

* * * * *

Flow-Related Measurements

§ 1065.220 Fuel flow meter.

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§ 1065.225 Intake-air flow meter.

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§ 1065.230 Raw exhaust flow meter.

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§ 1065.240 Dilution air and diluted exhaust flow meters.

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§ 1065.245 Sample flow meter for batch sampling.

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§ 1065.248 Gas divider.

* * * * *

CO and CO_2 Measurements

§ 1065.250 Nondispersive infra-red analyzer.

* * * * *

Hydrocarbon Measurements

§ 1065.260 Flame-ionization detector.

* * * * *

§ 1065.265 Nonmethane cutter.

* * * * *

§ 1065.267 Gas chromatograph.

* * * * *

NO_x and N_2O Measurements

§ 1065.270 Chemiluminescent detector.

* * * * *

§ 1065.272 Nondispersive ultraviolet analyzer.

* * * * *

§ 1065.275 N_2O measurement devices.

* * * * *

O_2 Measurements

§ 1065.280 Paramagnetic and magnetopneumatic O_2 detection analyzers.

* * * * *

Air-to-Fuel Ratio Measurements

§ 1065.284 Zirconia (ZrO_2) analyzer.

* * * * *

PM Measurements

§ 1065.290 PM gravimetric balance.

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§ 1065.295 PM inertial balance for field testing analysis.

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Subpart D –Calibrations and Verifications

§ 1065.301 Overview and general provisions.

* * * * *

§ 1065.303 Summary of required calibration and verifications.

* * * * *

§ 1065.305 Verifications for accuracy, repeatability, and noise.

* * * * *

§ 1065.307 Linearity verification.

* * * * *

§ 1065.308 Continuous gas analyzer system-response and updating-recording verification – for gas analyzers not continuously compensated for other gas species.

* * * * *

§ 1065.309 Continuous gas analyzer system-response and updating-recording verification – for gas analyzers continuously compensated for other gas species.

* * * * *

Measurement of Engine Parameters and Ambient Conditions

§ 1065.310 Torque calibration.

* * * * *

§ 1065.315 Pressure, temperature, and dewpoint calibration.

* * * * *

Flow-Related Measurements

§ 1065.320 Fuel-flow calibration.

* * * * *

§ 1065.325 Intake-flow calibration.

* * * * *

§ 1065.330 Exhaust-flow calibration.

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§ 1065.340 Diluted exhaust flow (CVS) calibration.

* * * * *

§ 1065.341 CVS and batch sampler verification (propane check).

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§ 1065.342 Sample dryer verification.

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§ 1065.345 Vacuum-side leak verification.

* * * * *

CO and CO_2 Measurements

§ 1065.350 H_2O interference verification for CO_2 NDIR analyzers.

* * * * *

§ 1065.355 H_2O and CO_2 interference verification for CO NDIR analyzers.

* * * * *

Hydrocarbon Measurements

§ 1065.360 FID optimization and verification.

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§ 1065.362 Non-stoichiometric raw exhaust FID O_2 interference verification.

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§ 1065.365 Nonmethane cutter penetration fractions.

* * * * *

NO_x and N_2O Measurements

§ 1065.370 CLD CO_2 and H_2O quench verification.

* * * * *

§ 1065.372 NDUV analyzer HC and H_2O interference verification.

* * * * *

§ 1065.375 Interference verification for N_2O analyzers.

* * * * *

§ 1065.376 Chiller NO_2 penetration.

* * * * *

§ 1065.378 NO_2-to-NO converter conversion verification.

* * * * *

PM Measurements

§ 1065.390 PM balance verifications and weighing process verification.

* * * * *

§ 1065.395 Inertial PM balance verifications.

* * * * *

Subpart E – Engine Selection, Preparation, and Maintenance

§ 1065.401 Test engine selection.

* * * * *

§ 1065.405 Test engine preparation and maintenance.

* * * * *

§ 1065.410 Maintenance limits for stabilized test engines.

* * * * *

§ 1065.415 Durability demonstration.

* * * * *

Subpart F –Performing an Emission Test in the Laboratory

§ 1065.501 Overview.

* * * * *

§ 1065.510 Engine mapping.

* * * * *

§ 1065.512 Duty cycle generation.

* * * * *

§ 1065.514 Cycle-validation criteria for operation over specified duty cycles.

* * * * *

§ 1065.520 Pre-test verification procedures and pre-test data collection.

* * * * *

§ 1065.525 Engine starting, restarting, and shutdown, and optional repeating of void discrete modes.

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§ 1065.526 Repeating void modes or test intervals.

* * * * *

§ 1065.530 Emission test sequence.

* * * * *

§ 1065.545 Validation of proportional flow control for batch sampling.

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§ 1065.546 Validation of minimum dilution ration for PM batch sampling.

* * * * *

§ 1065.550 Gas analyzer range validation, drift validation, and drift correction.

* * * * *

§ 1065.590 PM sampling media (e.g., filters) preconditioning and tare weighing.

* * * * *

§ 1065.595 PM sample post-conditioning and total weighing.

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Subpart G –Calculations and Data Requirements

§ 1065.601 Overview.

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§ 1065.602 Statistics.

* * * * *

§ 1065.610 Duty cycle generation.

* * * * *

§ 1065.630 1980 international gravity formula.

* * * * *

§ 1065.640 Flow meter calibration calculations.

* * * * *

§ 1065.642 SSV, CFV, and PDP molar flow rate calculations.

* * * * *

§ 1065.644 Vacuum-decay leak rate.

* * * * *

§ 1065.645 Amount of water in an ideal gas.

* * * * *

§ 1065.650 Emission calculations.

* * * * *

ADD:
(i) For PM testing, engine manufacturers must use the particulate sampling test procedure specified in this part 1065 or any similar procedure that has been approved by the Executive Officer. For two-stroke engines, engine manufacturers may, in lieu of testing, determine PM emissions through the following equation:

$$PM_{est} = \frac{HC}{\text{Fuel to oil ratio}}$$

Where HC = weighted hydrocarbons in g/kW-hr, and
Fuel to oil ratio = the fuel to oil ratio used in the test engine.

Engine manufacturers may report this estimate as PM_{est}, and indicate that the PM emissions were estimated as per this paragraph.

§ 1065.655 Chemical balances of fuel, intake air, and exhaust.

* * * * *

§ 1065.659 Removed water correction.

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§ 1065.660 THC, NMHC, and CH_4 determination.

* * * * *

§ 1065.665 THCE and NMHCE determination.

* * * * *

§ 1065.667 Dilution air background emission correction.

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§ 1065.670 NO_x intake-air humidity and temperature corrections.

* * * * *

§ 1065.672 Drift correction.

* * * * *

§ 1065.675 CLD quench verification calculations.

* * * * *

§ 1065.690 Buoyancy correction for PM sample media.

* * * * *

§ 1065.695 Data requirements.

* * * * *

Subpart H –Engine Fluids, Test Fuels, Analytical Gases and Other Calibration Standards

§ 1065.701 General requirements for test fuels.

(a) DELETE,
REPLACE WITH:

(a) Certification test fuel.

(1) The certification test fuel used for emission testing must be consistent with the fuel specifications as outlined in the California Code of Regulations, title 13, §1960.1, and the "California Exhaust Emission Standards and Test Procedures for 2001 – 2014 Model Passenger Cars, Light Duty Trucks, and Medium-Duty Vehicles", as last amended [insert latest amendment date], and as incorporated by reference herein. The test fuel specification should remain consistent from batch to batch. If a particular engine requires a different octane fuel, test records should indicate the fuel used.

(2) For 2020 and later gasoline-fueled engines: The certification test fuel for emission testing must be consistent with the fuel specifications as outlined in title 13, section 1961.2 and the "California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," adopted [insert adoption date], and incorporated by reference herein. The test fuel specifications must remain consistent from batch to batch. Optionally, manufacturers may use other renewable fuel blends under this paragraph that have been certified by ARB as yielding test results equivalent, or more stringent than, those resulting from the fuel specified by 13 CCR 1961.2, and which are appropriate for the certification of small off-road engines.

(3) For 2013 – 2019 model-year gasoline-fueled engines, the manufacturer has the option to use the certification test fuel specified in §1065.701(a)(2).

(4) Alcohol-based fuels. Alcohol-based fuels must be allowed for emission test purposes when the appropriate emission standards with respect to such fuels are a part of these provisions. Such fuels must be as specified in either §1065.701(a)(1) or §1065.701(a)(2), as applicable.

(b) DELETE,
REPLACE WITH:
With Executive Officer approval, the certifying entity may use other test fuels so long as they do not affect the demonstration of compliance.

* * * * *

(f) DELETE,
REPLACE WITH:

(f) Test fuels – service accumulation and aging.

(1) Gasoline.

(i) Gasoline representative of commercial gasoline generally available through retail outlets must be used in service accumulation and aging for gasoline fueled, spark ignition engines. As an alternative, the certification test fuels specified under either §1054.501(b)(2)(ii)(A) or §1054.501(b)(2)(ii)(B), as applicable, may be used for engine service accumulation and aging.

(ii) The octane rating of the gasoline used for service accumulation and aging must be no higher than 4.0 Research Octane Numbers above the minimum recommended by the engine manufacturer when a certification fuel is not used for service accumulation, and must have a minimum sensitivity of 7.5 Octane Numbers. Sensitivity is the Research Octane Number minus the Motor Octane Number.

(iii) The Reid Vapor Pressure of a gasoline used for service accumulation and aging must be characteristic of the engine fuel during the season in which the service accumulation takes place in the outdoors, or must be characteristic of the engine fuel appropriately suited to the ambient conditions of an indoor test cell in which the entire service accumulation takes place.

(2) Alternative fuels.

(i) Liquefied petroleum gas meeting the ASTM D1835 (11/10/1997) or NGPA HD-5 (1970) specifications must be used for service accumulation.

(ii) Natural gas representative of commercial natural gas that is available locally to the manufacturer's test site may be used in service accumulation. The manufacturer must provide the Executive Officer with detail of how the commercial natural gas differs from the certification test fuel specifications.

* * * * *

§ 1065.703 Distillate diesel fuel.

DELETE

§ 1065.705 Residual and intermediate residual fuel.

DELETE

§ 1065.710 Gasoline.

DELETE

§ 1065.715 Natural gas.

DELETE

§ 1065.720 Liquefied petroleum gas.

DELETE

§ 1065.740 Lubricants.

* * * * *

ADD:
(c) 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.

§ 1065.745 Coolants.

* * * * *

§ 1065.750 Analytical gases.

* * * * *

§ 1065.790 Mass standards.

* * * * *

Subpart I – Testing with Oxygenated Fuels

§ 1065.801 Applicability.

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§ 1065.805 Sampling system.

* * * * *

§ 1065.845 Response factor determination.

* * * * *

§ 1065.850 Calculations.

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Subpart J – Field Testing and Portable Emission Measurement Systems

§ 1065.901 Applicability.

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§ 1065.905 General provisions.

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§ 1065.910 PEMS auxiliary equipment for field testing.

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§ 1065.915 PEMS instruments.

* * * * *

§ 1065.920 PEMS calibrations and verifications.

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§ 1065.925 PEMS preparation for field testing.

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§ 1065.930 Engine starting, restarting, and shutdown.

* * * * *

§ 1065.935 Emission test sequence for field testing.

* * * * *

§ 1065.940 Emission calculations.

* * * * *

Subpart K – Definitions and Other Reference Information

§ 1065.1001 Definitions.

ADD:
The definitions in Section 2401, Chapter 9, Title 13 of the California Code of Regulations, 40 CFR 1054.801, and 1068.30 apply with the following additions:

* * * * *

Act DELETE.

Adjustable parameter DELETE,
REPLACE WITH:
Adjustable parameter means any device, system, or element of design that someone can adjust (including those which are difficult to access) and that, if adjusted, may affect emissions or engine performance during emission testing or normal in-use operation. This includes, but is not limited to, parameters related to injection timing and fueling rate. You may ask us to exclude a parameter that is difficult to access if it cannot be adjusted to affect emissions without significantly degrading engine performance, or if you otherwise show us that it will not be adjusted in a way that affects emissions during in-use operation.

* * * * *

Aftertreatment DELETE,
REPLACE WITH:
Aftertreatment means relating to a catalytic converter, particulate filter, thermal reactor, or any other system, component, or technology mounted downstream of the exhaust valve (or exhaust port) whose design function is to decrease emissions in the engine exhaust before it is exhausted to the environment. Exhaust-gas recirculation (EGR), turbochargers, and oxygen sensors are not aftertreatment.

* * * * *

Applicable standard DELETE,
REPLACE WITH:
Applicable emission standard or *applicable standard* means an emission standard to which an engine (or equipment) is subject. Additionally, if an engine (or equipment) has been or is being certified to another standard or FEL, *applicable emission standard* means the FEL or other standard to which the engine (or equipment) has been or is being certified.

* * * * *

Brake power DELETE,
REPLACE WITH:
Brake power means the usable power output of the engine, not including power required to fuel, lubricate, or heat the engine, circulate coolant to the engine, or to operate aftertreatment devices.

* * * * *

Calibration DELETE,
REPLACE WITH:
Calibration means the set of specifications and tolerances specific to a particular design, version, or application of a component or assembly capable of functionally describing its operation over its working range.

* * * * *

ADD:
Certificate of Conformity means an Executive Order issued in accordance with the California Health and Safety Code, Division 26, Part 5.

Certification DELETE,
REPLACE WITH:
Certification means, with respect to new small off-road engines, obtaining an executive order for an engine family complying with the small off-road engine emission standards and requirements specified in the California Code of Regulations, Title 13, Chapter 9, Sections 2400-2409.

* * * * *

Designated Compliance Officer DELETE,
REPLACE WITH:
Designated Compliance Officer means the Executive Officer of the Air Resources Board, or a designee of the Executive Officer.

* * * * *

Discrete-mode DELETE,
REPLACE WITH:
Discrete-mode means relating to the discrete-mode type of steady-state test described in §1054.505.

* * * * *

Engine DELETE,
REPLACE WITH:
Engine as used in this part, refers to small off-road engine.

* * * * *

ADD:
EPA means Air Resources Board.

ADD:
Executive Order means an order issued by the Executive Officer of the Air Resources Board or his or her delegate certifying engines for sale in California.

* * * * *

Fuel type DELETE,
REPLACE WITH:
Fuel type means a general category of fuels such as gasoline or natural gas. There can be multiple grades within a single fuel type, such as low-temperature or all-season gasoline.

Good engineering judgment DELETE.

* * * * *

Hydrocarbon DELETE,
REPLACE WITH:
Hydrocarbon (HC) means the hydrocarbon group on which the emission standards are based for each fuel type, as described in subpart B of 40 CFR 1054.

* * * * *

Manufacturer DELETE.

* * * * *

Nonroad engine DELETE,
REPLACE WITH:
Nonroad engine means a small off-road engine as defined in the California Code of Regulations, Title 13, Chapter 9, Section 2401.

* * * * *

Ramped-modal DELETE,
REPLACE WITH:
Ramped-modal means ramped-modal type of steady-state test, as described in 40 CFR 1054.

* * * * *

ADD:
Small volume engine manufacturer means any engine manufacturer whose total production of small off-road engines slated for sale in California are projected at the time of certification of a given model year to be no more than 500 engines.

* * * * *

Steady-state DELETE,
REPLACE WITH:
Steady-state means relating to emission tests in which engine speed and load are held at a finite set of essentially constant values. Steady-state tests are either discrete-mode tests or ramped-modal tests.

* * * * *

Test sample DELETE,
REPLACE WITH:
Test sample means the collection of engines selected from the population of an emission family for emission testing. This may include testing for certification, production-line testing, or in-use testing.

* * * * *

United States DELETE.

* * * * *

Useful life DELETE,
REPLACE WITH:
Useful life means the period during which the engine and equipment are designed to properly function in terms of power output and intended function, without being remanufactured, specified as a number of hours of operation or calendar years, whichever comes first. It is the period during which an off-road engine must comply with

all applicable emission standards. If an engine has no hour meter, the specified number of hours does not limit the period during which an in-use engine is required to comply with emission standards unless the degree of service accumulation can be verified separately.

* * * * *

We (us, our) DELETE,
REPLACE WITH:
We (us, our) means the Executive Officer of the Air Resources Board or a designee of the Executive Officer.

* * * * *

§ 1065.1005 Symbols, abbreviations, acronyms, and units of measure.

* * * * *

§ 1065.1010 Reference materials.

* * * * *

State of California
AIR RESOURCES BOARD

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2000 AND LATER TIER 1, TIER 2, AND TIER 3 OFF-ROAD COMPRESSION-IGNITION ENGINES

PART I-B

Adopted: January 28, 2000
Amended: October 20, 2005

NOTE: This document incorporates by reference 40 Code of Federal Regulations (CFR) part 89, subparts A, B, C, D, E, F, G, H, I, J, and K, including Appendix A to subpart A, Appendix A and B to subpart E, and Appendix A to subpart F, as most recently amended July 13, 2005, and 40 CFR Part 85, Subpart T and 40 CFR Part 86, Subparts A, D, I, and N. This document is printed in a style to indicate changes from the existing provisions. All existing language is indicated by plain type. All additions to language are indicated by underlined text. All deletions to language are indicated by ~~strikeout~~. Only those portions containing the suggested modifications from the existing provisions are included. Sections that have been included in their entirety are set forth with the section number and title. California provisions that replace specific federal language provisions are denoted by the words "DELETE" for the federal language and "REPLACE WITH" or "ADD" for the California language. The symbols "*****" and "..." mean that the remainder of the CFR text for a specific section is not shown in these procedures but has been incorporated by reference, unchanged. CFR sections that are not listed are not part of the test procedures. If there is any conflict between the provisions of this document and the California Health and Safety Code, Division 26, or Title 13 of the California Code of Regulations, the Health and Safety Code and Title 13 apply.

Table of Contents

CALIFORNIA EMISSION STANDARDS AND TEST PROCEDURES
FOR NEW 2000 AND LATER TIER 1, TIER 2, AND TIER 3 OFF-ROAD
COMPRESSION-IGNITION ENGINES

The following provisions of Part 89, Title 40, Code of Federal Regulations, as adopted or amended by the U. S. Environmental Protection Agency on the date listed, are adopted and incorporated herein by this reference for 2000 model year and later off-road compression-ignition engines subject to the requirements of the California Code of Regulations, Title 13, Section 2423(b)(1)(A), as the California Emission Standards and Test Procedures for New 2000 and Later Tier 1, Tier 2, and Tier 3 Off-Road Compression-Ignition Engines, except as altered or replaced by the provisions set forth below.

Part 89 – CONTROL OF EMISSIONS FROM NEW AND IN-USE NONROAD COMPRESSION-IGNITION ENGINES

SOURCE: 63 FR 56967, October 23, 1998, and as amended in 69 FR 38957, June 29, 2004, and 70 FR 40444, July 13, 2005, unless otherwise noted.

Subpart A – General.

89.1 Applicability.

* * * * *

(b)(6) DELETE,
REPLACE WITH:
Tier 4 Engines. This part is not applicable to engines that are subject to the emission standards in the California Code of Regulations, Title 13, Section 2423(b)(1)(B).

(c) DELETE,
REPLACE WITH:
As an alternative to the otherwise applicable requirements of the California Code of Regulations, Title 13, Section 2430 (et. seq.), manufacturers of off-road liquefied petroleum gas or natural gas spark-ignition engines with rated power greater than or equal to 250 kilowatts may instead obtain an Executive Order for these engines by certifying them to the requirements of the California Code of Regulations, Title 13, Section 2420 (et. seq.), and these 2000 Plus Limited Test Procedures.

89.2 Definitions.

ADD:
40 CFR part 1039 means Part 1039 and applicable subparts of the “2008 and Later Test Procedures” when referenced in unrevised sections.

ADD:
40 CFR part 1065 means Part 1065 and applicable subparts of the “2008 and Later Test Procedures” when referenced in unrevised sections.

ADD:
40 CFR part 1068 means Part 1068 and applicable subparts of the “2008 and Later Test procedures” when referenced in unrevised sections.

* * * * *

“Act” DELETE.

* * * * *

“Administrator” DELETE,
REPLACE WITH:
“Administrator” means the Executive Officer of the Air Resources Board (or the Executive Officer’s designee).

* * * * *

ADD:
“ARB” means the California Air Resources Board.

ADD:
“Assistant Administrator for Air and Radiation” means the Executive Officer of the Air Resources Board (or the Executive Officer’s designee).

ADD:
“Assistant Administrator for Enforcement” means the Executive Officer of the Air Resources Board (or the Executive Officer’s designee).

* * * * *

ADD:
“Certificate of conformity” means an Executive Order issued in accordance with the California Health and Safety Code, Division 26, Part 5.

“Certification” DELETE,
REPLACE WITH:
“Certification” means, with respect to new off-road compression-ignition engines, obtaining an Executive Order for an engine family complying with the off-road engine emission standards and requirements specified in the California Code of Regulations, Title 13, Section 2423.

ADD:
“Certified configuration” or “certified emissions configuration” means the assembled state of an engine that is equipped with a complete set of emission-related components and systems that are equivalent from an emissions standpoint (i.e., tolerances, calibrations, and specifications) to those components and systems that (A) were originally installed on the engine when it was issued an Executive Order, (B) have been approved by the engine manufacturer to supersede any of the original emission-related components and systems for that engine, or (C) are direct replacement parts equaling or exceeding the emissions-related performance of the original or superseded components and systems.

ADD:
“Chief, Selective Enforcement Auditing Section” means Chief, Mobile Source Operations Division, 9528 Telstar Avenue, El Monte, California 91731.

ADD:
“Clean Air Act” or the “Act” means California Health and Safety Code, Division 26, and corresponding regulations, except where the context indicates otherwise.

“Compression-ignition” DELETE,
REPLACE WITH:
“Compression-ignition engine” means a type of engine with operating characteristics significantly similar to the theoretical Diesel combustion cycle. The non-use of a throttle to regulate intake flow for controlling power during normal operation is indicative of a compression-ignition engine. A compression-ignition engine may be petroleum-fueled (i.e., diesel-fueled) or alternate-fueled. All engines and equipment that fall within the scope of the preemption of Section 209(e)(1)(A) of the Federal Clean Air Act (42 U.S.C. 7543(e)(1)(A)), as amended, and as defined by regulation of the Environmental Protection Agency, are specifically not included within this category.

* * * * *

ADD:
“Director, Engine Programs and Compliance Division” or “Engine Programs and Compliance Division of the EPA” means Chief, Mobile Source Operations Division, 9528 Telstar Avenue, El Monte, California 91731.

“EPA enforcement officer” DELETE,
REPLACE WITH:
“EPA enforcement officer” means an “ARB enforcement officer,” (or “ARB”) which means any employee of the Air Resources Board so designated in writing by the Executive Officer of the Air Resources Board or by the Executive Officer’s designee.

* * * * *

“Model year” DELETE,
REPLACE WITH:
“Model year” means the manufacturer’s annual production period, which includes January 1 of a calendar year or if the manufacturer has no annual production period, the calendar year.

“Nonroad engine” DELETE,
REPLACE WITH:
“Nonroad engine” means an off-road compression-ignition engine.

“Nonroad equipment” DELETE,
REPLACE WITH:
“Nonroad equipment” means equipment powered by off-road compression-ignition engines.

“Nonroad vehicle” DELETE,
REPLACE WITH:
“Nonroad vehicle” means a vehicle that is powered by an off-road compression-ignition engine.

* * * * *

ADD:
“Off-road compression-ignition engine” means:
(a) Except as specified in paragraph (b) of this definition, an off-road compression-ignition engine is any internal combustion engine:

(i) in or on a piece of equipment that is self-propelled or serves a dual purpose by both propelling itself and performing another function and is primarily used off the highways (such as garden tractors, off-highway mobile cranes and bulldozers); or

(ii) in or on a piece of equipment that is intended to be propelled while performing its function (such as lawnmowers and string trimmers); or

(iii) that, by itself or in or on a piece of equipment, is portable or transportable, meaning designed to be and capable of being carried or moved from one location to another. Indicia of transportability

include, but are not limited to wheels, skids, carrying handles, dolly, trailer, or platform.

(b) An internal combustion engine is not an off-road compression-ignition engine if:

(i) the engine is used to propel a vehicle subject to the emissions standards contained in Title 13, California Code of Regulations, Sections1950-1978, or a vehicle used solely for competition, or is subject to standards promulgated under section 202 of the federal Clean Air Act (42 U.S.C. 7521); or

(ii) the engine is regulated by a federal New Source Performance Standard promulgated under section 111 of the 1990 Clean Air Act (42 U.S.C. 7511); or

(iii) the engine otherwise included in paragraph (a)(iii) of this definition remains or will remain at a location for more than 12 consecutive months or a shorter period of time for an engine located at a seasonal source. A location is any single site at a building, structure, facility, or installation. Any engine (or engines) that replaces an engine at a location and that is intended to perform the same or similar function as the engine replaced will be included in calculating the consecutive period. An engine located at a seasonal source is an engine that remains at a seasonal source during the full operating period of the seasonal source. A seasonal source is a stationary source that remains in a single location on a permanent basis (i.e., at least two years) and that operates at a single location approximately three months (or more) each year. This paragraph does not apply to an engine after the engine is removed from the location.

* * * * *

ADD:
ADDENDUM: The definitions in the California Health and Safety Code and in Title 13, California Code of Regulations, Section 2421 shall apply.

89.3 Acronyms and abbreviations.

* * * * *

ADD:
ARB – Air Resources Board.

* * * * *

89.4 [Reserved]

89.5 Table and figure numbering; position.

* * * * *

89.6 Reference materials.

(a) DELETE,
REPLACE WITH:
"*Incorporation by reference*. The documents in paragraph (b) of this section are incorporated by reference.

* * * * *

(3) DELETE.

89.7 Treatment of confidential information.

DELETE,
REPLACE WITH:
Any manufacturer may assert that some or all of the information submitted pursuant to Title 13, California Code of Regulations, Division 3, Chapter 9, Article 4 (Off-Road Compression-Ignition Engines and Equipment) is entitled to confidential treatment as provided by Title 17, California Code of Regulations, Sections 91000-91022.

Appendix A to Subpart A – State Regulation of Nonroad Internal Combustion Engines

* * * * *

[62 FR 67736, December 30, 1997]

Subpart B – Emission Standards and Certification Provisions.

89.101 Applicability.

* * * * *

89.102 Effective dates, optional inclusion, flexibility for equipment manufacturers.

(a) DELETE,
REPLACE WITH:
This subpart applies to all off-road compression-ignition engines subject to the emission standards listed in the California Code of Regulations, Title 13, Section 2423(b)(1)(A):

* * * * *

(d) Introductory text DELETE,
REPLACE WITH:
Implementation flexibility for equipment and vehicle manufacturers and post-manufacture marinizers. For a limited time, off-road equipment and vehicle manufacturers and post-manufacture marinizers may produce equipment with engines that are subject to less stringent emission standards than required by this part, subject to the requirements of paragraph (e) of this section. The following allowances apply separately to each engine power category subject to standards under 89.112:

(d)(1)(i) DELETE,
REPLACE WITH:
Equipment rated at or above 37 kW. A manufacturer may produce equipment and vehicles with engines rated at, or above, 37 kW that are exempted from meeting current model year emission standards for a portion of its California-directed production volume. These percent-of-production flexibility allowances must be used within the seven years immediately following the date on which Tier 2 engine standards first apply to engines used in such equipment and vehicles, provided that the seven-year sum of the U.S.-directed portion of the manufacturer's percent-of-production flexibility allowances does not exceed 80 percent, expressed in yearly percentage increments, and provided that all such equipment and vehicles contain only engines that have been certified to the Tier 1 or Tier 2 standards;

(d)(1)(ii) DELETE,
REPLACE WITH:
Equipment rated under 37kW and subject to the standards in California Code of Regulations, Title 13, Section 2423(b)(1)(A). A manufacturer or

post-manufacture marinizer may produce equipment and vehicles and marine engines with engines rated under 37 kW that are exempt from meeting current model year emission standards for a portion of its California-directed production volume. These percent-of-production flexibility allowances must be used within the seven years immediately following the date on which Tier 1 engine standards first apply to engines used in such equipment and vehicles and marine engines, provided that the seven-year sum of the U.S.-directed portion of the manufacturer's percent-of-production flexibility allowances does not exceed 80 percent, expressed in cumulative yearly percentage increments;

* * * * *

(e)(1) DELETE,
REPLACE WITH:
(2423(e)(1) – duplicate text)

* * * * *

(f) DELETE,
REPLACE WITH:
The language in California Code of Regulations, Title 13, Section 2423(f) shall apply.

(g) DELETE,
REPLACE WITH:
Allowance for the production of engines. To meet the demand for engines created under paragraph (d), (f), or (h) of this section, engine manufacturers may produce engines that do not meet current year emission requirements. Engine manufacturers shall provide to the Executive Officer annually, as part of the certification application, a list of the equipment manufacturers requesting such engines for their equipment flexibility allowances. The list shall include the equipment manufacturers' names, engine models, and estimated national production volumes. Notwithstanding, all engines produced for sale in California under either of the transitional flexibility provisions for equipment manufacturers, starting January 1, 2007, must be covered by an Executive Order. To obtain an Executive Order for these engines, the engine manufacturer must comply with the following:

(1) Prior to the start of production, submit a letter to the Chief of the Mobile Source Operations Division, or designee, requesting certification for flexibility engines intended for sale in California, and

(2) Provide written assurance that the flexibility engines to be produced will be identical in all material respects to those for which a valid

Executive Order has been issued in a previous model year. The engine family name of the previously certified engine family must be included in the manufacturer's request for certification.

Upon determination that the conditions in paragraphs (1) and (2) have been satisfied, the engine manufacturer shall be provided with an Executive Order covering the requested flexibility engine families for the current model year. The engine family names included in the Executive Order shall either be the same as, or a subset of the previously certified engine family names, and will remain the same for as long as the engines continue to qualify as flexibility allowances regardless of model year. These engine family names shall be used by the engine manufacturer to comply with the labeling requirements of 2423(d)(5)(A).

* * * * *

89.103 Definitions.

DELETE,
REPLACE WITH:
The definitions in subpart A apply to this subpart. All terms not defined herein or in subpart A have the meaning given them in the California Health and Safety Code and the California Code of Regulations, Title 13.

89.104 Useful life, recall, and warranty periods.

* * * * *

89.105 Certificate of conformity.

DELETE,
REPLACE WITH:
Every manufacturer of a new off-road compression-ignition engine must obtain an Executive Order covering the engine family, as described in Section 89.116 of this Subpart. The Executive Order must be obtained from the Executive Officer prior to selling, offering for sale, introducing into commerce, or importing into California the new off-road compression-ignition engine for each model year.

89.106 Prohibited controls.

* * * * *

89.107 Defeat devices.

* * * * *

89.108 Adjustable parameters, requirements.

* * * * *

89.109 Maintenance instructions and minimum allowable maintenance intervals.

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89.110 Emission control information label.

* * * * *

(b)(10) DELETE,
REPLACE WITH:
The statement: “This engine conforms to (model year) California and U.S. EPA regulations for off-road compression-ignition engines.”;

* * * * *

ADD:

(e) *Labeling requirements.* Except for engines used in flexibility allowances prior to January 1, 2007, engine manufacturers shall meet the labeling requirements provided in Section 2424 with the following substitutions:

For flexibility engines meeting previous year emission requirements, the engine manufacturer shall substitute the following for the statement of compliance required in Sections 2424(c)(1)(E)6 and 2424(c)(2):

> “THIS ENGINE COMPLIES WITH CALIFORNIA EMISSION REQUIREMENTS UNDER 13 CCR 2423(d). SELLING OR INSTALLING THIS ENGINE FOR ANY PURPOSE OTHER THAN FOR THE EQUIPMENT FLEXIBILITY PROVISIONS CITED MAY BE A VIOLATION OF STATE LAW SUBJECT TO CIVIL PENALTY.” [Insert Engine Family Name]

For flexibility engines less than 37 kW and not subject to emission requirements, the engine manufacturer shall substitute the following for the statement of compliance required in Section 2424(c)(1)(E)6:

> “THIS ENGINE QUALIFIES FOR USE IN EQUIPMENT RATED BELOW 37 KW BY PROVISION OF 13 CCR 2423(d). SELLING OR INSTALLING THIS ENGINE FOR ANY PURPOSE OTHER THAN FOR THE EQUIPMENT FLEXIBILITY PROVISIONS CITED MAY BE A VIOLATION OF CALIFORNIA LAW SUBJECT TO CIVIL PENALTY.”

As an alternative, flexibility engine manufacturers offering proof to the Executive Officer that the otherwise required statements of compliance in this subsection would be unduly burdensome or costly to implement, may instead use the following:

> "THIS ENGINE CONFORMS TO CALIFORNIA OFF-ROAD COMPRESSION-IGNITION ENGINE REGULATIONS UNDER 13 CCR 2423(d)." [Insert Engine Family Name if Certified]

These revised statements of compliance do not preclude the referencing of similar federal requirements that would be satisfied simultaneously by meeting the provisions of Section 2423(d). Furthermore, the Executive Officer may, upon request, approve alternate labeling specifications that are equivalent to the specifications in this subsection.

89.111 Averaging, banking, and trading of exhaust emissions.

* * * * *

89.112 Oxides of nitrogen, carbon monoxide, hydrocarbon, and particulate matter exhaust emission standards.

* * * * *

(c) DELETE,
REPLACE WITH:
Exhaust emission of particulate matter is measured using the PM and Test Cycle Limited Procedures.

* * * * *

(f)(3) DELETE,
REPLACE WITH:
Test procedures. NOx, NMHC, and PM emissions are measured using the procedures set forth in 40 CFR part 1065 (July 13, 2005), which is incorporated by reference, in lieu of the procedures set forth in subpart E of this part. CO emissions may be measured using procedures set forth either in 40 CFR part 1065, or in subpart E of this part. Manufacturers may use an alternate procedure to demonstrate the desired level of control if approved in advance by the Executive Officer. Engines meeting the requirements to qualify as Blue Sky Series engines must be capable of maintaining a comparable level of emission control when tested using the procedures set forth in paragraph (c) of this section and subpart E of this part. The numerical emission levels measured using the procedures from subpart E of this part may be up to 20 percent higher than those measured using procedures from 40 CFR part 1065, subpart N (July 13, 2005), and still be considered comparable.

89.113 Smoke emission standard.

* * * * *

89.114 Special and alternate test procedures.

* * * * *

89.115 Application for certificate.

* * * * *

89.116 Engine families.

* * * * *

89.117 Test fleet selection.

* * * * *

89.118 Deterioration factors and service accumulation.

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89.119 Emission tests.

* * * * *

(a)(1)(ii) DELETE,
REPLACE WITH:
PM and Test Cycle Limited Procedures, and

(a)(1)(iii) DELETE,
REPLACE WITH:
40 CFR part 86, subpart I (July 1, 1999).

* * * * *

89.120 Compliance with emission standards.

* * * * *

89.121 Certificate of conformity effective dates.

* * * * *

89.122 Certification.

* * * * *

89.123 Amending the application and certification of conformity.

* * * * *

89.124 Record retention, maintenance, and submission.

* * * * *

89.125 Production engines, annual report.

* * * * *

89.126 Denial, revocation of certificate of conformity.

* * * * *

89.127 Request for hearing.

DELETE,
REPLACE WITH:
A manufacturer may request a hearing on an Executive Officer's decision regarding certification, as specified in Title 17, California Code of Regulations, Division 3, Chapter 1, Subchapter 1.25, Articles 1 and 2.

89.128 Hearing procedures.

DELETE.

89.129 Right of entry.

* * * * *

89.130 Rebuild practices.

DELETE,
REPLACE WITH:
The provisions in Section 1068.120 of the “2008 and Later Test Procedures” shall apply for the rebuilding of engines that are subject to the requirements of the California Code of Regulations, Title 13, Section 2423(b)(1)(A), except Tier 1 engines rated at or above 37 kW. The provisions in the California Code of Regulations, Title 13, Section 2423(l), shall apply for labeling rebuilt engines.

Subpart C – Averaging, Banking, and Trading Provisions.

89.201 Applicability.

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89.202 Definitions.

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89.203 General provisions.

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89.204 Averaging.

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89.205 Banking.

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89.206 Trading.

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89.207 Credit calculation.

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89.208 Labeling.

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89.209 Certification.

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89.210 Maintenance of records.

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89.211 End-of-year and final reports.

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89.212 Notice of opportunity for hearing.

DELETE,
REPLACE WITH:
A manufacturer may request a hearing on an Executive Officer's decision regarding certification, as specified in Title 17, California Code of Regulations, Division 3, Chapter 1 Subchapter 1.25, Articles 1 and 2.

Subpart D – Emission Test Equipment Provisions

89.301 Scope; applicability.

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89.302 Definitions.

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89.303 Symbols/abbreviations.

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89.304 Equipment required for gaseous emissions; overview.

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89.305 Equipment measurement accuracy/calibration frequency.

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89.306 Dynamometer specifications and calibration weights.

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89.307 Dynamometer calibration.

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89.308 Sampling system requirements for gaseous emissions.

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89.309 Analyzers required for gaseous emissions.

* * * * *

89.310 Analyzer accuracy and specifications.

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89.311 Analyzer calibration frequency.

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89.312 Analytical gases.

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89.313 Initial calibration of analyzers.

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89.314 Pre- and post-test calibration of analyzers.

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89.315 Analyzer bench checks.

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89.316 Analyzer leakage and response time.

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89.317 NOx converter check.

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89.318 Analyzer interference checks.

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89.319 Hydrocarbon analyzer calibration.

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89.320 Carbon monoxide analyzer calibration.

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89.321 Oxides of nitrogen analyzer calibration.

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89.322 Carbon dioxide analyzer calibration.

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89.323 NDIR analyzer calibration.

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89.324 Calibration of other equipment.

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89.325 Engine intake air temperature measurement.

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89.326 Engine intake air humidity measurement.

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89.327 Charge cooling.

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89.328 Inlet and exhaust restrictions.

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89.329 Engine cooling system.

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89.330 Lubricating oil and test fuels.

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89.331 Test conditions.

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Appendix A to Subpart D

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Appendix B to Subpart D

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Subpart E – Exhaust Emission Test Procedures.

89.401 Scope; availability.

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89.402 Definitions.

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89.403 Symbols/abbreviations.

* * * * *

89.404 Test procedure overview.

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(b) DELETE,
REPLACE WITH:
The test is designed to determine the brake-specific emissions of hydrocarbons, carbon monoxide, oxides of nitrogen, and particulate matter. For more information on particulate sampling see the PM and Test Cycle Limited Procedures. The test cycles consist of various steady-state operating modes that include different combinations of engine speeds and loads. These procedures require the determination of the concentration of each pollutant, exhaust volume, the fuel flow (raw analysis) and the power output during each mode. The measured values are weighted and used to calculate the grams of each pollutant emitted per kilowatt-hour (g/kW-hr).

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89.405 Recorded information.

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89.406 Pre-test procedures.

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89.407 Engine dynamometer test run.

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89.408 Post-test procedures.

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89.409 Data logging.

* * * * *

89.410 Engine test cycle.

* * * * *

89.411 Exhaust sample procedure – gaseous components.

* * * * *

89.412 Raw gaseous exhaust sampling and analytical system description.

* * * * *

89.413 Raw sampling procedures.

* * * * *

89.414 Air flow measurement specifications.

* * * * *

89.415 Fuel flow measurement specifications.

* * * * *

89.416 Raw exhaust gas flow.

* * * * *

89.417 Data evaluation for gaseous emissions.

* * * * *

89.418 Raw emission sampling calculations.

* * * * *

89.419 Dilute gaseous exhaust sampling and analytical system description.

* * * * *

89.420 Background sample.

* * * * *

89.421 Exhaust gas analytical system; CVS bag sample.

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89.422 Dilute sampling procedures – CVS calibration.

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89.423 [Reserved]

89.424 Dilute emission sampling calculations.

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89.425 [Reserved]

Appendix A to Subpart E

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Appendix B to Subpart E

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Subpart F – Selective Enforcement Auditing.

89.501 Applicability.

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89.502 Definitions.

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89.503 Test Orders.

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89.504 Testing by the Administrator.

* * * * *

89.505 Maintenance of records; submittal of information.

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ADD:
(a)(2)(viii)
The manufacturer shall supply upon request emission test results from U.S. EPA-directed audits for engines certified in California.

* * * * *

89.506 Right of entry and access.

* * * * *

89.507 Sample selection.

* * * * *

89.508 Test Procedures.

(a)(1) DELETE,
REPLACE WITH:
For off-road engines subject to the provisions of this subpart, the prescribed test procedures are the engine 8-mode test procedure as described in subpart E of this part, the federal smoke test procedure as described in 40 CFR part 86, subpart I (July 1, 1999), and the particulate test procedure as adopted in the PM and Test Cycle Limited Procedures.

* * * * *

89.509 Calculation and reporting of test results.

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89.510 Compliance with acceptable quality level and passing failing criteria for selective enforcement audits.

* * * * *

89.511 Suspension and revocation of certificates of conformity.

* * * * *

89.512 Request for public hearing.

DELETE,
REPLACE WITH:
A manufacturer may request a hearing on an Executive Officer's decision regarding certification, as specified in Title 17, California Code of Regulations, Division 3, Chapter 1, Subchapter 1.25, Articles 1 and 2.

89.513 Administrative procedures for public hearing.

DELETE.

89.514 Hearing procedures.

DELETE.

89.515 Appeal of hearing decision.

DELETE.

89.516 Treatment of confidential information.

* * * * *

Appendix A to Subpart F of Part 89. Sampling Plans for Selective Enforcement Auditing of Nonroad Engines.

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Subpart G – Importation of Nonconforming Nonroad Engines.

89.601 Applicability.

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89.602 Definitions.

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89.603 General requirements for importation of nonconforming nonroad engines.

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89.604 Conditional admission.

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89.605 Final admission of certified nonroad engines.

* * * * *

89.606 Inspection and testing of imported nonroad engines.

* * * * *

89.607 Maintenance of independent commercial importer's records.

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89.608 "In Use" inspections and recall requirements.

* * * * *

89.609 Final admission of modification nonroad engines and test nonroad engines.

* * * * *

89.610 Maintenance instructions, warranties, emission labeling.

* * * * *

89.611 Exemptions and exclusions.

* * * * *

89.612 Prohibited acts; penalties.

* * * * *

89.613 Treatment of confidential information.

* * * * *

89.614 Importation of partially complete engines.

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Subpart H – Recall Regulations

89.701 Applicability.

* * * * *

89.702 Definitions.

* * * * *

89.703 Applicability of part 85, subpart S.

(a) DELETE,
REPLACE WITH:
Off-road engines subject to provisions of subpart B of this part are subject to recall regulations specified in Title 13, California Code of Regulations, Chapter 2, Articles 2.1 – 2.4, Sections 2111 – 2141.

(b)–(d) DELETE.

(e) DELETE,
REPLACE WITH:
For purposes of this section, reference to “vehicles or engines” throughout Title 13 is replaced by reference to “engines.”

Subpart I – Emission Defect Reporting Requirements

89.801 Applicability.

* * * * *

89.802 Definitions.

* * * * *

89.803 Applicability of part 85, subpart T.

(a) DELETE,
REPLACE WITH:
Off-Road engines subject to provisions of subpart B of this part are subject to emission defect reporting requirements specified in 40 CFR part 85, subpart T (July 1, 1999), which is incorporated by reference, except for the items set forth in this section.

* * * * *

Subpart J – Exemption Provisions

89.901 Applicability.

* * * * *

89.902 Definitions.

* * * * *

89.903 Application of section 216(10) of that Act.

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89.904 Who may request an exemption.

* * * * *

89.905 Testing exemption.

* * * * *

89.906 Manufacturer-owned exemption and precertification exemption.

* * * * *

89.907 Display exemption.

* * * * *

89.908 National security exemption.

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89.909 Export exemptions.

* * * * *

89.910 Granting of exemptions.

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89.911 Submission of exemption requests.

* * * * *

89.912 Treatment of confidential information.

* * * * *

89.913 What provisions apply to engines certified under the motor-vehicle program?

DELETE.

89.914 What provisions apply to vehicles certified under the motor-vehicle program?

DELETE.

89.915 Staged-assembly exemption.

* * * * *

Subpart K – General Enforcement Provisions and Prohibited Acts

89.1001 Applicability.

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89.1002 Definitions.

* * * * *

89.1003 Prohibited acts.

* * * * *

(b)(7)(iii) DELETE,
REPLACE WITH:
If the engine being replaced was not certified to any emission standards under the California Code of Regulations, Title 13, Section 2423(b)(1)(A), the replacement engine must have a permanent label with your corporate name and trademark and the following language, or similar alternate language approved by the Executive Officer:

“THIS ENGINE DOES NOT COMPLY WITH CALIFORNIA AND FEDERAL OFF-ROAD OR ON-HIGHWAY EMISSION REQUIREMENTS. SALE OR INSTALLATION OF THIS ENGINE FOR ANY PURPOSE OTHER THAN AS A REPLACEMENT ENGINE FOR AN ENGINE MANUFACTURED PRIOR TO JANUARY 1 [INSERT APPROPRIATE YEAR] IS A VIOLATION OF CALIFORNIA AND FEDERAL LAW SUBJECT TO CIVIL PENALTY”.

(b)(7)(iv) DELETE,
REPLACE WITH:
If the engine being replaced was certified to emission standards less stringent than those in effect when you produce the replacement engine, the replacement engine must have a permanent label with your corporate name and trademark and the following language, or similar alternate language approved by the Executive Officer:

“THIS ENGINE COMPLIES WITH CALIFORNIA OFF-ROAD AND U.S. EPA NONROAD EMISSION REQUIREMENTS FOR [Insert appropriate year reflecting when the Tier 1 or Tier 2 standards for the replaced engine began to apply] ENGINES UNDER 13 CCR 2423(j) AND 40 CFR 89.1003(b)(7). SELLING OR INSTALLING THIS ENGINE FOR ANY PURPOSE OTHER THAN TO REPLACE AN OFF-ROAD ENGINE BUILT BEFORE JANUARY 1 [Insert appropriate year reflecting when the next tier of emission standards began to apply] MAY BE A VIOLATION OF CALIFORNIA AND FEDERAL LAW SUBJECT TO CIVIL PENALTY.”

* * * * *

89.1004 General enforcement provisions.

* * * * *

89.1005 Injunction proceedings for prohibited acts.

DELETE,
REPLACE WITH:
Under Section 43017 of the California Health and Safety Code, the Air Resources Board may enjoin any violation of any provision of Section 89.1003(a).

89.1006 Penalties.

(a) DELETE,
REPLACE WITH:
Violations. A violation of the requirements of this subpart is a violation of the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations, and is subject to the penalty provisions thereunder.

(a)(1) DELETE,
REPLACE WITH:
A person who violates Section 89.1003(a)(1), (a)(4), or (a)(6), or a manufacturer or dealer who violates Section 89.1003(a)(3)(ii) is subject to a civil penalty as specified in the California Health and Safety Code, Division 26, and corresponding regulations.

(a)(2) DELETE,
REPLACE WITH:
A person other than a manufacturer or dealer who violates Section 89.1003(a)(3)(i) or any person who violates Section 89.1003(a)(3)(ii) is subject to a civil penalty as specified in the California Health and Safety Code, Division 26, and corresponding regulations.

* * * * *

(a)(5) DELETE,
REPLACE WITH:
A person who violates Section 89.1003(a)(2) or (a)(5) is subject to a civil penalty as specified in the California Health and Safety Code, Division 26, and corresponding regulations.

(a)(6) DELETE.

(b) DELETE,
REPLACE WITH:
Civil Actions. Any person who violates any provision of this subpart is subject to a civil action to assess and recover any civil penalty under paragraph (a) of this section.

(c) DELETE.

89.1007 Warranty provisions.

* * * * *

89.1008 In-use compliance provisions.

DELETE.

89.1009 What special provisions apply to branded engines?

* * * * *

State of California
AIR RESOURCES BOARD

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 1996 AND LATER TIER 1, TIER 2, AND TIER 3 OFF-ROAD COMPRESSION-IGNITION ENGINES

PART II

Adopted: May 12, 1993
Amended: January 28, 2000
Amended: October 20, 2005

NOTE: This document incorporates by reference the International Standards Organization (ISO) 8178 test procedure, Part 1, June 3, 1992, and Part 4, June 30, 1992, and Part 5, June 3, 1992, 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 language 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 printed in a style to indicate changes from existing provisions. All existing language in indicated by plain type. All additions to language are indicated by underline. All deletions to language are indicated by ~~strikeout~~.

If there is any conflict between the provisions of this document and the California Health and Safety Code, Division 26, or Title 13 of the California Code of Regulations, the Health and Safety Code and Title 13 apply.

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 1996 AND LATER TIER 1, TIER 2, AND TIER 3 OFF-ROAD COMPRESSION-IGNITION ENGINES

PART II

To the extent the following provisions of ISO 8178, Part 1, version N95, June 3, 1992, and Part 4, version N97, June 30, 1992, and Part 5, version N99, June 3, 1992, pertain to the testing and compliance of exhaust emissions from off-road compression-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 1996-1999 Heavy-Duty Off-Road Compression-Ignition Engines (1996-1999 Heavy-Duty Test Procedures) and the California Exhaust Emission Standards and Test Procedures for New 2000 and Later Tier 1, Tier 2, and Tier 3 Off-Road Compression-Ignition Engines (2000 Plus Limited Test Procedures), except as altered or replaced by the provisions set forth below.

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

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 the 1996-1999 Heavy-Duty Test Procedures and Section 89.2 of the 2000 Plus Limited 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 the 1996-1999 Heavy-Duty Test Procedures and Section 89.3 of the 2000 Plus Limited Test Procedures shall apply.

* * * * *

5. Test Conditions

6. Test Fuels

DELETE
REPLACE WITH:

Test fuels shall meet the requirements specified in Section 25 of the 1996-1999 Heavy-Duty Test Procedures or Section 89.330 of the 2000 Plus Limited Test Procedures, as applicable.

7. Measurement Equipment and data to be measured

DELETE any reference to the single filter method.

8. Calibration of the analytical instruments

9. Calibration of the particulate sampling system

10. Running conditions (Test cycles)

11. Test run

DELETE any reference to the single filter method.

12. Data evaluation for gaseous and particulate emission

13. Calculation of the gaseous emissions

14. Calculation of the particulate emission

DELETE any reference to the single filter method.

15. Determination of the gaseous emissions

16. Determination of the particulates

Figures and Explanations

Annex A

Annex B Auxiliary Equipment

Annex C NMHC method, efficiency

Annex D Calculation formulas for u, v, w

Annex E Heat calculation (transfer tube)

Annex F Informative

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 the 1996-1999 Heavy-Duty Test Procedures and Section 89.2 of the 2000 Plus Limited 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 the 1996-1999 Heavy-Duty Test Procedures and Section 89.3 of the 2000 Plus Limited Test Procedures shall apply.

* * * * *

5. Information regarding preparation of the test

DELETE any reference to ISO 8178-2.

6. Modes and weighting factors for test cycles

* * * * *

6.1 DELETE

6.2 DELETE

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

* * * * *

6.3.2 DELETE

6.4 DELETE

6.5 DELETE

6.6 DELETE

6.7 DELETE

ISO 8178, RIC Engines – Exhaust emission measurement – Part 5: Specifications of test fuels.

1. Scope

DELETE
REPLACE WITH:

This part specifies the calculation of the specific factors and exhaust 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 the 1996-1999 Heavy-Duty Test Procedures and Section 89.2 of the 2000 Plus Limited 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 the 1996-1999 Heavy-Duty Test Procedures and Section 89.3 of the 2000 Plus Limited Test Procedures shall apply.

* * * * *

6. Remarks

DELETE

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

8. Calculation of the Fuel Specific Factors

Tables

Appendix A

Appendix B

Appendix C

State of California
AIR RESOURCES BOARD

California Exhaust Emission Standards and Test Procedures for New 2008 and Later Tier 4 Off-Road Compression-Ignition Engines

PART I-C

Adopted: October 20, 2005

NOTE: This document incorporates by reference 40 Code of Federal Regulations (CFR) part 1039, subparts A, B, C, D, E, F, G, H, and I, including Appendix I, II, III, IV, V, and VI to part 1039, as amended July 13, 2005, 40 CFR Part 1065, Subparts A, B, C, D, E, F, G, H, I, J, and K, as amended July 13, 2005, 40 CFR Part 1068, Subparts A, B, C, D, E, F, and G, including Appendix A to Subpart E and Appendix I and II to part 1068, as amended July 13, 2005, and the internally referenced subparts of 40 CFR Part 85, 40 CFR Part 86, and 40 CFR Part 89. This is an original document and all language contained herein is set forth in standard type. Incorporated sections that have been included in their entirety are set forth with the section number and title. California provisions that replace specific federal provisions are denoted by the words "DELETE" for the federal language and "REPLACE WITH" or "ADD" for the California language. The symbols "* * * * *" and "..." mean that the remainder of the CFR text for a specific section, although not shown, has been incorporated into these test procedures by reference, unchanged. CFR sections that are not listed are not part of the test procedures. If there is any conflict between the provisions of this document and the California Health and Safety Code, Division 26, or Title 13 of the California Code of Regulations (CCR), the Health and Safety Code and Title 13 apply.

Table of Contents

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2008 AND LATER TIER 4 OFF-ROAD COMPRESSION-IGNITION ENGINES

The following provisions of Part 1039, Part 1065, and Part 1068, Title 40, Code of Federal Regulations, as proposed by the United States Environmental Protection Agency on the date listed, are adopted and incorporated herein by this reference for 2008 model year and later off-road compression-ignition engines as the California Exhaust Emission Standards and Test Procedures for New 2008 and Later Tier 4 Off-Road Compression-Ignition Engines, except as altered or replaced by the provisions set forth below.

PART 1039 – CONTROL OF EMISSIONS FROM NEW AND IN-USE NONROAD COMPRESSION-IGNITION ENGINES

SOURCE: 69 FR 38957, June 29, 2004, amended July 13, 2005, unless otherwise noted.

Subpart A – Overview and Applicability

§ 1039.1 Does this part apply for my engines?

* * * * *

(b)(3)
See Title 13, CCR, Chapter 9, Article 4, and the 2000 Plus Limited Test Procedures for requirements that apply to engines not yet subject to the requirements of this part 1039.

* * * * *

§ 1039.5 Which engines are excluded from this part's requirements?

* * * * *

§ 1039.10 How is this part organized?

Introductory Text DELETE,
REPLACE WITH:
The regulations in this part 1039 contain provisions that may affect engine or equipment manufacturers, or both, and others. However, the requirements of this part are generally addressed to the engine manufacturer. The term “you” generally means the engine manufacturer, as defined in § 1039.801. This part 1039 is divided into the following subparts:

* * * * *

§ 1039.15 Do any other regulation parts apply to me?

* * * * *

§ 1039.20 What requirements from this part apply to excluded stationary engines?

* * * * *

(b)(4) DELETE,
REPLACE WITH:
State: "THIS ENGINE IS EXCLUDED FROM THE REQUIREMENTS OF 13 CCR, CH 9, ARTICLE 4, AS A “STATIONARY ENGINE.” INSTALLING OR USING THIS ENGINE IN ANY OTHER APPLICATION MAY BE A VIOLATION OF CALIFORNIA LAW SUBJECT TO CIVIL PENALTY.”. The referencing of similar federal requirements in combination with California references under this provision is permitted.

Subpart B – Emission Standards and Related Requirements

§ 1039.101 What exhaust emission standards must my engines meet after the 2014 model year?

Introductory Text DELETE,
REPLACE WITH:
The exhaust emission standards of this section apply after the 2014 model year. Certain of these standards also apply for model year 2014 and earlier. This section presents the full set of emission standards that apply after all the transition and phase-in provisions of § 1039.102 and § 1039.104 expire. See § 1039.102 and Title 13, CCR, § 2423(b)(1)(A) for exhaust emission standards that apply to 2014 and earlier model years. § 1039.105 specifies smoke standards.

* * * * *

(d) “not-to-exceed standards” DELETE,
REPLACE WITH:
“not-to-exceed limits”

* * * * *

(e) “not-to-exceed (NTE) standards” DELETE,
REPLACE WITH:
“not-to-exceed (NTE) limits”

* * * * *

(e)(2) “section, the NTE standard” DELETE,
REPLACE WITH:
“section, the NTE limit”

* * * * *

(e)(2) “equation: NTE standard” DELETE,
REPLACE WITH:
“equation: NTE limit”

* * * * *

(e)(6) “NTE standards” DELETE,
REPLACE WITH:
“NTE limits”

* * * * *

(e)(7) “NTE standard” DELETE,
REPLACE WITH:
“NTE limit”

* * * * *

(h) “The NTE standards of” DELETE,
REPLACE WITH:
“The NTE limits of”

* * * * *

(h) “meet the NTE standards” DELETE,
REPLACE WITH:
“meet the NTE limits”

* * * * *

§ 1039.102 What exhaust emission standards and phase-in allowances apply for my engines in model year 2014 and earlier?

Introductory Text DELETE,
REPLACE WITH:
The exhaust emission standards of this section apply for 2014 and earlier model years. See §1039.101 for exhaust emission standards that apply to later model years. See Title 13, CCR, §2423(b)(1)(A), for exhaust emission standards that apply to model years before the standards of this part 1039 take effect.

* * * * *

(a)(2) DELETE,
REPLACE WITH:
The transient standards in this section for gaseous pollutants do not apply to phase-out engines that you certify to the same numerical standards (and FELs if the engines are certified using ABT) for gaseous pollutants as certified under the Tier 3 requirements of Title 13, CCR, § 2423(b)(1)(A). However, except as specified by paragraph (a)(1) of this section, the transient PM emission standards apply to these engines.

* * * * *

Table 1 Footnote [1] DELETE,
REPLACE WITH:
For engines that qualify for the special provisions in § 1039.101(c), you may delay certifying to the standards in this part 1039 until 2010. In 2009 and earlier model years, these engines must instead meet the applicable Tier 2 standards and other requirements of Title 13, CCR, § 2423(b)(1)(A). Starting in 2010, these engines must meet a PM standard of 0.60 g/kW-hr, as described in § 1039.101(c). Engines certified to the 0.60 g/kWhr PM standard may not generate ABT credits.

* * * * *

Table 3 Footnote [1] DELETE,
REPLACE WITH:
You may certify engines to the Option #1 or Option #2 standards starting in the listed model year. Under Option #1, all engines at or above 37 kW and below 56 kW produced before the 2013 model year must meet the applicable Option #1 standards in this table. These engines are considered to be "Option #1 engines." Under Option #2, all these

engines produced before the 2012 model year must meet the applicable standards under Title 13, CCR, § 2423(b)(1)(A). Engines certified to the Option #2 standards in model year 2012 are considered to be "Option #2 engines."

* * * * *

(d)(1) DELETE,
REPLACE WITH:
For model years 2012 through 2014, you may use banked NOx+NMHC credits from any Tier 2 engine at or above 37 kW certified under Title 13, CCR, § 2423(b)(1)(A) to meet the NOx phase-in standards or the NOx+NMHC phase-out standards under paragraphs (b) and (c) of this section, subject to the additional ABT provisions in § 1039.740.

* * * * *

(g)(1) “(1) NTE standards.” DELETE,
REPLACE WITH:
“(1) NTE limits.”

* * * * *

(g)(1) “calculate and apply the NTE standards” DELETE,
REPLACE WITH:
“calculate and apply the NTE limits.”

* * * * *

(g)(1) “The NTE standards do not” DELETE,
REPLACE WITH:
“The NTE limits do not.”

* * * * *

(g)(1)(iii) “the NTE standards” DELETE,
REPLACE WITH:
“the NTE limits”

* * * * *

(g)(1)(iv) DELETE,
REPLACE WITH:
Gaseous pollutants for phase-out engines that you certify to the same numerical standards and FELs for gaseous pollutants to which you certified under the Tier 3 requirements of Title 13, CCR, § 2423(b)(1)(A). However, the NTE limits for PM apply to these engines.

* * * * *

Table 8 Footnote [3] DELETE,
REPLACE WITH:
For manufacturers certifying engines to the standards of this part 1039 in 2012 under Option #2 of Table 3 of § 1039.102, the FEL caps of § 1039.101 apply for model year 2012 and later; see Title 13, CCR, § 2423(b)(1)(A) for provisions that apply to earlier model years.

* * * * *

§ 1039.104 Are there interim provisions that apply only for a limited time?

* * * * *

(a)(4)(iii) DELETE,
REPLACE WITH:
All other offset-using engines must meet the standards and other provisions that apply in model year 2011 for engines in the 19 ≤ kW < 130 power categories, in model year 2010 for engines in the 130 ≤ kW ≤ 560 power category, or in model year 2014 for engines above 560 kW. Show that engines meet these emission standards by meeting all the requirements of § 1068.265. You must meet the labeling requirements in Title 13, CCR, § 2424, but use the following in place of the otherwise required statement of compliance in § 2424(c)(2): "THIS ENGINE MEETS CALIFORNIA EMISSION STANDARDS UNDER 13 CCR 2423(b)(6)." The referencing of similar federal requirements in combination with California references under this provision is permitted. For power categories with a percentage phase-in, these engines should be treated as phase-in engines for purposes of determining compliance with phase-in requirements.

* * * * *

(c)(1) Table DELETE "The standards and requirements in 40 CFR part 89",
REPLACE WITH:
The standards and requirements in Title 13, CCR, § 2423(b)(1)(A)

* * * * *

(c)(2)(ii) DELETE,
REPLACE WITH:
If you do not choose to comply with paragraph (c)(2)(i) of this section, you may continue to comply with the standards and requirements in Title 13, CCR, § 2423(b)(1)(A) and the 2000 Plus Limited Test Procedures for model years through 2012, but you must begin complying in 2013 with Tier 4 standards and requirements specified in Table 3 of § 1039.102 for model years 2013 and later.

* * * * *

(c)(4)(i) DELETE,
REPLACE WITH:
Produce engines that meet all the emission standards and other requirements under Title 13, CCR, § 2423(b)(1)(A) and the 2000 Plus Limited Test Procedures applicable for that model year, except as noted in this paragraph (c).

(c)(4)(ii) DELETE,
REPLACE WITH:
Meet the labeling requirements in Title 13, CCR, § 2424, but use the following in place of the otherwise required statement of compliance in § 2424(c)(2): "THIS ENGINE COMPLIES WITH CALIFORNIA REGULATIONS FOR [CURRENT MODEL YEAR] OFF-ROAD COMPRESSION-IGNITION ENGINES UNDER 13 CCR 2423(b)(7).". The referencing of similar federal requirements in combination with California references under this provision is permitted.

* * * * *

(c)(5)(ii) DELETE,
REPLACE WITH:
Meet the labeling requirements in Title 13, § 2424, but use the following in place of the otherwise required statement of compliance in § 2424(c)(3): "THIS ENGINE COMPLIES WITH CALIFORNIA REGULATIONS FOR [CURRENT MODEL YEAR] OFF-ROAD COMPRESSION-IGNITION ENGINES UNDER 13 CCR 2423(b)(7).". The referencing of similar federal requirements in combination with California references under this provision is permitted.

* * * * *

(d) “Deficiencies for NTE standards.” DELETE,
REPLACE WITH:
“Deficiencies for NTE limits.”

* * * * *

(d) “applicable NTE standards” DELETE,
REPLACE WITH:
“applicable NTE limits.”

* * * * *

(d) “from the NTE standards” DELETE,
REPLACE WITH:
“from the NTE limits.”

* * * * *

(d) “with the NTE standards” DELETE,
REPACE WITH:
“with the NTE limits.”

* * * * *

(d)(4) “which NTE standards” DELETE,
REPLACE WITH:
“which NTE limits.”

* * * * *

(g)(4) DELETE,
REPLACE WITH:
Do not apply TCAFs to gaseous emissions for phase-out engines that you certify to the same numerical standards (and FELs if the engines are certified using ABT) for gaseous pollutants as you certified under the Tier 3 requirements of Title 13, CCR, § 2423(b)(1)(A) and § 2423(b)(2)(A).

* * * * *

§ 1039.105 What smoke standards must my engines meet?

* * * * *

§ 1039.107 What evaporative emission standards and requirements apply?

* * * * *

§ 1039.110 [Reserved]

* * * * *

§ 1039.115 What other requirements must my engines meet?

* * * * *

§ 1039.120 What emission-related warranty requirements apply to me?

* * * * *

(c) DELETE,
REPLACE WITH:
Components covered. The emission-related warranty covers all components whose failure would increase an engine's emissions of any pollutant. This includes components listed in Title 13, CCR, § 2425(d), and components from any other system developed to control emissions. The emission-related warranty covers these components even if another company produces the component. Your emission-related warranty does not cover components whose failure would not increase an engine's emissions of any pollutant.

* * * * *

§ 1039.125 What maintenance instructions must I give to buyers?

* * * * *

§ 1039.130 What installation instructions must I give to equipment manufacturers?

* * * * *

§ 1039.135 How must I label and identify the engines I produce?

* * * * *

(c)(12) DELETE,
REPLACE WITH:
State: "THIS ENGINE COMPLIES WITH CALIFORNIA REGULATIONS FOR [MODEL YEAR] OFF-ROAD DIESEL ENGINES.". The referencing of similar federal requirements in combination with California references under this provision is permitted.

* * * * *

ADD:
(h) Labeling requirements for rebuilt engines. The provisions in the California Code of Regulations, Title 13, Section 2423(l), shall apply for labeling rebuilt engines.

§ 1039.140 What is my engine's maximum engine power?

* * * * *

Subpart C – Certifying Engine Families

§ 1039.201 What are the general requirements for obtaining an Executive Order?

* * * * *

§ 1039.205 What must I include in my application?

* * * * *

(p) "not-to-exceed emission standards" DELETE,
REPLACE WITH:
"not-to-exceed emission limits"

* * * * *

(w) DELETE,
REPLACE WITH:
Unconditionally certify that all the engines in the engine family comply with the requirements of this part, other referenced parts of the California Code of Regulations and the California Health and Safety Code.

* * * * *

§ 1039.210 May I get preliminary approval before I complete my application?

* * * * *

§ 1039.220 How do I amend the maintenance instructions in my application?

* * * * *

§ 1039.225 How do I amend my application for certification to include new or modified engines or to change an FEL?

* * * * *

§ 1039.230 How do I select engine families?

* * * * *

§ 1039.235 What emission testing must I perform for my application for an Executive Order?

Introductory Text: DELETE, “NTE standards”
REPLACE WITH:
“NTE limits”

* * * * *

§ 1039.240 How do I demonstrate that my engine family complies with exhaust emission standards?

* * * * *

§ 1039.245 How do I determine deterioration factors from exhaust durability testing?

* * * * *

(a) DELETE,
REPLACE WITH:
An engine manufacturer may request the Executive Officer to approve deterioration factors for an engine family with established technology based on engineering analysis instead of testing. Engines certified to a NOx+NMHC standard or FEL greater than the Tier 3 NOx+NMHC standard described in Title 13, CCR, § 2423(b)(1)(A) are considered to rely on established technology for gaseous emission control, except that this does not include any engines that use exhaust-gas recirculation or aftertreatment. In most cases, technologies used to meet the Tier 1 and Tier 2 emission standards would be considered to be established technology.

* * * * *

§ 1039.250 What records must I keep and what reports must I send to the Air Resources Board (ARB)?

* * * * *

§ 1039.255 What decisions may ARB make regarding my Executive Order?

* * * * *

Subpart D – [Reserved]

Subpart E – In-use Testing

§ 1039.401 General Provisions.

* * * * *

Subpart F – Test Procedures

§ 1039.501 How do I run a valid emission test?

* * * * *

(b) “not-to-exceed emission standards” DELETE,
REPLACE WITH:
“not-to-exceed emission limits”

* * * * *

§ 1039.505 How do I test engines using steady-state duty cycles, including ramped-modal testing?

* * * * *

§ 1039.510 Which duty cycles do I use for transient testing?

* * * * *

§ 1039.515 What are the test procedures related to not-to-exceed limits?

* * * * *

(a) “not-to-exceed emission standards” DELETE,
REPLACE WITH:
“not-to-exceed emission limits”

* * * * *

§ 1039.520 What testing must I perform to establish deterioration factors?

* * * * *

§ 1039.525 How do I adjust emission levels to account for infrequently regenerating aftertreatment devices?

* * * * *

Subpart G – Special Compliance Provisions

§ 1039.601 What compliance provisions apply to these engines?

* * * * *

§ 1039.605 What provisions apply to engines already certified under the motor-vehicle program?

DELETE.

§ 1039.610 What provisions apply to vehicles already certified under the motor-vehicle program?

DELETE.

§ 1039.615 What special provisions apply to engines using noncommercial fuels?

* * * * *

(b)(2)(ii) DELETE,
REPLACE WITH:
State: “THIS ENGINE IS CERTIFIED TO OPERATE IN APPLICATIONS USING NONCOMMERCIAL FUEL. MALADJUSTMENT OF THE ENGINE IS A VIOLATION OF CALIFORNIA LAW SUBJECT TO CIVIL PENALTY.”. The referencing of similar federal requirements in combination with California references under this provision is permitted.

* * * * *

§ 1039.620 What are the provisions for exempting engines used solely for competition?

* * * * *

§ 1039.625 What requirements apply under the program for equipment-manufacturer flexibility?

Introductory Text DELETE,
REPLACE WITH:
The provisions of this section allow equipment manufacturers to produce equipment with engines that are subject to less stringent emission standards after the Tier 4 emission standards begin to apply. To be eligible to use these provisions, you must follow all the instructions in this section. See Title 13, CCR, §§ 2423(d) and (e) for provisions that apply to equipment produced while Tier 1, Tier 2, or Tier 3 standards apply. See § 1039.626 for requirements that apply specifically to companies that manufacture equipment outside the United States and to companies that import such equipment without manufacturing it.

* * * * *

(b)(1) DELETE,
REPLACE WITH:
Percent-of-production allowances. A manufacturer may produce equipment and vehicles with engines that are exempt from meeting current model year emission standards for a portion of its California-directed production volume. These percent-of-production flexibility allowances must be used within one of the seven-year flexibility usage periods specified in Table 1 or Table 2 of this section for each applicable power category, provided that the seven-year sum of the U.S.-directed portion of the manufacturer's percent-of-production flexibility allowances does not exceed 80 percent, expressed in cumulative yearly percentage increments, except as provided for in paragraph (b)(2) or (m) of this section. Equipment claimed as percent-of-production flexibility allowances must contain only engines that have been certified to, at least, the standards in paragraph (e), corresponding to the flexibility usage period selected by the manufacturer. All flexibility allowances for a power category must be used within the same flexibility usage period.

(b)(2) DELETE,
REPLACE WITH:
Small-volume allowances. As an alternative to the percent-of-production allowance in paragraph (b)(1), an off-road equipment or vehicle manufacturer may produce equipment with engines that are exempt from meeting current model year emission standards for a portion of its California-directed production volume, provided that the exempt equipment is a subset of the manufacturer's U.S.-directed volume of exempt equipment and the manufacturer is in compliance with the following provisions:

* * * * *

(d)(4) DELETE,
REPLACE WITH:
Manufacturers may start using a portion of the flexibility allowances in paragraphs (b)(1) or (b)(2) of this section for equipment and vehicles containing engines not yet subject to the Tier 4 standards, provided that the seven-year period for using flexibility allowances under the Tier 2/3 flexibility program in Title 13, CCR, §§ 2423(d)(1)(a), (d)(1)(b), or (d)(2)(a) has expired. Manufacturers must count these early-use flexibility allowances toward the total percentage, or number, of flexibility allowances permitted under the provisions of paragraphs (b)(1) or (b)(2) of this section. The maximum cumulative early-use allowance is 10 percent under the percent-of-production provision in paragraph (b)(1), or 100 units under the small volume provision in paragraph (b)(2). Table 3 shows the applicable years for using early-use flexibility allowances. Manufacturers using allowances under this paragraph (d)(4) must comply with the notification and reporting requirements specified in paragraph (g) of this section. Table 3 follows:

* * * * *

(e)(1) DELETE,
REPLACE WITH:
Equipment manufacturers using the provisions of paragraph (d)(4) of this section, must use engines that, at a minimum, meet the applicable Tier 1 emission standards in Title 13, CCR, § 2423(b)(1)(a).

* * * * *

(e)(3) DELETE,
REPLACE WITH:
In all other cases, engines at or above 37 kW and at or below 560 kW must meet the appropriate Tier 3 standards described in Title 13, CCR, § 2423(b)(1)(a). Engines below 37 kW and engines above 560 kW must meet the appropriate Tier 2 standards described in Title 13, CCR, § 2423(b)(1)(a).

* * * * *

(f)(5) DELETE,
REPLACE WITH:
The following statement: THIS EQUIPMENT [or identify the type of equipment] HAS AN ENGINE THAT MEETS CALIFORNIA EMISSION STANDARDS UNDER 13 CCR 2423(d).

* * * * *

(g)(1)(vi) DELETE,
REPLACE WITH:
The number of units in each power category that the equipment manufacturer has sold in previous calendar years under 40 CFR 89.102(d) and, if available, Title 13, CCR, § 2423(d).

(g)(2) DELETE,
REPLACE WITH:
For each year that an equipment manufacturer uses the provisions of this section, the manufacturer must send the Executive Officer a written report by March 31 of the following year. The report shall include the total number of engines sold by the manufacturer in the preceding year for each power category, based on actual U.S.-directed production volume and, if available, California-directed production volume. Also, the manufacturer must identify the percentages of U.S.-directed production volumes and, if available, California-directed production volumes, that correspond to the number of units in each power category and the cumulative numbers and percentages of units for all the units sold by the manufacturer under this section for each power category. The percentage figures may be omitted if the manufacturer states in the report that it will not be using the percent-of-production allowances in paragraph (b)(1) of this section.

* * * * *

(i) DELETE,
REPLACE WITH:
Enforcement. Producing more equipment with engines exempted from meeting current-model year emission requirements under this section or installing engines that do not meet the emission standards of paragraph (e) of this section violates the requirements of Title 13, CCR, § 2423(d) and may be subject to civil penalties under California Health and Safety Code, Division 26, and corresponding regulations. Equipment manufacturers must, upon request, surrender to the Executive Officer all records required under this section.

(j) DELETE,
REPLACE WITH:
(1) Provisions for engine manufacturers. To meet the demand for engines created under this section, engine manufacturers may produce engines that do not meet current model year emission requirements. However, engine manufacturers must receive written assurance from each equipment manufacturer, prior to production, that a certain number of these engines are needed for the equipment manufacturer's equipment flexibility allowances. Engine manufacturers shall provide to the Executive Officer annually, as part of the certification application, a list of the equipment manufacturers requesting such engines for their flexibility allowances. The list shall include the equipment manufacturers' names, engine models, and estimated national production volumes. A copy of the original correspondence from the equipment manufacturer

requesting the production of flexibility engines shall be kept on file by the engine manufacturer in addition to, and in accordance with, the provisions of § 1039.250, and shall be made available without delay to the Executive Officer upon request. Furthermore, all engines produced for sale in California under the provisions of this section must be covered by an Executive Order. To obtain an Executive Order for these engines, the engine manufacturer shall comply with the following:

(A) Prior to the start of production, submit a letter to the Chief of the Mobile Source Operations Division, or designee, requesting certification for flexibility engines intended for sale in California, and

(B) Provide written assurance that the flexibility engines to be produced will be identical in all material respects to those for which a valid Executive Order has been issued in a previous model year. The engine family name of the previously certified engine family must be included in the manufacturer's request for certification.

Upon determination that the conditions in paragraphs (1) and (2) have been satisfied, the engine manufacturer shall be provided with an Executive Order covering the requested flexibility engine families for the current model year. The engine family names included in the Executive Order shall either be the same as, or a subset of the previously certified engine family names, and will remain the same for as long as the engines continue to qualify as flexibility allowances regardless of model year. These engine family names shall be used by the engine manufacturer to comply with the labeling requirements of paragraph (2) below.

(2) Engine labeling. Engine manufacturers shall meet the labeling requirements provided in § 1039.135 for all engines produced under the allowances of this section. However, the following statement must be substituted for the statement of compliance required under § 1039.135:

> "THIS ENGINE COMPLIES WITH CALIFORNIA EMISSION REQUIREMENTS UNDER 13 CCR 2423(d). SELLING OR INSTALLING THIS ENGINE FOR ANY PURPOSE OTHER THAN FOR THE EQUIPMENT FLEXIBILITY PROVISIONS CITED MAY BE A VIOLATION OF STATE LAW SUBJECT TO CIVIL PENALTY." [Insert Engine Family Name]

The referencing of similar federal requirements in combination with California references under this provision is permitted. Furthermore, the Executive Officer may, upon request, approve alternate labeling specifications provided that they meet the intent of this requirement.

§ 1039.626 What special provisions apply to equipment imported under the equipment-manufacturer flexibility program?

* * * * *

(b)(1)(iv) DELETE,
REPLACE WITH:
The number of units in each power category imported by the foreign manufacturer in previous calendar years under 40 CFR 89.102(d) and Title 13, CCR, § 2423(d).

* * * * *

§ 1039.627 What are the incentives for equipment manufacturers to use cleaner engines?

* * * * *

§ 1039.630 What are the economic hardship provisions for equipment manufacturers?

Entire Section DELETE,
REPLACE WITH:
The provisions in Title 13, CCR, § 2423(f) shall apply.

§ 1039.635 What are the hardship provisions for engine manufacturers?

* * * * *

§ 1039.640 What special provisions apply to branded engines?

* * * * *

(a)(1) DELETE,
REPLACE WITH:
Meet the emission warranty requirements that apply under Title 13, CCR, § 2425. This may involve a separate agreement involving reimbursement of warranty-related expenses.

* * * * *

§ 1039.645 What special provisions apply to engines used for transportation refrigeration units?

* * * * *

(d)(1) DELETE,
REPLACE WITH:
State on the emission control information label: "THIS ENGINE IS CERTIFIED TO OPERATE ONLY IN TRANSPORTATION REFRIGERATION UNITS. INSTALLING OR USING THIS ENGINE IN ANY OTHER APPLICATION MAY BE A VIOLATION OF CALIFORNIA LAW SUBJECT TO CIVIL PENALTY.". The referencing of similar federal requirements in combination with California references under this provision is permitted.

* * * * *

(e) “comply with NTE standards” DELETE,
REPLACE WITH:
“comply with NTE limits.”

* * * * *

(e) “that the NTE standards” DELETE,
REPLACE WITH:
“that the NTE limits.”

* * * * *

(e) “the not-to-exceed standards” DELETE,
REPLACE WITH:
“the not-to-exceed limits.”

* * * * *

(e) “subject to NTE standards” DELETE,
REPLACE WITH:
“subject to NTE limits.”

* * * * *

(f)(2)(i) REPLACE “NTE emission standards” WITH “NTE emission limits”

* * * * *

§ 1039.650 [Reserved]

* * * * *

§ 1039.655 What special provisions apply to engines sold in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands?

DELETE.

§ 1039.660 What special provisions apply to Independent Commercial Importers?

* * * * *

Subpart H – Averaging, Banking, and Trading for Certification

§ 1039.701 General provisions.

* * * * *

§ 1039.705 How do I generate and calculate emission credits?

* * * * *

§ 1039.710 How do I average emission credits?

* * * * *

§ 1039.715 How do I bank emission credits?

* * * * *

§ 1039.720 How do I trade emission credits?

* * * * *

§ 1039.725 What must I include in my application for certification?

* * * * *

§ 1039.730 What ABT reports must I send to ARB?

* * * * *

§ 1039.735 What records must I keep?

* * * * *

§ 1039.740 What restrictions apply for using emission credits?

* * * * *

(b)(1) DELETE,
REPLACE WITH:
For purposes of ABT under this subpart, you may not use emission credits generated from engines subject to emission standards under 40 CFR part 89 or Title 13, CCR, § 2423(b)(1)(A), except as specified in § 1039.102(d)(1) or the following table:

* * * * *

Table Heading DELETE "And it was certified to the following standards under 40 CFR part 89",
REPLACE WITH:
And it was certified to the following standards under 40 CFR part 89 or 13 CCR 2423(b)(1)(A) …

(b)(2) DELETE,
REPLACE WITH:
Emission credits generated from marine engines certified under the provisions of 40 CFR part 89 or Title 13, CCR, § 2423(b)(1)(A), may not be used under this part.

(b)(3) DELETE,
REPLACE WITH:
See 40 CFR part 89 or Title 13, CCR, § 2423 and the 2000 Plus Limited Test Procedures for other restrictions that may apply for using emission credits generated under that part.

* * * * *

§ 1039.745 What can happen if I do not comply with the provisions of this subpart?

* * * * *

Subpart I – Definitions and Other Reference Information

§ 1039.801 What definitions apply to this part?

ADD:
<u>40 CFR part 1065</u> means Part 1065 and applicable subparts of these 2008 and Later Test Procedures when referenced in unrevised sections.

ADD:
40 CFR part 1068 means Part 1068 and applicable subparts of these 2008 and Later Test procedures when referenced in unrevised sections.

Act DELETE,
REPLACE WITH:
Act means California Health and Safety Code, Division 26, and corresponding regulations, except where the context indicates otherwise.

* * * * *

ADD:
Certificate of Conformity means an Executive Order issued in accordance with the California Health and Safety Code, Division 26, Part 5.

Certification DELETE,
REPLACE WITH:
Certification means obtaining an executive order for an engine family complying with the off-road compression-ignition engine emission standards and requirements specified in Title 13, CCR, Chapter 9, §§ 2420-2427.

* * * * *

ADD:
Certified configuration or certified emissions configuration means the assembled state of an engine that is equipped with a complete set of emission-related components and systems that are equivalent from an emissions standpoint (i.e., tolerances, calibrations, and specifications) to those components and systems that (A) were originally installed on the engine when it was issued an Executive Order, (B) have been approved by the engine manufacturer to supersede any of the original emission-related components and systems for that engine, or (C) are direct replacement parts equaling or exceeding the emissions-related performance of the original or superseded components and systems.

* * * * *

ADD:
Clean Air Act means California Health and Safety Code, Division 26, and corresponding regulations, except where the context indicates otherwise.

* * * * *

Designated Compliance Officer DELETE,
REPLACE WITH:
Designated Compliance Officer means the Executive Officer of the Air Resources Board (or the Executive Officer's designee).

Designated Enforcement Officer DELETE,
REPLACE WITH:
Designated Enforcement Officer means the Executive Officer of the Air Resources Board (or the Executive Officer's designee).

* * * * *

ADD:
EPA or U.S. EPA means Air Resources Board.

* * * * *

ADD:
Executive Order means an order issued by the Executive Officer of the Air Resources Board certifying engines for sale in California.

* * * * *

Nonroad DELETE,
REPLACE WITH:
Nonroad means relating to off-road engines or equipment that includes off-road engines.

* * * * *

Nonroad engine DELETE,
REPLACE WITH:
Nonroad engine means an off-road engine as defined in this section.

* * * * *

Nonroad equipment DELETE,
REPLACE WITH:
Nonroad equipment means a piece of equipment that is powered by one or more off-road engines.

* * * * *

ADD:
Off-road engine means:
(1) Except as discussed in paragraph (2) of this definition, any internal combustion engine:
(i) In or on a piece of equipment that is self-propelled or serves a dual purpose by both propelling itself and performing another function (such as garden tractors, off-

highway mobile cranes, and bulldozers); or

(ii) In or on a piece of equipment that is intended to be propelled while performing its function (such as lawnmowers and string trimmers); or

(iii) That, by itself or in or on a piece of equipment, is portable or transportable, meaning designed to be and capable of being carried or moved from one location to another. Indicia of transportability include, but are not limited to, wheels, skids, carrying handles, dolly, trailer, or platform.

(2) An internal combustion engine is not an off-road engine if:

(i) The engine is used to propel a vehicle subject to the emissions standards contained in Title 13, California Code of Regulations, Sections 1950-1978, or a vehicle used solely for competition, or is subject to standards promulgated under section 202 of the federal Clean Air Act (42 U.S.C; or

(ii) The engine is regulated by a federal New Source Performance Standard promulgated under section 111 of the 1990 Clean Air Act (42 U.S.C. 7511); or

(iii) The engine otherwise included in paragraph (1)(iii) of this definition remains or will remain at a location for more than 12 consecutive months or a shorter period of time for an engine located at a seasonal source. A location is any site at a building, structure, facility, or installation. Any engine (or engines) that replaces an engine at a location and that is intended to perform the same or similar function as the engine replaced will be included in calculating the consecutive time period. An engine located at a seasonal source is an engine that remains at a seasonal source during the full annual operating period of the seasonal source. A seasonal source is a stationary source that remains in a single location on a permanent basis (i.e., at least two years) and that operates at that single location approximately three months (or more) each year. This paragraph does not apply to an engine after the engine is removed from the location.

* * * * *

We (us, our) DELETE,
REPLACE WITH:
We (us, our) means the Executive Officer of the California Air Resources Board and any authorized representatives.

ADD:
ADDENDUM: The definitions in the California Health and Safety Code and in Title 13, CCR, § 2421, shall apply.

§ 1039.805 What symbols, acronyms, and abbreviations does this part use?

* * * * *

§ 1039.810 What materials does this part reference?

* * * * *

§ 1039.815 What provisions apply to confidential information?

DELETE,
REPLACE WITH:
Any manufacturer may assert that some or all of the information submitted pursuant to Title 13, CCR, Division 3, Chapter 9, Article 4 (Off-Road Compression-Ignition Engines and Equipment) is entitled to confidential treatment as provided by Title 17, CCR, §§ 91000-91022.

§ 1039.820 How do I request a hearing?

DELETE,
REPLACE WITH:
A manufacturer may request a hearing on an Executive Officer's decision regarding certification, as specified in Title 17, CCR, Division 3, Chapter 1, Subchapter 1.25, Articles 1 and 2.

Appendix I to Part 1039 – [Reserved]

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Appendix II to Part 1039 – Steady-state Duty Cycles for Constant-Speed Engines

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Appendix III to Part 1039 – Steady-state Duty Cycles for Variable-Speed Engines with Maximum Power below 19 kW

* * * * *

Appendix IV to Part 1039 – Steady-state Duty Cycles for Variable-Speed Engines with Maximum Power at or above 19 kW

* * * * *

Appendix V to Part 1039 – [Reserved]

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Appendix VI to Part 1039 – Nonroad Compression-Ignition Composite Transient Cycle

* * * * *

PART 1065 – ENGINE-TESTING PROCEDURES

Note: 40 CFR Part 1065, as modified by the July 13, 2005, Omnibus Technical Amendments, is for all intents and purposes a completely new document. Few of the original sections remain, but even those have different titles and content than originally designated. Therefore, to expedite the incorporation of the Omnibus Technical Amendments into Part 1065 of the 2008 and Later Test Procedures, the modified text identified will reference modifications to the Omnibus Technical Amendments rather than to staff's existing Part 1065 of the existing 2008 and Later Test Procedures. In effect, staff is proposing to incorporate the Omnibus Technical Amendments (70 FR 40516, July 13, 2005), as if it were a new document.

SOURCE: 70 FR 40516, July 13, 2005, unless otherwise noted.

Subpart A – Applicability and General Provisions

§ 1065.1 Applicability.

* * * * *

(a)(2) DELETE,
REPLACE WITH:
Land-based off-road compression-ignition engines regulated under Title 13, CCR, Chapter 9, Article 4, and subject to the emission standards in § 2423(b)(1)(B) of that Article.

* * * * *

(g) DELETE.

§ 1065.2 Submitting information to ARB under this part.

* * * * *

§ 1065.5 Overview of this part 1065 and its relationship to the standard-setting part.

* * * * *

§ 1065.10 Other procedures.

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§ 1065.12 Approval of alternate procedures.

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§ 1065.15 Overview of procedures for laboratory and field testing.

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§ 1065.20 Units of measure and overview of calculations.

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§ 1065.25 Recordkeeping.

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Subpart B – Equipment Specifications

§ 1065.101 Overview.

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§ 1065.110 Work inputs and outputs, accessory work, and operator demand.

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§ 1065.120 Fuel properties and fuel temperature and pressure.

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§ 1065.122 Engine cooling and lubrication.

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§ 1065.125 Engine intake air.

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§ 1065.127 Exhaust gas recirculation.

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§ 1065.130 Engine exhaust.

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§ 1065.140 Dilution for gaseous and PM constituents.

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§ 1065.145 Gaseous and PM probes, transfer lines, and sampling system components.

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§ 1065.150 Continuous sampling.

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§ 1065.170 Batch sampling for gaseous and PM constituents.

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§ 1065.190 PM-stabilization and weighing environments for gravimetric analysis.

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§ 1065.195 PM-stabilization environment for in-situ analyzers.

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Subpart C – Measurement Instruments

§ 1065.201 Overview and general provisions.

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§ 1065.202 Data updating, recording, and control.

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§ 1065.205 Performance specifications for measurement instruments.

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Measurement of Engine Parameters and Ambient Conditions

§ 1065.210 Work input and output sensors.

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§ 1065.215 Pressure transducers, temperature sensors, and dewpoint sensors.

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Flow-Related Measurements

§ 1065.220 Fuel flow meter.

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§ 1065.225 Intake-air flow meter.

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§ 1065.230 Raw exhaust flow meter.

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§ 1065.240 Dilution air and diluted exhaust flow meters.

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§ 1065.245 Sample flow meter for batch sampling.

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§ 1065.248 Gas divider.

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CO and CO_2 Measurements

§ 1065.250 Nondispersive infra-red analyzer.

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Hydrocarbon Measurements

§ 1065.260 Flame-ionization detector.

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§ 1065.265 Nonmethane cutter.

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§ 1065.267 Gas chromatograph.

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NO_x Measurements

§ 1065.270 Chemiluminescent detector.

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§ 1065.272 Nondispersive ultraviolet analyzer.

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O_2 Measurements

§ 1065.280 Paramagnetic and magnetopneumatic O_2 detection analyzers.

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Air-to-Fuel Ratio Measurements

§ 1065.284 Zirconia (ZrO_2) analyzer.

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PM Measurements

§ 1065.290 PM gravimetric balance.

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§ 1065.295 PM inertial balance for field testing analysis.

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Subpart D – Calibrations and Verifications

§ 1065.301 Overview and general provisions.

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§ 1065.303 Summary of required calibration and verifications.

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§ 1065.305 Verifications for accuracy, repeatability, and noise.

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§ 1065.307 Linearity verification.

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§ 1065.308 Continuous gas analyzer system-response and updating-recording verification.

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§ 1065.309 Continuous gas analyzer uniform response verification.

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Measurement of Engine Parameters and Ambient Conditions

§ 1065.310 Torque calibration.

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§ 1065.315 Pressure, temperature, and dewpoint calibration.

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Flow-Related Measurements

§ 1065.320 Fuel-flow calibration.

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§ 1065.325 Intake-flow calibration.

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§ 1065.330 Exhaust-flow calibration.

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§ 1065.340 Diluted exhaust flow (CVS) calibration.

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§ 1065.341 CVS and batch sampler verification (propane check).

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§ 1065.345 Vacuum-side leak verification.

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CO and CO_2 Measurements

§ 1065.350 H_2O interference verification for CO_2 NDIR analyzers.

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§ 1065.355 H_2O and CO_2 interference verification for CO NDIR analyzers.

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Hydrocarbon Measurements

§ 1065.360 FID optimization and verification.

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§ 1065.362 Non-stoichiometric raw exhaust FID O_2 interference verification.

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§ 1065.365 Nonmethane cutter penetration fractions.

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NO_x Measurements

§ 1065.370 CLD CO_2 and H_2O quench verification.

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§ 1065.372 NDUV analyzer HC and H_2O interference verification.

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§ 1065.376 Chiller NO_2 penetration.

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§ 1065.378 NO_2-to-NO converter conversion verification.

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PM Measurements

§ 1065.390 PM balance verifications and weighing process verification.

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§ 1065.395 Inertial PM balance verifications.

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Subpart E – Engine Selection, Preparation, and Maintenance

§ 1065.401 Test engine selection.

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§ 1065.405 Test engine preparation and maintenance.

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§ 1065.410 Maintenance limits for stabilized test engines.

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§ 1065.415 Durability demonstration.

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Subpart F – Performing an Emission Test in the Laboratory

§ 1065.501 Overview.

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§ 1065.510 Engine mapping.

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§ 1065.512 Duty cycle generation.

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§ 1065.514 Cycle-validation criteria.

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§ 1065.520 Pre-test verification procedures and pre-test data collection.

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§ 1065.525 Engine starting, restarting, and shutdown.

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§ 1065.530 Emission test sequence.

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§ 1065.545 Validation of proportional flow control for batch sampling.

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§ 1065.550 Gas analyzer range validation, drift validation, and drift correction.

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§ 1065.590 PM sample preconditioning and tare weighing.

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§ 1065.595 PM sample post-conditioning and total weighing.

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Subpart G – Calculations and Data Requirements

§ 1065.601 Overview.

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§ 1065.602 Statistics.

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§ 1065.610 Duty cycle generation.

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§ 1065.630 1980 international gravity formula.

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§ 1065.640 Flow meter calibration calculations.

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§ 1065.642 SSV, CFV, and PDP molar flow rate calculations.

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§ 1065.645 Amount of water in an ideal gas.

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§ 1065.650 Emission calculations.

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§ 1065.655 Chemical balances of fuel, intake air, and exhaust.

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§ 1065.659 Removed water correction.

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§ 1065.660 THC and NMHC determination.

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§ 1065.665 THCE and NMHCE determination.

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§ 1065.667 Dilution air background emission correction.

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§ 1065.670 NO_x intake-air humidity and temperature corrections.

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§ 1065.672 Drift correction.

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§ 1065.675 CLD quench verification calculations.

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§ 1065.690 Buoyancy correction for PM sample media.

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§ 1065.695 Data requirements.

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Subpart H – Engine Fluids, Test Fuels, Analytical Gases and Other Calibration Standards

§ 1065.701 General requirements for test fuels.

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(b) DELETE,
REPLACE WITH:
With Executive Officer approval, the certifying entity may use other test fuels so long as they do not affect the demonstration of compliance.

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§ 1065.703 Distillate diesel fuel.

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ADD:
(d) The Executive Officer may allow other fuel specifications, such as California diesel fuel, so long as they do not affect the demonstration of compliance.

§ 1065.705 Residual fuel [Reserved].

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§ 1065.710 Gasoline.

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§ 1065.715 Natural gas.

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§ 1065.720 Liquefied petroleum gas.

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§ 1065.740 Lubricants.

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§ 1065.745 Coolants.

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§ 1065.750 Analytical gases.

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§ 1065.790 Mass standards.

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Subpart I – Testing with Oxygenated Fuels

§ 1065.801 Applicability.

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§ 1065.805 Sampling system.

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§ 1065.845 Response factor determination.

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§ 1065.850 Calculations.

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Subpart J – Field Testing and Portable Emission Measurement Systems

DELETE.

Subpart K – Definitions and Other Reference Information

§ 1065.1001 Definitions.

ADD:
The definitions in 40 CFR 1039.801, as modified, apply with the following revisions.

ADD:
40 CFR part 1039 means Part 1039 and applicable subparts of these 2008 and Later Test procedures when referenced in unrevised sections.

40 CFR part 1068 means Part 1068 and applicable subparts of these 2008 and Later Test procedures when referenced in unrevised sections.

* * * * *

Designated Officer DELETE,
REPLACE WITH:
Designated Compliance Officer means the Executive Officer of the Air Resources Board, or a designee of the Executive Officer.

* * * * *

§ 1065.1005 Symbols, abbreviations, acronyms, and units of measure.

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§ 1065.1010 Reference materials.

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PART 1068 – GENERAL COMPLIANCE PROVISIONS FOR NONROAD PROGRAMS

SOURCE: 67 FR 68427, November 8, 2002, amended July 13, 2005, unless otherwise noted.

Subpart A – Applicability and Miscellaneous Provisions

§ 1068.1 Does this part apply to me?

* * * * *

(a)(3) DELETE,
REPLACE WITH:
Land-based off-road compression-ignition engines regulated under Title 13, CCR, Chapter 9, Article 4, and subject to the emission standards in § 2423(b)(1)(B) of that Article.

* * * * *

(b)(5) DELETE,
REPLACE WITH:
Off-road compression-ignition engines regulated under Title 13, CCR, Chapter 9, Article 4, and subject to the emission standards in § 2423(b)(1)(A) of that Article.

* * * * *

§ 1068.5 How must manufacturers apply good engineering judgment?

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§ 1068.10 What provisions apply to confidential information?

DELETE,
REPLACE WITH:
Any manufacturer may assert that some or all of the information submitted pursuant to Title 13, CCR, Division 3, Chapter 9, Article 4 (Off-Road Compression-Ignition Engines and Equipment) is entitled to confidential treatment as provided by Title 17, CCR, §§ 91000-91022.

§ 1068.15 Who is authorized to represent the Air Resources Board?

* * * * *

§ 1068.20 May ARB enter my facilities for inspections?

DELETE,
REPLACE WITH:
(a) Any engine manufacturer affected by these regulations, upon receipt of prior notice must admit or cause to be admitted during operating hours any ARB Enforcement Officer that has presented proper credentials to any of the following:

(1) Any facility where tests or procedures or activities connected with such tests or procedures are or were performed.

(2) Any facility where any new off-road compression-ignition engine is present and is being, has been, or will be tested.

(3) Any facility where a manufacturer constructs, assembles, modifies, or builds-up an engine into a certification engine that will be tested for certification.

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

(b) Upon admission to any facility referred to in paragraph (c)(1) of this Section, any ARB Enforcement Officer must be allowed:

(1) 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 break-in, maintenance, and engine storage procedures.

(2) To verify correlation or calibration of test equipment; and,

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

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

(c) To permit an ARB determination whether production off-road compression-ignition engines conform in all material respects to the design specifications that apply to those engines described in the Executive Order certifying such engines and to standards prescribed herein. Engine manufacturers must, upon receipt of prior notice, admit any ARB Enforcement Officer, upon presentation of credentials, to:

(1) 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 or used for certification testing into production engines is located or carried on; and,

(2) Any facility where any off-road compression-ignition engines to be introduced into commerce are manufactured or assembled.

(3) Any California retail outlet where any off-road compression-ignition engine is sold.

(d) On admission to any such facility referred to in this Section, any ARB Enforcement Officer must be allowed:

(1) To inspect and monitor any aspects of such manufacture or assembly and other procedures;

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

(3) To inspect and photograph any part or aspect of any such new off-road compression-ignition engines and any component used in the assembly thereof that are reasonably related to the purpose of the Enforcement Officer's entry.

(e) Any ARB Enforcement Officer must be furnished by those in charge of a facility being inspected with such reasonable assistance as may be necessary to 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 the ARB irrespective of whether or not the applicant controls the facility.

(f) 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 engine manufacturers and facilities. The ARB will not attempt to make any inspections that it has been informed that local law forbids. However, if local law makes it impossible to insure the accuracy of data generated at a facility, no informed judgment that an engine is certifiable or is covered by an Executive Order can properly be based on the data. It is the responsibility of the engine manufacturer to locate its testing and manufacturing facilities in jurisdictions where this situation will not arise.

(g) For purposes of this Section:

(1) “Presentation of credentials” means a display of a document designating a person to be an ARB Enforcement Officer.

(2) Where engine, component, or engine storage areas or facilities are concerned, “operating hours” means all times during which personnel are at work in the vicinity of the area or facility and have access to it.

(3) Where facilities or areas other than those covered by paragraph (g)(2) of this Section are concerned, “operating hours” means all times during which an assembly line is in operation or during which testing, maintenance, break-in procedure, production or compilation of records, or any other procedure or activity is being conducted related to certification testing, translation of designs from the test stage to the production stage, or engine manufacture or assembly.

(4) “Reasonable assistance” includes, but is not limited to, providing clerical, copying, interpretation and translation services; making personnel available upon request to inform the ARB Enforcement Officer of how the facility operates and to answer questions; and performing requested emissions tests on any engine that is being, has been, or will be used for certification testing. Such tests must be nondestructive, but may require appropriate break-in. The engine manufacturer must be compelled to cause the personal appearance of any employee at such a facility before an ARB Enforcement Officer, upon written request from the Executive Officer for the appearance of any employee of a facility, and service of such request upon the engine manufacturer. Any such employee who has been instructed by the engine

manufacturer to appear will be entitled to be accompanied, represented, and advised by counsel.

§ 1068.25 What information must I give to ARB?

* * * * *

(b) DELETE,
REPLACE WITH:
Manufacturers subject to the requirements of this part must establish and maintain records, perform tests, make reports and provide additional information that the Executive Officer may reasonably require under the California Health and Safety Code, Division 26, and corresponding regulations. This also applies to engines that are exempt from emission standards.

§ 1068.27 May ARB conduct testing with my production engines?

* * * * *

§ 1068.30 What definitions apply to this part?

ADD:
The definitions in 40 CFR 1039.801 and 1065.1001, as modified, apply with the following revisions:

ADD:
40 CFR part 1039 means Part 1039 and applicable subparts contained in these 2008 and Later Test procedures when referenced in unrevised sections.

ADD:
40 CFR part 1068 means Part 1068 and applicable subparts contained in these 2008 and Later Test procedures when referenced in unrevised sections.

* * * * *

ADD:
Administrator means the Executive Officer of the Air Resources Board, or a designee of the Executive Officer.

* * * * *

Certificate holder DELETE,
REPLACE WITH:
Certificate holder means a manufacturer (including importers) with a valid Executive Order for at least one engine family in a given model year.

ADD:
Certified configuration or certified emissions configuration means the assembled state of an engine that is equipped with a complete set of emission-related components and systems that are equivalent from an emissions standpoint (i.e., tolerances, calibrations, and specifications) to those components and systems that (A) were originally installed on the engine when it was issued an Executive Order, (B) have been approved by the engine manufacturer to supersede any of the original emission-related components and systems for that engine, or (C) are direct replacement parts equaling or exceeding the emissions-related performance of the original or superseded components and systems.

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ADD:
EPA Delegation Manual means documents explaining the procedures for delegation within the Air Resources Board.

* * * * *

Standard-setting part DELETE,
REPLACE WITH:
Standard-setting part means the articles of the California Code of Regulations that define emission standards for a particular engine.

* * * * *

§ 1068.35 What symbols, acronyms, and abbreviations does this part use?

* * * * *

Subpart B – Prohibited Actions and Related Requirements

§ 1068.101 What general actions does this regulation prohibit?

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(a) DELETE,
REPLACE WITH:
The following prohibitions and requirements apply to manufacturers of new engines and manufacturers of equipment containing these engines, except as described in subparts C and D of this part:
(1) Introduction into commerce. New engines and equipment may not be sold, offered for sale, or introduced or delivered into commerce in California or imported into California unless it has a valid Executive Order for its model year and the required label or tag. The actions listed in the previous sentence may not be taken with respect to any equipment containing an engine subject to this part's provisions, unless the engine has a valid and appropriate Executive Order and the required engine label or tag. For purposes of this paragraph (a)(1), an appropriate Executive Order is one that applies for the same model year as the model year of the equipment (except as allowed by § 1068.105(a)), covers the appropriate category of engines, and conforms to all requirements specified for the equipment in the standard-setting part. The requirements of this paragraph (a)(1) also cover new engines that are produced solely to replace an older engine in a piece of equipment, unless the engine qualifies for the replacement-engine exemption in § 1068.240. Civil penalties my be assessed for each engine in violation under the requirements of the California Health and Safety Code, Division 26, and corresponding regulations.
(2) Reporting and recordkeeping. Manufacturers are required to record certain types of information to show that their engines are meeting California's standards. Manufacturers must comply with these requirements to make and maintain required records (including those described in § 1068.501), and may not deny ARB access to these records or the ability to copy these records for which ARB has the authority to examine upon request. The required reports and information must be provided to the ARB upon request without delay. Failure to comply with the requirements of this paragraph is prohibited. A violation of the requirements of this subpart is a violation of the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations, and is subject to the penalty provisions thereunder.
(3) Testing and access to facilities. Manufacturers may not prevent ARB or its delegated agents from entering the manufacturer's facility to inspect and/or perform authorized testing. Manufacturers must perform the tests we require (or have the tests performed by an outside source). Failure to perform this testing is prohibited. Civil penalties my be assessed for each engine in violation under the requirements of the California Health and Safety Code, Division 26, and corresponding regulations.

(b) DELETE,
REPLACE WITH:
The following prohibitions apply to all entities with respect to the engines to which this part applies:
(1) Tampering. No one may remove or disable a device or element of design that may affect an engine's emission levels. This restriction applies before and after the engine is placed in service. Section 1068.120 describes how this applies to rebuilding engines. A person or a manufacturer or dealer who violates this part is subject to a civil penalty

as specified in the California Health and Safety Code, Division 26, and corresponding regulations This prohibition does not apply in any of the following situations:

* * * * *

(2) Defeat devices. A manufacturer may not knowingly manufacture, sell, offer to sell, or install, an engine part if it bypasses, impairs, defeats, or disables the engine's control the emissions of any pollutant. A violation of the requirements of this subpart is a violation of the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations, and is subject to the penalty provisions thereunder.
(3) Stationary engines. An engine that is excluded from any requirements of this chapter because it is a stationary engine may not be moved or installed in any mobile equipment except as allowed by the provisions of this chapter. The residence time requirements of paragraph (2)(iii) of the nonroad engine definition in § 1068.30 may not be intentionally circumvented. A violation of the requirements of this subpart is a violation of the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations, and is subject to the penalty provisions thereunder for each day you are in violation.
(4) Competition engines. An uncertified engine or piece of equipment that is excluded or exempted from any requirements of this chapter because it is to be used solely for competition may not be used in a manner that is inconsistent with use solely for competition. A violation of the requirements of this subpart is a violation of the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations, and is subject to the penalty provisions thereunder.
(5) Importation. An uncertified engine or piece of equipment may not be imported if it is defined to be new in the standard-setting part and it is built after emission standards start to apply in California. A violation of the requirements of this subpart is a violation of the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations, and is subject to the penalty provisions thereunder. Note the following:
(i) The definition of new is broad for imported engines; uncertified engines and equipment (including used engines and equipment) are generally considered to be new when imported.
(ii) Engines that were originally manufactured before applicable ARB standards became effective are generally not subject to emission standards.
(6) Warranty. Manufacturers must honor the emission-related warranty requirements under § 1068.115 and fulfill any applicable responsibilities to recall engines under § 1068.505. Failure to meet these obligations is prohibited. A violation of the requirements of this subpart is a violation of the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations, and is subject to the penalty provisions thereunder.

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(e) DELETE,
REPLACE WITH:
The maximum penalty values listed in paragraphs (a) and (b) of this section are shown for calendar year 2002. Maximum penalty limits for later years may be adjusted based on the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations.

ADD:
(f) Under § 43017 of the California Health and Safety Code, the Air Resources Board may enjoin any violation of any provision of Subpart B of this part 1068.

§ 1068.105 What other provisions apply to me specifically if I manufacture equipment needing certified engines?

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(d) DELETE,
REPLACE WITH:
Producing off-road equipment certified to highway emission standards. A manufacturer may produce off-road equipment from complete or incomplete motor vehicles with the motor vehicle engine under the following conditions:
(1) The engine or vehicle is certified to California on-road requirements.
(2) The engine is not adjusted outside the manufacturer's specifications.
(3) The engine or vehicle is not modified in any way that may affect its emission control. This applies to evaporative emission controls, but not refueling emission controls.
(4) Additional restrictions may be imposed by the Executive Officer as determined necessary to ensure emission performance equity.

§ 1068.110 What other provisions apply to engines in service?

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(b) DELETE,
REPLACE WITH:
Certifying aftermarket parts. The manufacturer or rebuilder of an aftermarket engine part shall be required to certify according to the requirements of Title 13, CCR, Chapter 4, Article 2. The aftermarket part rebuilder or manufacturer must keep all records showing how the part affects emissions, and shall provide this information to the Executive Officer within 30 calendar days upon request.

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§ 1068.115 When must manufacturers honor emission-related warranty claims?

Introductory text DELETE,
REPLACE WITH:
Title 13, CCR, Chapter 9, Article 4, § 2425, requires certifying manufacturers of compression-ignition engines to warrant to purchasers that their engines are designed, built, and equipped to conform at the time of sale to the applicable regulations for their full useful life, including a warranty that the engines are free from defects in materials and workmanship that would cause an engine to fail to conform to the applicable regulations during the specified warranty period. This section codifies the warranty requirements without intending to limit them.

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§ 1068.120 What requirements must I follow to rebuild engines?

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ADD:
(l) The provisions in Title 13, CCR, § 2423(l) shall apply.

§ 1068.125 What happens if I violate the regulations?

DELETE,
REPLACE WITH:
A violation of the requirements of this subpart is a violation of the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations, and is subject to the penalty provisions thereunder.

Subpart C – Exemptions and Exclusions

§ 1068.201 Does ARB exempt or exclude any engines from the prohibited acts?

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§ 1068.210 What are the provisions for exempting test engines?

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§ 1068.215 What are the provisions for exempting manufacturer-owned engines?

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(b) DELETE,
REPLACE WITH:
By provision of the California Health and Safety Code, Division 24, Part 5, Chapter 1, § 43014, a manufacturer may request the Executive Officer to issue an experimental permit for a nonconforming engine under the ownership and control of the manufacturer for the purposes of developing products, assessing production methods, or promoting engines in the marketplace. The engine shall not be loaned, leased, or sold to generate revenue, either by itself or in a piece of equipment.

* * * * *

(c)(3)(iv) DELETE,
REPLACE WITH:
The statement “THIS ENGINE IS COVERED BY AN EXPERIMENTAL PERMIT AND IS EXEMPT FROM MEETING CALIFORNIA EMISSION REQUIREMENTS.”. The referencing of similar federal requirements in combination with California references under this provision is permitted.

§ 1068.220 What are the provisions for exempting display engines?

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§ 1068.225 What are the provisions for exempting engines for national security?

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§ 1068.230 What are the provisions for exempting engines for export?

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§ 1068.235 What are the provisions for exempting engines used solely for competition?

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§ 1068.240 What are the provisions for exempting new replacement engines?

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(c) DELETE,
REPLACE WITH:
If the engine being replaced was not certified to any emission standards under this chapter, add a permanent label with your corporate name and trademark and the following language:

“THIS ENGINE DOES NOT COMPLY WITH CALIFORNIA OFF-ROAD EMISSION REQUIREMENTS. SALE OR INSTALLATION OF THIS ENGINE FOR ANY PURPOSE OTHER THAN AS A REPLACEMENT ENGINE FOR AN ENGINE MANUFACTURED PRIOR TO JANUARY 1, [Insert appropriate year reflecting when the earliest tier of emission standards began to apply to engines of that size and type] IS A VIOLATION OF CALIFORNIA LAW SUBJECT TO CIVIL PENALTY.” The referencing of similar federal requirements in combination with California references under this provision is permitted.

(d) DELETE,
REPLACE WITH:
If the engine being replaced was certified to emission standards less stringent than those in effect when you produce the replacement engine, add a permanent label with your corporate name and trademark and the following language:
“THIS ENGINE COMPLIES WITH CALIFORNIA OFF-ROAD AND U.S. EPA NONROAD EMISSION REQUIREMENTS FOR [Insert appropriate year reflecting when the applicable tier of emission standards for the replaced engine began to apply] ENGINES UNDER 13 CCR 2423(j) AND 40 CFR 1068.240. SELLING OR INSTALLING THIS ENGINE FOR ANY PURPOSE OTHER THAN TO REPLACE AN OFF-ROAD ENGINE BUILT BEFORE JANUARY 1 [Insert appropriate year reflecting when the next tier of emission standards began to apply] MAY BE A VIOLATION OF CALIFORNIA AND FEDERAL LAW SUBJECT TO CIVIL PENALTY.” The referencing of similar federal requirements in combination with California references under this provision is permitted.

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§ 1068.245 What temporary provisions address hardship due to unusual circumstances?

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§ 1068.250 What are the provisions for extending compliance deadlines for small-volume manufacturers under hardship?

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§ 1068.255 What are the provisions for exempting engines for hardship for equipment manufacturers and secondary engine manufacturers?

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(b)(4)(i) DELETE,
REPLACE WITH:
If the engine does not meet any emission standards: “THIS ENGINE IS EXEMPT

UNDER 13 CCR 2423(f) FROM EMISSION STANDARDS AND RELATED REQUIREMENTS.". The referencing of similar federal requirements in combination with California references under this provision is permitted.

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§ 1068.260 What are the provisions for temporarily exempting engines for delegated final assembly?

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§ 1068.265 What provisions apply to engines that are conditionally exempted from certification?

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Subpart D – Imports

§ 1068.301 Does this subpart apply to me?

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§ 1068.305 How do I get an exemption or exclusion for imported engines?

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ADD:
(f) For any engine whose destination is California, send the completed form to the Executive Officer of the Air Resources Board.

§ 1068.310 What are the exclusions for imported engines?

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§ 1068.315 What are the permanent exemptions for imported engines?

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§ 1068.320 How must I label an imported engine with a permanent exemption?

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(b)(4) DELETE,
REPLACE WITH:
State: "THIS IMPORT ENGINE IS GRANTED A PERMANENT EXEMPTION FROM MEETING CURRENT YEAR CALIFORNIA OFF-ROAD DIESEL EMISSION REQUIREMENTS BY ALLOWANCE FOR [identify the permanent exemption category authorizing the exemption (for example, “NATIONAL SECURITY”)]. INSTALLING THIS ENGINE IN ANY DIFFERENT APPLICATION IS A VIOLATION OF CALIFORNIA LAW SUBJECT TO CIVIL PENALTY.”. The referencing of similar federal requirements in combination with California references under this provision is permitted.

§ 1068.325 What are the temporary exemptions for imported engines?

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§ 1068.330 How do I import engines requiring further assembly?

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§ 1068.335 What are the penalties for violations?

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ADD:
(c) Under § 43017 of the California Health and Safety Code, the Air Resources Board may enjoin any violation of any provision of Subpart D of this part 1068.

Subpart E – Selective Enforcement Auditing

§ 1068.401 What is a selective enforcement audit?

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§ 1068.405 What is in a test order?

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§ 1068.410 How must I select and prepare my engines?

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§ 1068.415 How do I test my engines?

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§ 1068.420 How do I know when my engine family fails an SEA?

* * * * *

§ 1068.425 What happens if one of my production-line engines exceeds the emission standards?

* * * * *

§ 1068.430 What happens if an engine family fails an SEA?

* * * * *

§ 1068.435 May I sell engines from an engine family with a suspended Executive Order?

* * * * *

§ 1068.440 How do I ask ARB to reinstate my suspended Executive Order?

* * * * *

§ 1068.445 When may ARB revoke my Executive Order under this subpart and how may I sell these engines again?

* * * * *

§ 1068.450 What records must I send to ARB?

* * * * *

ADD:
(f) The manufacturer shall supply upon request emission test results from U.S. EPA-directed audits for engines certified in California.

§ 1068.455 What records must I keep?

* * * * *

Appendix A to Subpart E of Part 1068-Plans for Selective Enforcement Auditing

* * * * *

Subpart F – Reporting Defects and Recalling Engines

§ 1068.501 How do I report engine defects?

* * * * *

§ 1068.505 How does the recall program work?

DELETE,
REPLACE WITH:
Off-road engines subject to provisions of subpart B of this part are subject to recall regulations specified in Title 13, California Code of Regulations, Chapter 2, Articles 2.1 – 2.4, §§ 2111 – 2141.

§ 1068.510 How do I prepare and apply my remedial plan?

DELETE,
REPLACE WITH:
Off-road engines subject to provisions of subpart B of this part are subject to recall regulations specified in Title 13, California Code of Regulations, Chapter 2, Articles 2.1 – 2.4, §§ 2111 – 2141.

§ 1068.515 How do I mark or label repaired engines?

DELETE,
REPLACE WITH:
Off-road engines subject to provisions of subpart B of this part are subject to recall regulations specified in Title 13, California Code of Regulations, Chapter 2, Articles 2.1 – 2.4, §§ 2111 – 2141.

§ 1068.520 How do I notify affected owners?

DELETE,
REPLACE WITH:
Off-road engines subject to provisions of subpart B of this part are subject to recall regulations specified in Title 13, California Code of Regulations, Chapter 2, Articles 2.1 – 2.4, §§ 2111 – 2141.

§ 1068.525 What records must I send to ARB?

DELETE,
REPLACE WITH:
Off-road engines subject to provisions of subpart B of this part are subject to recall regulations specified in Title 13, California Code of Regulations, Chapter 2, Articles 2.1 – 2.4, §§ 2111 – 2141.

§ 1068.530 What records must I keep?

DELETE,
REPLACE WITH:
Off-road engines subject to provisions of subpart B of this part are subject to recall regulations specified in Title 13, California Code of Regulations, Chapter 2, Articles 2.1 – 2.4, §§ 2111 – 2141.

§ 1068.535 How can I do a voluntary recall for emission-related problems?

DELETE,
REPLACE WITH:
Off-road engines subject to provisions of subpart B of this part are subject to recall regulations specified in Title 13, California Code of Regulations, Chapter 2, Articles 2.1 – 2.4, §§ 2111 – 2141.

§ 1068.540 [Removed]

DELETE.

Subpart G – Hearings

§ 1068.601 What are the procedures for hearings?

DELETE,
REPLACE WITH:
A manufacturer may request a hearing on an Executive Officer's decision regarding certification, as specified in Title 17, California Code of Regulations, Division 3, Chapter 1, Subchapter 1.25, Articles 1 and 2.

Appendix I to Part 1068 – Emission-Related Components

* * * * *

Appendix II to Part 1068 – Emission-Related Parameters and Specifications

* * * * *

PART 6

FINAL REGULATION ORDER TEST PROCEDURES

Part I – C

(Parts 1039/1065/1068)

(2008 – 2010 Model Years)

Tier 4 Off-Road Compression-Ignition Engines

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FINAL REGULATION ORDER TEST PROCEDURES

Note: This appendix shows the entirety of regulatory amendments to the test procedures titled below, which were approved by the Air Resources Board on December 16, 2011, and refined via subsequent conforming modifications authorized under Resolution 11-41. The source for these test procedures is Part 1039 of the "California Exhaust Emission Standards and Test Procedures for New 2008 and Later Tier 4 Off-Road Compression-Ignition Engines, Part I-C" (Part I-C), adopted October 20, 2005. These amendments are formatted in a style to indicate changes from the existing test procedures. All existing language is indicated by plain type. All additions to the existing language are indicated by underlined type (except that some existing headings within the test procedures were underlined originally for emphasis, and remain so, and thus do not constitute new language). All deletions to the existing language are indicated by ~~strikeout~~. Only those sections containing the modifications from the existing language are included. All other portions remain unchanged and are indicated by the notation [* * * * *] for reference. If there is any conflict between the provisions of this document and the California Health and Safety Code, Division 26, or Title 13 of the California Code of Regulations (CCR), the Health and Safety Code and Title 13 apply.

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State of California

AIR RESOURCES BOARD

California Exhaust Emission Standards and Test Procedures for New 2008-2010 ~~and Later~~ Tier 4 Off-Road Compression-Ignition Engines

PART I-C

Adopted: October 20, 2005

Amended: October 25, 2012

Table of Contents

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2008 AND LATER TIER 4 OFF-ROAD COMPRESSION-IGNITION ENGINES

SOURCE: The "California Exhaust Emission Standards and Test Procedures for New 2008 and Later Tier 4 Off-Road Compression-Ignition Engines, Part I-C" (Part I-C), adopted October 20, 2005

PART 1039 – CONTROL OF EMISSIONS FROM NEW AND IN-USE ~~NONROAD~~ OFF-ROAD COMPRESSION-IGNITION ENGINES

Subpart A – Overview and Applicability

§ 1039.1 Does this part apply for my engines?

* * * * *

§ 1039.625 What requirements apply under the program for equipment-manufacturer flexibility?

* * * * *

(e)(3) In all other cases, engines at or above ~~37~~56 kW and at or below 560 kW must meet the appropriate Tier 3 standards described in Title 13, CCR, §2423(b)(1)(a). Engines below ~~37~~56 kW and engines above 560 kW must meet the appropriate Tier 2 standards described in Title 13, CCR, § 2423(b)(1)(a).

* * * * *

PART 1065 – ENGINE-TESTING PROCEDURES

Subpart A – Applicability and General Provisions

§ 1065.1 Applicability.

* * * * *

PART 1068 – GENERAL COMPLIANCE PROVISIONS FOR ~~NONROAD~~ OFF-ROAD PROGRAMS

Subpart A – Applicability and Miscellaneous Provisions

§ 1068.1 Does this part apply to me?

* * * * *

Subpart B – Prohibited Actions and Related Requirements

§ 1068.101 What general actions does this regulation prohibit?

* * * * *

(b)(3) Stationary engines. An engine that is excluded from any requirements of this chapter because it is a stationary engine may not be moved or installed in any mobile equipment except as allowed by the provisions of this chapter. The residence time requirements of paragraph (2)(iii) of the ~~nonroad~~ engine definition in §1068.30 may not be intentionally circumvented. A violation of the requirements of this subpart is a violation of the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations, and is subject to the penalty provisions thereunder for each day you are in violation.

* * * * *

PART 7

FINAL REGULATION ORDER TEST PROCEDURES

Part I – D (Part 1039)

(2011 and Later Model Years)

Tier 4 Off-Road Compression-Ignition Engines

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FINAL REGULATION ORDER TEST PROCEDURES

Note: This appendix shows the entirety of regulatory amendments to the test procedures titled below, which were approved by the Air Resources Board on December 16, 2011, and refined via subsequent conforming modifications authorized under Resolution 11-41. The source for these test procedures is Part 1039 of the "California Exhaust Emission Standards and Test Procedures for New 2008 and Later Tier 4 Off-Road Compression-Ignition Engines, Part I-C" (Part I-C), adopted October 20, 2005. Part 1068 and Part 1065 of those test procedures have been updated in separate documents titled "California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression Ignition Engines, Part I-E" (Part I-E), and "California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression Ignition Engines, Part I-F" (Part I-F), respectively. The proposed modifications to this document are, in large part, incorporated directly or by reference from 40 Code of Federal Regulations (CFR) part 1039, subparts A, B, C, D, E, F, G, H, and I, including Appendix I, II, V, and VI to part 1039, last amended June 28, 2011, and the subparts of 40 CFR Part 60, 40 CFR Part 85, 40 CFR Part 86, 40 CFR Part 89, 40 CFR Part 92, and 40 CFR Part 1033 that are internally referenced within 40 CFR Part 1039. These test procedures are incorporated by reference in Title 13, California Code of Regulations, Section 2421(a)(4)(B). These amendments are formatted in a style to indicate changes from the existing test procedures. All existing language is indicated by plain type. All additions to the existing language are indicated by <u>underlined</u> type (except that some existing headings within the test procedures were underlined originally for emphasis, and remain so, and thus do not constitute new language). All deletions to the existing language are indicated by ~~strikeout~~. Additionally, to facilitate lengthy and extensive revisions of the existing text, the terms "DELETE" and "REPLACE WITH" or "ADD" are used to denote changes from the existing test procedures and do not generally indicate the incorporation of federal provisions as this convention is normally used. Only those sections containing the modifications from the existing language are included. All other portions remain unchanged and are indicated by the notation [* * * * *] for reference. If there is any conflict between the provisions of this document and the California Health and Safety Code, Division 26, or Title 13 of the California Code of Regulations (CCR), the Health and Safety Code and Title 13 apply.

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State of California

AIR RESOURCES BOARD

California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines

PART I-~~C~~D

Adopted: October 20, 2005

Amended: October 25, 2012

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CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 20~~08~~11 AND LATER TIER 4 OFF-ROAD COMPRESSION-IGNITION ENGINES, Part I-D

The following provisions of Part 1039~~, Part 1065, and Part 1068~~, Title 40, Code of Federal Regulations (CFR), as ~~proposed~~ promulgated and last amended by the United States Environmental Protection Agency on ~~the date listed~~ June 28, 2011, are ~~adopted and~~ incorporated herein by this reference into the existing California test procedures for 2008 model year and later off-road compression-ignition engines, hereafter known as the "California Exhaust Emission Standards and Test Procedures for New 20~~08~~11 and Later Tier 4 Off-Road Compression-Ignition Engines, Part I-D," except as altered or replaced by the provisions set forth below. All proposed changes indicated by the notation " * * * * * " or by ~~strikeout~~/underline refer to the existing 2008 and Later California Test Procedures, Part I-C, as previously adopted by the Air Resources Board on October 20, 2005. References to other 40 CFR parts and sections refer to parts and sections incorporated in this or other ARB Test Procedures unless otherwise indicated.

PART 1039 – CONTROL OF EMISSIONS FROM NEW AND IN-USE OFF-ROAD COMPRESSION-IGNITION ENGINES

SOURCE: California Exhaust Emission Standards and Test Procedures for New 2008 and Later Tier 4 Off-Road Compression-Ignition Engines, Part I-C, Adopted October 20, 2005, predicated upon the requirements of 69 FR 38957, June 29, 2004, amended July 13, 2005, unless otherwise noted.

Subpart A – Overview and Applicability

§ 1039.1 Does this part apply for my engines?

* * * * *

(c) DELETE,
REPLACE WITH:
(c) The definitions of "off-road compression-ignition engine" in 13 CCR 2421(a)(38) and 40 CFR 1068.30 exclude certain engines used in stationary applications. These engines may be required by 17 CCR 93115 or subpart IIII of 40 CFR part 60 to comply with some of the provisions of this part 1039; otherwise, these engines are ~~not~~ only required to comply with ~~this part, except for~~ the requirements in §1039.20. In addition~~, if these engines are uncertified~~, the prohibitions in §1068.101 restrict ~~their use as~~ the use of stationary engines for nonstationary purposes unless they are certified under §1039, or under the provisions referenced in 13 CCR 2421(a)(3), or 40 CFR part 94, to the same standards that would apply to off-road compression-ignition engines for the same model year.

ADD:
§ 1039.2 Who is responsible for compliance?
The regulations in this part 1039 contain provisions that may affect engine or equipment manufacturers, or both, and others. However, the requirements of this part are generally addressed to the engine manufacturer. The term "you" generally means the engine manufacturer, as defined in §1039.801, especially for issues related to certification.

§ 1039.5 Which engines are excluded from this part's requirements?
DELETE,
REPLACE WITH:
This part does not apply to the following off-road engines:

(a) Locomotive engines.

(1) The following locomotive engines are not subject to the provisions of this part 1039:

(i) Engines in locomotives ~~subject to the standards of~~ certified under 40 CFR part ~~92~~ 1033.

(ii) Engines in locomotives that are exempt from the standards of 40 CFR part 92 or 1033 pursuant to the provisions of 40 CFR part 1033 (except for the provisions of 40 CFR 1033.150(e) or to §1068. ~~(except for the provisions of 40 CFR 92.907). For example, an engine that is exempt under 40 CFR 92.906 because it is in a manufacturer-owned locomotive is not subject to the provisions of this part 1039. 1033.150(e)).~~

(2) The following locomotive engines are subject to the provisions of this part 1039:

(i) Engines in locomotives exempt from 40 CFR part ~~92~~ 1033 pursuant to the provisions of 40 CFR ~~92.907~~ 1033.150(e).

(ii) Locomotive engines excluded from the definition of locomotive in 40 CFR ~~92.2~~ 1033.901.

(b) Marine engines. (1) The following marine engines are not subject to the provisions of this part 1039 or 13 CCR 2423:

(i) Engines subject to the standards of 40 CFR part 94.

(ii) Engines not subject to the standards of 40 CFR part 94 only because they were produced before the standards of 40 CFR part 94 started to apply.

(iii) Engines otherwise subject to the standards of 40 CFR Part 94 but that are exempt from the standards of 40 CFR part 94 pursuant to the provisions of 40 CFR part 94

(except for the provisions of 40 CFR 94.907 or 94.912). For example, an engine that is exempt under 40 CFR 94.906 because it is a manufacturer-owned engine is not subject to the provisions of this part 1039.

(iv) Engines with rated power below 37 kW, except that such engines must continue to meet Tier 2 standards and other requirements as stated in the 2000 Plus Limited Test Procedures .

(v) Engines on foreign vessels.

(2) Marine engines are subject to the provisions of this part 1039 if they are otherwise subject to the standards of 40 CFR Part 94 but are exempted from 40 CFR part 94 based on the engine-dressing provisions of 40 CFR 94.907 or the common-family provisions of 40 CFR 94.912.

(c) Mining engines. Engines used in underground mining or in underground mining equipment and regulated by the Mining Safety and Health Administration in 30 CFR parts 7, 31, 32, 36, 56, 57, 70, and 75 are not subject to the provisions of this part 1039.

(d) Hobby engines. Engines ~~with per-cylinder displacement below 50 cubic centimeters~~ installed in reduced-scale models of vehicles that are not capable of transporting a person are not subject to the provisions of this part 1039.

(e) Engines used in recreational vehicles. Engines certified to meet the requirements of 13 CCR Chapter 9 Article 3 or otherwise subject to 13 CCR Chapter 9 Article 3 (for example, engines used in snowmobiles and all-terrain vehicles) are not subject to the provisions of this part 1039.

§ 1039.10 How is this part organized?

(Introduction) DELETE:
~~The regulations in this part 1039 contain provisions that may affect engine or equipment manufacturers, or both, and others. However, the requirements of this part are generally addressed to the engine manufacturer. The term "you" generally means the engine manufacturer, as defined in § 1039.801.~~

* * * * *

§ 1039.15 Do any other regulation parts apply to me?
(a) DELETE,
REPLACE WITH:
(a) Part 1065 of this chapter describes procedures and equipment specifications for testing engines to measure exhaust emissions. Subpart F of this part 1039 describes how to apply the provisions of part 1065 of this chapter to determine whether engines meet the exhaust emission standards in this part.

* * * * *

§ 1039.20 What requirements from this part apply to excluded stationary engines?
DELETE,
REPLACE WITH:
The provisions of this section apply for engines built on or after January 1, 2006.

(a) You must add a permanent label or tag to each new engine you produce or import that is excluded under §1039.1(c) as a stationary engine and is not required by 17 CCR 93115 or CFR 40 part 60, subpart IIII, to meet:
1) the requirements of this Part 1039 or Title 13, CCR, Chapter 9, Article 4, or
2) the requirements in 40 CFR part 94, that are equivalent to the requirements applicable to off-road or marine engines, respectively, for the same model year.

To meet labeling requirements, you must do the following things:

(1) Attach the label or tag in one piece so no one can remove it without destroying or defacing it.

(2) Secure it to a part of the engine needed for normal operation and not normally requiring replacement.

(3) Make sure it is durable and readable for the engine's entire life.

(4) Write it in English.

(5) Follow the requirements in §1039.135(g) regarding duplicate labels if the engine label is obscured in the final installation.

(b) Engine labels or tags required under this section must have the following information:

(1) Include the heading “EMISSION CONTROL INFORMATION".”

(2) Include your full corporate name and trademark. You may instead include the full corporate name and trademark of another company you choose to designate.

(3) State the engine displacement (in liters) and maximum engine power (or in the case of fire pumps, NFPA nameplate engine power).

(4) State: “THIS ENGINE IS ~~EXCLUDED~~ EXEMPTED FROM THE REQUIREMENTS OF 13 CCR, CH 9, ARTICLE 4, AS A “STATIONARY ENGINE.” INSTALLING OR USING THIS ENGINE IN ANY OTHER APPLICATION MAY BE A VIOLATION OF CALIFORNIA LAW SUBJECT TO CIVIL PENALTY.” The referencing of similar federal requirements in combination with California references is permitted.

(c) Stationary engines required by 17 CCR 93115 or 40 CFR part 60, subpart IIII, to meet the requirements of this part 1039, or the requirements referenced at 13 CCR 2421(a)(3), or in 40 CFR part 94, must meet the labeling requirements of 40 CFR 60.4210.

ADD:
§1039.30 Submission of information.
(a) This part includes various requirements to record data or other information. Refer to §1039.825 and §1068.25 regarding recordkeeping requirements. Unless we specify otherwise, store these records in any format and on any media and keep them readily available for one year after you send an associated application for certification, or one year after you generate the data if they do not support an application for certification. You must promptly send us organized, written records in English if we ask for them. We may review them at any time.

(b) The regulations in §1039.255 and §1068.101 describe your obligation to report truthful and complete information and the consequences of failing to meet this obligation. This includes information not related to certification.

(c) Send all reports and requests for approval to the Executive Officer of the Air Resources Board (or the Executive Officer's designee as notified by ARB).

(d) Any written information we require you to send to or receive from another company is deemed to be a required record under this section. Such records are also deemed to be submissions to the Air Resources Board. We may require you to send us these records whether or not you are a certificate holder.

Subpart B – Emission Standards and Related Requirements

§ 1039.101 What exhaust emission standards must my engines meet after the 2014 model year?

* * * * *

§ 1039.102 What exhaust emission standards and phase-in allowances apply for my engines in model year 2014 and earlier?

* * * * *

(e) Alternate NOx standards. DELETE,
REPLACE WITH:
(e) Alternate NOx standards. For engines in 56-560 kW power categories during the phase-in of Tier 4 standards, you may certify engine families to the alternate NOx or NOx+NMHC standards in this paragraph (e) instead of the phase-in and phase-out NOx+NMHC standards described in Tables 4 through 6 of this section. Engines

certified to an alternate NOx standard under this section must be certified to an NMHC standard of 0.19 g/kW-hr. Do not include engine families certified under this paragraph (e) in determining whether you comply with the percentage phase-in requirements of paragraphs (c) and (d)(2) of this section. Except for the provisions for alternate FEL caps in §1039.104(g), the NOx and NOx+NMHC standards and FEL caps under this paragraph (e) are as follows:

* * * * *

ADD:
(e)(3) You may use NOx+NMHC emission credits to certify an engine family to the alternate NOx+NMHC standards in this paragraph (e)(3) instead of the otherwise applicable alternate NOx and NMHC standards. Calculate the alternate NOx+NMHC standard by adding 0.1 g/kW-hr to the numerical value of the applicable alternate NOx standard of paragraph (e)(1) or (2) of this section. Engines certified to the NOx+NMHC standards in Table 1b of 13 CCR 2423(b)(1)(A) using credits as permitted in~~of~~ this paragraph (e)(3) may not generate emission credits. The FEL caps for engine families certified under this paragraph (e)(3) are the previously applicable NOx+NMHC standards of 40 CFR 89.112 (generally the Tier 3 standards).

* * * * *

Table 8 Footnote [3] DELETE,
REPLACE WITH:
For manufacturers certifying engines to the standards of this part 1039 in 2012 under Option #2 of Table 3 of §1039.102, the FEL caps for 37-56 kW engines in the 19-56 kW category of Table 2 of §1039.101 apply for model year 2012 and later; see Title 13, CCR, §2423(b)(1)(A) for provisions that apply to earlier model years.

* * * * *

(g)(4) DELETE,
REPLACE WITH:
(g)(4) Special provisions for 37-56 kW engines. For engines at or above 37 kW and below 56 kW from model years 2008 through 2012, you must ~~take the following additional steps:~~

~~(i) State the applicable PM standard on the emission control information label.~~

~~(ii) A~~ add information to the emission-related installation instructions to clarify the equipment manufacturer's obligations under §1039.104(f).

§ 1039.104 Are there interim provisions that apply only for a limited time?

* * * * *

Table 1 of §1039.104 DELETE,
REPLACE WITH:

Table 1 of §1039.104 - Alternate FEL Caps				
Maximum Engine Power	PM FEL Cap, g/kW-hr	Model Years for the Alternate PM FEL Cap	NOx FEL Cap, g/kW-hr	Model Years for the Alternate NOx FEL Cap
19 ≤ kW < 56	0.30	2012-2015 [1]	-	-
56 ≤ kW < 130 [2]	0.30	2012-2015 [3]	3.8	~~2014~~2012-2015 [3]
130 ≤ kW ≤ 560	0.20	2011-2014	3.8	2011-2014 [4]
kW > 560 [45]	0.10	2015-2018	3.5	2015-2018

[1] For manufacturers certifying engines under Option #1 of Table 3 of §1039.102, these alternate FEL caps apply to all 19-56 kW engines for model years from 2013 through 2016 instead of in the years indicated in this table. For manufacturers certifying engines under Option #2 of Table 3 of §1039.102, these alternate FEL caps do not apply to 19-37 kW engines except in model years 2013 to 2015.

[2] For engines below 75 kW, the FEL caps are 0.40 g/kW-hr for PM emissions and 4.4 g/kW-hr for NOx emissions.

[3] For ~~engines certified under the provisions of §1039.102(d)(2) or (e)(1)(ii), the alternate NOx FEL cap in the table applies only for the 2015 model year~~ manufacturers certifying engines in this power category using a percentage phase-in/phase-out approach instead of the alternate NOx standards of §1039.102(e)(1), the alternate NOx FEL cap in the table applies only in the 2014-2015 model years if certifying under §1039.102(d)(1), and only in the 2015 model year if certifying under §1039.102(d)(2).

[4] For manufacturers certifying engines in this power category using the percentage phase-in/phase-out approach instead of the alternate NOx standard of §1039.102(e)(2), the alternate NOx FEL cap in the table applies only for the 2014 model year.

[45] For engines above 560 kW, the provision for alternate NOx FEL caps is limited to generator-set engines. For example, if you produce 1,000 generator-set engines above 560 kW in 2015, up to 200 of them may be certified to the alternate NOx FEL caps.

ADD:
(g)(5) You may certify engines under this paragraph (g) without regard to whether or not the engine family's FEL is at or below the otherwise applicable FEL cap. For example, a 200 kW engine certified to the NOx+NMHC standard of §1039.102(e)(3) with an FEL equal to the FEL cap of 2.8 g/kW-hr may be certified under this paragraph (g) and count toward the sales limit specified in paragraph (g)(1) of this section.

§ 1039.105 What smoke standards must my engines meet?

* * * * *

§ 1039.107 What evaporative emission standards and requirements apply?

* * * * *

§ 1039.110 [Reserved]

* * * * *

§ 1039.115 What other requirements ~~must my engines meet~~apply?
Introductory Text DELETE,
REPLACE WITH:
Engines ~~subject to this part~~ that are required to meet the emission standards of this part must meet the following requirements, except as noted elsewhere in this part:

Introductory Text (a) DELETE,
REPLACE WITH:

(a) Crankcase emissions. Crankcase emissions may not be discharged directly into the ambient atmosphere from any engine throughout its useful life, except as follows:

* * * * *

§ 1039.120 What emission-related warranty requirements apply to me?

* * * * *

(c) DELETE,
REPLACE WITH:
(c) Components covered. The emission-related warranty covers all components whose failure would increase an engine's emissions of any regulated pollutant, including. This includes components listed in §1068, Appendix I, Title 13, CCR, § 2425(d), and components from any other system you developed to control emissions. The emission-related warranty covers these components even if another company produces the component. Your emission-related warranty does not need to cover components whose failure would not increase an engine's emissions of any regulated pollutant.

* * * * *

§ 1039.125 What maintenance instructions must I give to buyers?

* * * * *

(a)(1)(iii) DELETE,
REPLACE WITH:
(a)(1)(iii) You provide the maintenance free of charge and clearly say so in your maintenance instructions for the customer.

* * * * *

(a)(2)(i) DELETE,
REPLACE WITH:
(a)(2)(i) For EGR-related filters and coolers, PCV valves, crankcase vent filters, and fuel injector tips (cleaning only), the minimum interval is 1,500 hours.

(a)(2)(ii) DELETE,
REPLACE WITH:
(a)(2)(ii) For the following components, including associated sensors and actuators, the minimum interval is 3000 hours: fuel injectors, turbochargers, catalytic converters, electronic control units, particulate traps, trap oxidizers, components related to particulate traps and trap oxidizers, EGR systems (including related components, but excluding filters and coolers), and other add-on components. For particulate traps, trap oxidizers, and components related to either of these, maintenance is limited to cleaning and repair only.

(a)(3) DELETE,
REPLACE WITH:
(a)(3) For engines at or above 130 kW, you may not schedule critical emission-related maintenance more frequently than the following minimum intervals, except as specified in paragraphs (a)(4), (b), and (c) of this section:
(i) For EGR-related filters and coolers, PCV valves, crankcase vent filters, and fuel injector tips (cleaning only), the minimum interval is 1,500 hours.
(ii) For the following components, including associated sensors and actuators, the minimum interval is 4500 hours: fuel injectors, turbochargers, catalytic converters, electronic control units, particulate traps, trap oxidizers, components related to particulate traps and trap oxidizers, EGR systems (including related components, but excluding filters and coolers), and other add-on components~~. For particulate traps, trap oxidizers, and components related to either of these, maintenance is limited to cleaning and repair only.~~

(a)(4) DELETE,
REPLACE WITH,
(a)(4) ~~If your engine family has an alternate useful life under §1039.101(g) that is shorter than the period specified in paragraph (a)(2) or (a)(3) of this section, you may not schedule critical emission-related maintenance more frequently than the alternate useful life, except as specified in paragraph (c) of this section.~~For particulate traps, trap oxidizers, and components related to either of these, scheduled maintenance may include cleaning or repair at the intervals specified in paragraph (a)(2) or (3) of this section, as applicable. Scheduled maintenance may include a shorter interval for cleaning or repair and may also include adjustment or replacement, but only if we approve it. We will approve your request if you provide the maintenance free of charge, ~~and~~ clearly state ~~this~~ in your maintenance instructions that the service is to be provided free of charge, and the Executive Officer or his/her designee determines there is a high likelihood that the maintenance will occur. The Executive Officer may request the submission of additional information to aid in making this determination.

ADD:
(a)(5) You may ask us to approve a maintenance interval shorter than that specified in paragraphs (a)(2) and (a)(3) of this section under §1039.210, including emission-related components that were not in widespread use with off-road compression-ignition engines before 2011. In your request you must describe the proposed maintenance step, recommend the maximum feasible interval for this maintenance, include your rationale with supporting evidence to support the need for the maintenance at the recommended interval, and demonstrate that the maintenance will be done at the recommended interval on in-use engines. In considering your request, we will evaluate the information you provide and any other available information to establish alternate specifications for maintenance intervals, if appropriate. We will announce any decision we make under this paragraph (a)(5) in an ARB manufacturers advisory correspondence or other suitable method of public communication. Anyone may request a hearing regarding such a decision (see §1039.820).

ADD:
(a)(6) If your engine family has an alternate useful life under §1039.101(g) that is shorter than the period specified in paragraph (a)(2) or (a)(3) of this section, you may not schedule critical emission-related maintenance more frequently than the alternate useful life, except as specified in paragraph (c) of this section.

* * * * *

(c) DELETE,
REPLACE WITH:
(c) Special maintenance. You may specify more frequent maintenance to address problems related to special situations, such as atypical engine operation. You must clearly state that this additional maintenance is associated with the special situation you are addressing. We may disapprove your maintenance instructions if we determine that you have specified special maintenance steps to address engine operation that is not atypical, or that the maintenance is unlikely to occur in use. If we determine that certain maintenance items do not qualify as special maintenance under this paragraph (c), you may identify this as recommended additional maintenance under paragraph (b) of this section.

(d) DELETE,
REPLACE WITH:
(d) Noncritical emission-related maintenance. ~~Y~~Subject to the provisions of this paragraph (d), you may schedule any amount of emission-related inspection or maintenance that is not covered by paragraph (a) of this section, ~~as long as you~~ (that is, maintenance that is neither explicitly identified as critical emission-related maintenance, nor that we approve as critical emission-related maintenance). Noncritical emission-related maintenance generally includes maintenance on the components we specify in 40 CFR part 1068, Appendix I, that is not covered in paragraph (a) of this section. You must state in the owner's manual that these steps are not necessary to keep the emission-related warranty valid. If operators fail to do this maintenance, this does not allow you to disqualify those engines from in-use testing or deny a warranty claim. You may ~~Do~~ not take these inspection or maintenance steps during service accumulation on your emission-data engines.

* * * * *

(f) DELETE,
REPLACE WITH:
(f) Source of parts and repairs. State clearly on the first page of your written maintenance instructions that a repair shop or person of the owner's choosing may maintain, replace, or repair emission-control devices and systems. Your instructions may not require components or service identified by brand, trade, or corporate name. Also, do not directly or indirectly condition your warranty on a requirement that the ~~equipment~~engine be serviced by your franchised dealers or any other service establishments with which you have a commercial relationship. You may disregard the requirements in this paragraph (f) if you do one of two things:
(1) Provide a component or service without charge under the purchase agreement.
(2) Get us to waive this prohibition in the public's interest by convincing us the engine will work properly only with the identified component or service.

(g) DELETE,
REPLACE WITH:
(g) Payment for scheduled maintenance. Owners are responsible for properly maintaining their engines. This generally includes paying for scheduled maintenance. However, manufacturers must pay for scheduled maintenance during the useful life if the regulations require it or if it meets all the following criteria:
(1) Each affected component was not in general use on similar engines before the applicable dates shown in paragraph (6) of the definition of new off-road engine in §1039.801.
(2) The primary function of each affected component is to reduce emissions.
(3) The cost of the scheduled maintenance is more than 2 percent of the price of the engine.
(4) Failure to perform the maintenance would not cause clear problems that would significantly degrade the engine's performance.

* * * * *

§ 1039.130 What installation instructions must I give to equipment manufacturers?

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§ 1039.135 How must I label and identify the engines I produce?

* * * * *

(c)(4) DELETE,
REPLACE WITH:
(c)(4) State the power category or subcategory from §1039.101 or §1039.102 that determines the applicable emission standards for the engine family. For engines at or above 37 kW and below 56 kW from model years 2008 through 2012, and for engines less than 8 kW utilizing the provision at §1039.101(c), you must state the applicable PM standard for the engine family.

* * * * *

(c)(6) DELETE,
REPLACE WITH:
(c)(6) State the date of manufacture [MONTH and YEAR]. ~~You may omit this from the label if you keep a record of the engine-manufacture dates and provide it to us upon request.~~

* * * * *

(c)(8) DELETE,
REPLACE WITH:
(c)(8) Identify the emission-control system. Use terms and abbreviations ~~consistent with SAE J1930 (incorporated by reference~~ as described in ~~§1039~~ 40 CFR 1068.~~810)~~45. You may omit this information from the label if there is not enough room for it and you put it in the owners manual instead.

* * * * *

(g) DELETE,
REPLACE WITH:
(g) If you obscure the engine label while installing the engine in the equipment such that the label is no longer readily visible as described in 13 CCR 2424(e), you must place a duplicate label on the equipment. If others install your engine in their equipment in a way that obscures the engine label, we require them to add a duplicate label on the equipment (see 40 CFR 1068.105); in that case, give them the number of duplicate labels they request and keep the following records for at least five years:

(1) Written documentation of the request from the equipment manufacturer.
(2) The number of duplicate labels you send for each engine family and the date you sent them.

* * * * *

§ 1039.140 What is my engine's maximum engine power?

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Subpart C – Certifying Engine Families

§ 1039.201 What are the general requirements for obtaining an Executive Order?

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§ 1039.205 What must I include in my application?

* * * * *

(o) DELETE,
REPLACE WITH:
(o) Present emission data for hydrocarbons (such as NMHC or THCE, as applicable), NOx, PM, and CO on an emission--data engine to show your engines meet the applicable duty-cycle emission standards we specify in §1039.101. Show emission ~~data~~ figures before and after applying adjustment factors for regeneration and deterioration factors for each engine. Include emission results for each mode if you do discrete-mode testing under §1039.505. Present emission data to show that you meet any applicable smoke standards we specify in §1039.105. If we specify more than one grade of any fuel type (for example, high-sulfur and low-sulfur diesel fuel), you need to submit test data only for one grade, unless the regulations of this part specify otherwise for your engine. Note that §1039.235 allows you to submit an application in certain cases without new emission data.

* * * * *

(r) DELETE,
REPLACE WITH:
(r) Report test results as follows:

(1) Report all test results~~, including those~~ involving measurement of pollutants for which emission standards apply. Include test results from invalid tests or from any other tests, whether or not they were conducted according to the test procedures of subpart F of this part. ~~If you measure CO2, report those emission levels~~. We may ask you to send other information to confirm that your tests were valid under the requirements of this part and 40 CFR part 1065.

(2) Report measured CO2, N2O, and CH4 as described in §1039.235. Small-volume engine manufacturers may omit reporting N2O and CH4.

* * * * *

(v) DELETE,
REPLACE WITH:
(v) State whether your certification is intended to include engines used in stationary applications. State whether your certification is limited for certain engines. If this is the case, describe how you will prevent use of these engines in applications for which they are not certified. This applies for engines such as the following:

(1) Constant-speed engines.

(2) Engines used for transportation refrigeration units that you certify under the provisions of §1039.645.

(3) Hand-startable engines certified under the provisions of §1039.101(c).

(4) Engines above 560 ~~k~~KW that are not certified to emission standards for generator-set engines.

* * * * *

(x) DELETE,
REPLACE WITH:
(x) Include good-faith estimates of U.S.-directed production volumes and, if available, California-directed production volumes. Include a justification for the estimated production volumes if they are substantially different than actual production volumes in earlier years for similar models.

* * * * *

ADD:
(aa) Name an agent for service located in California, or if you have no California agent, in the United States. Service on this agent constitutes service on you or any of your officers or employees for any action by ARB or otherwise by ~~the~~ the State of California related to the requirements of this part.

§ 1039.210 May I get preliminary approval before I complete my application?

* * * * *

§ 1039.220 How do I amend the maintenance instructions in my application?

DELETE,
REPLACE WITH:
You may amend your emission--related maintenance instructions after you submit your application for certification, as long as the amended instructions remain consistent with the provisions of §1039.125. You must send the ~~Designated Compliance Officer~~ Executive Officer or his/her designee a written request to amend your application for certification for an engine family if you want to change the emission--related maintenance instructions in a way that could affect emissions. In your request, describe the proposed changes to the maintenance instructions. ~~We will disapprove your request if we determine that the amended instructions are inconsistent with maintenance you performed on emission-data engines.~~ If operators follow the original maintenance instructions rather than the newly specified maintenance, this does not allow you to disqualify those engines from in-use testing or deny a warranty claim.
(a) If you are decreasing ~~the~~ or eliminating any specified maintenance, you may distribute the new maintenance instructions to your customers 30 days after we receive your request, unless we disapprove your request. This would generally include replacing one maintenance step with another. We may approve a shorter time or waive this requirement.

(b) If your requested change would not decrease the specified maintenance, you may distribute the new maintenance instructions any time after you send your request. For example, this paragraph (b) would cover adding instructions to increase the frequency of ~~a maintenance step~~ filter changes for engines in severe-duty applications.
(c) You need not request approval if you are making only minor corrections (such as correcting typographical mistakes), clarifying your maintenance instructions, or changing instructions for maintenance unrelated to emission control. We may ask you to send us copies of maintenance instructions revised under this paragraph (c).

§ 1039.225 How do I amend my application for certification ~~to include new or modified engines or to change an FEL~~?

DELETE,
REPLACE WITH:
Before we issue you ~~a certificate of conformity~~ an Executive Order, you may amend your application to include new or modified engine configurations, subject to the provisions of this section. After we have issued your ~~certificate of conformity~~ Executive Order, you may send us an amended application requesting that we include new or modified engine configurations within the scope of the ~~certificate~~ Order, subject to the provisions of this section. You must amend your application if any changes occur with respect to any information that is included or should be included in your application.

(a) You must amend your application before you take ~~either~~ any of the following actions:

(1) Add an engine ~~(that is, an additional engine~~ configuration~~)~~ to an engine family. In this case, the engine configuration added must be consistent with other ~~engines~~ engine configurations in the engine family with respect to the criteria listed in §1039.230.

(2) Change an engine configuration already included in an engine family in a way that may affect emissions, or change any of the components you described in your application for certification. This includes production and design changes that may affect emissions any time during the engine's lifetime.

(3) Modify an FEL for an engine family, as described in paragraph (f) of this section.

(b) To amend your application for certification, send the following ~~relevant~~ information, as applicable, to the ~~Designated Compliance Officer~~ Executive Officer or his/her designee ~~the following information~~:

(1) Describe in detail the addition or change in the engine model or configuration you intend to make.

(2) Include engineering evaluations or data showing that the amended engine family complies with all applicable requirements. You may do this by showing that the original emission-data engine is still appropriate ~~with respect to~~ for showing ~~compliance of~~ that the amended family complies with all applicable requirements.

(3) If the original emission-data engine for the engine family is not appropriate to show compliance for the new or modified ~~off-road~~ engine configuration, include new test data showing that the new or modified ~~off-road~~ engine configuration meets the requirements of this part.

(c) We may ask for more test data or engineering evaluations. You must give us these within 30 days after we request them.

(d) For engine families already covered by ~~a certificate of conformity~~ an Executive Order, we will determine whether the existing certificate of conformity covers your ~~new~~ newly added or modified ~~off-road~~ engine. You may ask for a hearing if we deny your request (see §1039.820).

(e) For engine families already covered by ~~a certificate of conformity~~ an Executive Order, you may start producing the new or modified ~~off-road~~ engine configuration any time after you send us your amended application, and before we make a decision under paragraph (d) of this section. However, if we determine that the affected engines do not meet applicable requirements, we will notify you to cease production of the engines and may require you to recall the engines at no expense to the owner. Choosing to produce engines under this paragraph (e) is deemed to be consent to recall all engines that we determine do not meet applicable emission standards or other requirements and to remedy the nonconformity at no expense to the owner. If you do not provide information required under paragraph (c) of this section within 30 days after we request it, you must stop producing the new or modified ~~off-road~~ engines.

(f) You may ask us to approve a change to your FEL in ~~the following~~ certain cases~~:~~
~~(1) You may ask to raise your FEL~~ after the start of production. ~~You~~The changed FEL may not apply ~~the higher FEL~~ to engines you have already introduced into ~~commerce. Use the appropriate FELs with corresponding sales volumes to calculate your average emission level,~~ U.S. commerce, except as described in ~~subpart H of this part. In your request, you must demonstrate that you will still be able to comply with the applicable average emission standards as specified in subparts B and H of this part.~~
~~(2) You may ask to lower the FEL for your engine family~~ this paragraph (f). If we approve a changed FEL after the start of production ~~only when you have test data from production engines indicating that your engines comply with the lower FEL. You may create a separate subfamily with the lower FEL. Otherwise, you must use the higher FEL for the family to calculate your average emission level under subpart H of this part.~~
~~(3) If you change the FEL during production~~, you must include the new FEL on the emission control information label for all engines produced after the change. You may ask us to approve a change to your FEL in the following cases:

(1) You may ask to raise your FEL for your engine family at any time. In your request, you must show that you will still be able to meet the emission standards as specified in subparts B and H of this part. If you amend your application by submitting new test data to include a newly added or modified engine, as described in paragraph (b)(3) of this

section, use the appropriate FELs with corresponding production volumes to calculate emission credits for the model year, as described in subpart H of this part. In all other circumstances, you must use the higher FEL for the entire engine family to calculate emission credits under subpart H of this part.

(2) You may ask to lower the FEL for your engine family only if you have test data from production engines showing that emissions are below the proposed lower FEL. The lower FEL applies only to engines you produce after we approve the new FEL. Use the appropriate FELs with corresponding production volumes to calculate emission credits for the model year, as described in subpart H of this part.

§ 1039.230 How do I select engine families?

DELETE,
REPLACE WITH:

(a) ~~D~~For purposes of certification, divide your product line into families of engines that are expected to have similar emission characteristics throughout the useful life as described in this section. Your engine family is limited to a single model year.

(b) Group engines in the same engine family if they are the same in all the following aspects:

(1) The combustion cycle and fuel.

(2) The cooling system (water-cooled vs. air-cooled).

(3) Method of air aspiration.

(4) Method of exhaust aftertreatment (for example, catalytic converter or particulate trap).

(5) Combustion chamber design.

(6) Bore and stroke.

(7) ~~Number of cylinders (~~Cylinder arrangement (such as in-line vs. vee configurations). This applies for engines with aftertreatment devices only).

~~(8) Cylinder arrangement (for engines with aftertreatment devices only).~~

(~~9~~8) Method of control for engine operation other than governing (i.e., mechanical or electronic).

(~~10~~9) Power category.

(~~11~~10) Numerical level of the emission standards that apply to the engine.

(c) You may subdivide a group of engines that is identical under paragraph (b) of this section into different engine families if you show the expected emission characteristics are different during the useful life.

(d) ~~Y~~In unusual circumstances, you may group engines that are not identical with respect to the things listed in paragraph (b) of this section in the same engine family if you show that their emission characteristics during the useful life will be similar.

(e) If you combine engines from different power categories into a single engine family under paragraph (d) of this section, you must certify the engine family to the more stringent set of standards from the two power categories in that model year.

§ 1039.235 What ~~emission testing must I perform for my application for an Executive Order~~ testing requirements apply for certification?

* * * * *

(c) DELETE,
REPLACE WITH:
(c) We may measure emissions from any of your ~~test~~ emission-data engines or other engines from the engine family, as follows:

(1) We may decide to do the testing at your plant or any other facility. If we do this, you must deliver the ~~test~~ engine to a test facility we designate. The ~~test~~ engine you provide must include appropriate manifolds, aftertreatment devices, electronic control units, and other emission-related components not normally attached directly to the engine block. If we do the testing at your plant, you must schedule it as soon as possible and make available the instruments, personnel, and equipment we need.

(2) If we measure emissions on one of your ~~test~~ engines, the results of that testing become the official emission results for the engine. Unless we later invalidate these data, we may decide not to consider your data in determining if your engine family meets applicable requirements.

(3) Before we test one of your engines, we may set its adjustable parameters to any point within the physically adjustable ranges (see §1039.115(e)).

(4) Before we test one of your engines, we may calibrate it within normal production tolerances for anything we do not consider an adjustable parameter. For example, this would apply for an engine parameter that is subject to production variability because it is adjustable during production, but is not considered an adjustable parameter (as defined in §1039.801) because it is permanently sealed.

(d) DELETE,

REPLACE WITH:
(d) You may ask to use carryover emission data from a previous model year instead of doing new tests, but only if all the following are true:

(1) The engine family from the previous model year differs from the current engine family only with respect to model year or other characteristics unrelated to emissions.

* * * * *

ADD:
(g) Measure CO2 and CH4 with each low-hour certification test using the procedures specified in 40 CFR part 1065 in the 2011 and 2012 model years, respectively. Also measure N2O with each low-hour certification test using the procedures specified in part 1065 of these Test Procedures starting in the 2013 model year for any engine family that depends on NOx aftertreatment to meet emission standards. Small-volume engine manufacturers may omit measurement of N2O and CH4. Additionally, manufacturers may omit direct measurement of N2O and CH4 for engines not subject to N2O and CH4 standards according to the provisions in 1065.5(a)(3). These measurements are not required for NTE testing. Use the same units and modal calculations as for your other results to report a single weighted value for each constituent. Round the final values as follows:

(1) Round CO2 to the nearest 1 g/kW-hr.

(2) Round N2O to the nearest 0.001 g/kW-hr.

(3) Round CH4 to the nearest 0.001g/kW-hr.

§ 1039.240 How do I demonstrate that my engine family complies with exhaust emission standards?

(a) DELETE,
REPLACE WITH:
(a) For purposes of certification, your engine family is considered in compliance with ~~the applicable numerical~~ emission standards in §1039.101(a) and (b), §1039.102(a) and (b), §1039.104, and §1039.105 if all emission-data engines representing that family have test results showing official emission results and deteriorated emission levels at or below these standards. ~~(Note: if you participate in the ABT program in subpart H of this part,~~ This also applies for all test points for emission-data engines within the family used to establish deterioration factors. Note that your FELs are considered to be the applicable emission standards with which you must comply if you participate in the ABT program in subpart H of this part.~~)~~

(b) DELETE,
REPLACE WITH:
(b) Your engine family is deemed not to comply if any emission-data engine representing that family has test results showing an official emission result or a deteriorated emission level for any pollutant that is above an applicable ~~FEL or~~ emission standard. Similarly, your engine family is deemed not to comply if any emission-data engine representing that family has test results showing any emission level above the applicable not-to-exceed emission standard from §1039.101, §1039.102, §1039.104, or §1039.105 for any pollutant. This also applies for all test points for emission-data engines within the family used to establish deterioration factors.

* * * * *

(c)(1) DELETE,
REPLACE WITH:
(c)(1) Additive deterioration factor for exhaust emissions. Except as specified in paragraph (c)(2) of this section, use an additive deterioration factor for exhaust emissions. An additive deterioration factor for a pollutant is the difference between exhaust emissions at the end of the useful life and exhaust emissions at the low-hour test point. In these cases, adjust the official emission results for each tested engine at the selected test point by adding the factor to the measured emissions. If the factor is less than zero, use zero. Additive deterioration factors must be specified to one more decimal place than the applicable standard.

* * * * *

§ 1039.245 How do I determine deterioration factors from exhaust durability testing?

Introductory Text DELETE,
REPLACE WITH:
~~Establish deterioration factors to determine whether your engines will meet emission standards for each pollutant throughout the useful life, as described in §§1039.101 and 1039.240.~~ This section describes how to determine deterioration factors, either with an engineering analysis, with pre-existing test data, or with new emission measurements. ~~If you are required to perform durability testing, see §1039.125 for limitations on the maintenance that you may perform on your emission-data engine.~~ Apply these deterioration factors to determine whether your engines will meet the duty-cycle emission standards as described in §1039.240 throughout the engines' useful lives.

* * * * *

§ 1039.250 What records must I keep and what reports must I send to the Air Resources Board (ARB)?

(a) DELETE,
REPLACE WITH:
(a) Within ~~30~~45 days after the end of the model year, send the Executive Officer or his/her designee a report describing the following information about engines you produced during tha~~t~~e model year:

* * * * *

(c) DELETE,
REPLACE WITH:
(c) Keep data from routine emission tests (such as test-cell temperatures and relative humidity readings) for one year after we issue the associated Executive Order. Keep all other information specified in ~~paragraph (a) of~~ this section for eight years after we issue your Executive Order.

* * * * *

(e) DELETE.

§ 1039.255 What decisions may ARB make regarding my Executive Order?

* * * * *

(b) DELETE,
REPLACE WITH:
(b) We may deny your application for certification if we determine that your engine family fails to comply with emission standards or other requirements of this part or the ~~Act. Our decision may be based on a review of all information available to~~ California Health and Safety Code, Division 26, and corresponding regulations. We will base our decision on all available information. If we deny your application, we will explain why in writing.

* * * * *

(d) DELETE,
REPLACE WITH:
(d) We may void your Executive Order if you do not keep the records we require or do not give us information ~~when we~~ as~~k for it~~ required under this part or the California Health and Safety Code, Division 26, and corresponding regulations.

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Subpart D – [Reserved]

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Subpart E – In-use Testing

§ 1039.401 General Provisions.

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Subpart F – Test Procedures

§ 1039.501 How do I run a valid emission test?

(a) DELETE,
REPLACE WITH:
(a) Use the equipment and procedures for compression-ignition engines in 40 CFR part 1065 to determine whether engines meet the duty-cycle emission standards in subpart B of this part.~~101(a) and (b).~~ Measure the emissions of all the ~~pollutants we regulate in §1039.101exhaust constituents subject to emission standards as specified in 40 CFR part 1065~~ exhaust constituents subject to emission standards as specified in 40 CFR part 1065. Measure CO2, N2O, and CH4 as described in §1039.235. Use the applicable duty cycles specified in §§1039.505 and 1039.510.

(b) DELETE,
REPLACE WITH:
(b) Section 1039.515 describes the supplemental procedures for evaluating whether engines meet the not-to-exceed emission limits in ~~§1039.101(e)~~ subpart B of this part.

* * * * *

§ 1039.505 How do I test engines using steady-state duty cycles, including ramped-modal testing?

* * * * *

(a)(1) DELETE,
REPLACE WITH:
(a)(1) For discrete-mode testing, sample emissions separately for each mode, then calculate an average emission level for the whole cycle using the weighting factors specified for each mode. Calculate cycle statistics ~~for the sequence of modes~~ and compare with the established criteria as specified ~~values~~ in §1065.514 to confirm that the test is valid. Operate the engine and sampling system as follows:

(i) Engines with NOx aftertreatment. For engines that depend on aftertreatment to meet the NOx emission standard, operate the engine for 5-6 minutes, then sample emissions for 1-3 minutes in each mode. You may extend the sampling time to improve measurement accuracy of PM emissions, using good engineering judgment. If you have a longer sampling time for PM emissions, calculate and validate cycle statistics separately for the gaseous and PM sampling periods.

(ii) Engines without NOx aftertreatment. For other engines, operate the engine for at least 5 minutes, then sample emissions for at least 1 minute in each mode. ~~Calculate cycle statistics for the sequence of modes and compare with the specified values in §1065 to confirm that the test is valid.~~

* * * * *

(b) DELETE,
REPLACE WITH:
(b) Measure emissions by testing the engine on a dynamometer with one of the following duty cycles to determine whether it meets the steady-state emission standards in § 1039.101(b):

(1) Use the 5-mode duty cycle or the corresponding ramped-modal cycle described in paragraph (a) of Appendix II of this part for constant-speed engines. Note that these cycles do not apply to all engines used in constant-speed applications, as described in §1039.801.

(2) Use the 6-mode duty cycle or the corresponding ramped-modal cycle described in paragraph (b) of Appendix II~~I~~ of this part for variable-speed engines below 19 kW. You may instead use the 8-mode duty cycle or the corresponding ramped-modal cycle described in paragraph (c) of Appendix I~~I~~V of this part if some engines from your engine family will be used in applications that do not involve governing to maintain engine operation around rated speed.

(3) Use the 8-mode duty cycle or the corresponding ramped-modal cycle described in paragraph (c) of Appendix I~~I~~V of this part for variable-speed engines at or above 19 kW.

(c) DELETE,
REPLACE WITH:
(c) During idle mode, operate the engine at its warm idle speed as described in §1065. ~~with the following parameters:~~

~~(1) Hold the speed within your specifications.~~

~~(2) Set the engine to operate at its minimum fueling rate.~~

~~(3) Keep engine torque under 5 percent of maximum test torque.~~

(d) DELETE,
REPLACE WITH:
(d) ~~For full-load operating modes, operate the engine at its maximum fueling rate. However, for constant-speed~~ For constant-speed engines whose design prevents full-load operation for extended periods, you may ask for approval under §1065.10(c) to

replace full-load operation with the maximum load for which the engine is designed to operate for extended periods.

* * * * *

ADD:
(g) To allow non-motoring dynamometers on cycles with idle, you may omit additional points from the duty-cycle regression as follows:

(1) For variable-speed engines with low-speed governors, you may omit speed, torque, and power points from the duty-cycle regression statistics if the following are met:

(i) The engine operator demand is at its minimum.

(ii) The dynamometer demand is at its minimum.

(iii) It is an idle point fnref = 0 % (idle) and Tref = 0 % (idle).

(iv) Tref < T < 5 % · Tmax mapped.

(2) For variable-speed engines without low-speed governors, you may omit torque and power points from the duty-cycle regression statistics if the following are met:

(i) The dynamometer demand is at its minimum.

(ii) It is an idle point fnref = 0 % (idle) and Tref = 0 % (idle).

(iii) fnref - (2 % · fntest) < fn < fnref + (2 % · fntest).

(iv) Tref < T < 5 % · Tmax mapped.

§ 1039.510 Which duty cycles do I use for transient testing?

* * * * *

(b) DELETE,
REPLACE WITH:
(b) The transient test sequence consists of an initial run through the transient duty cycle from a cold start, 20 minutes with no engine operation, then a final run through the same transient duty cycle. Start sampling emissions immediately after you start the engine. Calculate the official transient emission result from the following equation:
~~Official transient emission result = 0.05 × cold-start emission rate + 0.95 × hot-start emission rate.~~

$$\text{Official transient emission result} = \frac{0.05 \cdot \text{cold-start emissions (g)} + 0.95 \cdot \text{hot-start emissions (g)}}{0.05 \cdot \text{cold-start work (kW-hr)} + 0.95 \cdot \text{hot-start work (kW-hr)}}$$

(c) DELETE,
REPLACE WITH:
(c) ~~Cool the engine down between tests as described in 40 CFR 86.1335-90.~~ Calculate cycle statistics and compare with the established criteria as specified in §1065.514 to confirm that the test is valid.

(d) DELETE:
~~(d) For validating cycle statistics, you may delete from your regression analysis speed, torque, and power points for the first 23 seconds and the last 25 seconds of the transient duty cycle.~~

§ 1039.515 What are the test procedures related to not-to-exceed limits?

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§ 1039.520 What testing must I perform to establish deterioration factors?

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§ 1039.525 How do I adjust emission levels to account for infrequently regenerating aftertreatment devices?

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Subpart G – Special Compliance Provisions

§ 1039.601 What compliance provisions apply to these engines?

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§ 1039.615 What special provisions apply to engines using noncommercial fuels?

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§ 1039.620 What are the provisions for exempting engines used solely for competition?

* * * * *

§ 1039.625 What requirements apply under the program for equipment-manufacturer flexibility?

* * * * *

(e) Introductory Text DELETE,
REPLACE WITH:
Standards. If you produce equipment with exempted engines under this section, the engines must meet emission standards ~~at least as stringent as the following:~~ specified in this paragraph (e). Note that we consider engines to be meeting emission standards even if they are certified with a family emission limit that is higher than the emission standard that would otherwise apply.

* * * * *

(e)(1) DELETE,
REPLACE WITH:
(e)(1) Equipment manufacturers using the provisions of paragraph (d)(4) of this section, must use engines that, at a minimum, meet the applicable Tier 1 or Tier 2 emission standards in Title 13, CCR, § 2423(b)(1)(a).

* * * * *

(e)(3) DELETE,
REPLACE WITH:
(e)(3) In all other cases, engines at or above ~~37~~ 56 kW and at or below 560 kW must meet the appropriate Tier 3 standards described in Title 13, CCR, § 2423(b)(1)(a). Engines below ~~37~~ 56 kW and engines above 560 kW must meet the appropriate Tier 2 standards described in Title 13, CCR, § 2423(b)(1)(a).

* * * * *

(f)(4) DELETE,
REPLACE WITH:
(f)(4) ~~The name,~~ An e-mail address~~,~~ and phone number ~~of a person~~ to contact for further information, or a website that includes this contact information.

* * * * *

(g)(1) DELETE,
REPLACE WITH:
(g)(1) Before ~~January 1 of the first year~~ you ~~intend to~~ use the provisions of this section, send the Executive Officer or his/her designee a written notice of your intent, including:

* * * * *

(ii) ~~Whom~~ The name, phone number and e-mail address of a person to contact for more information.

* * * * *

(iv) The name and address of ~~the~~ each company ~~that produces the~~ you expect to produce engines ~~you will be using~~ for the equipment ~~exempted~~ you manufacture under this section.

* * * * *

(g)(2) DELETE,
REPLACE WITH:
(g)(2) For each year that an equipment manufacturer uses the provisions of this section, the manufacturer must send the Executive Officer a written report by March 31 of the following year. In ~~T~~the report, the manufacturer shall ~~include~~ identify the total ~~number~~ count of ~~engines~~ units sold by the manufacturer in the preceding year for each power category, based on actual U.S.-directed production volume and, if available, California-directed production volume. ~~Also, t~~The manufacturer ~~must~~ shall also identify in the report the percentages of U.S.-directed production volumes and, if available, California-directed production volumes, that correspond to the number of units in each power category and the cumulative numbers and percentages of units for all the units sold by the manufacturer under this section for each power category. The percentage figures may be omitted if the manufacturer states in the report that it will not be using the percent-of-production allowances in paragraph (b)(1) of this section. If the manufacturer(s) of the engine installed in the equipment has not already been identified as required in §1039.625(g)(1)(iv), the equipment manufacturer shall identify the name and address of this engine manufacturer(s) in the report.

* * * * *

(h)(1) DELETE,
REPLACE WITH:
(h)(1) The model number, serial number, engine family name, and the date of manufacture for each engine and piece of equipment.

(j)(2) DELETE,
REPLACE WITH:
(j)(2) Engine labeling. Engine manufacturers shall meet the labeling requirements provided in §1039.135 for all engines produced under the allowances of this section, except that manufacturers may omit the family emission limits from the label only if the limits are more stringent than the emissions standards. ~~However~~ Additionally, the following statement must be substituted for the statement of compliance required under §1039.135(12):

> "THIS ENGINE COMPLIES WITH CALIFORNIA EMISSION REQUIREMENTS UNDER 13 CCR 2423(d). SELLING OR INSTALLING THIS ENGINE FOR ANY PURPOSE OTHER THAN FOR THE EQUIPMENT FLEXIBILITY PROVISIONS CITED MAY BE A VIOLATION OF STATE LAW SUBJECT TO CIVIL PENALTY." [Insert Engine Family Name]

The referencing of similar federal requirements in combination with California references under this provision is permitted. Furthermore, the Executive Officer may, upon request, approve alternate labeling specifications provided that they meet the intent of this requirement.

§ 1039.626 What special provisions apply to equipment imported under the equipment-manufacturer flexibility program?

* * * * *

(b)(1) DELETE,
REPLACE WITH:
(b)(1) Before ~~January 1 of the first year~~ you ~~intend to~~ use the provisions of this section, send the Executive Officer of the Air Resources Board, or his/her designee, a written notice of your intent, including:

* * * * *

§ 1039.627 What are the incentives for equipment manufacturers to use cleaner engines?

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§ 1039.630 What are the economic hardship provisions for equipment manufacturers?

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§ 1039.635 What are the hardship provisions for engine manufacturers?

* * * * *

§ 1039.640 What special provisions apply to branded engines?

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§ 1039.645 What special provisions apply to engines used for transportation refrigeration units?

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§ 1039.650 [Reserved]

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§ 1039.660 What special provisions apply to Independent Commercial Importers?

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Subpart H – Averaging, Banking, and Trading for Certification

§ 1039.701 General provisions.

* * * * *

§ 1039.705 How do I generate and calculate emission credits?

* * * * *

(a) DELETE,
REPLACE WITH:
(a) ~~Calculate positive emission credits for an engine family that has an FEL below the otherwise applicable standard. Calculate negative emission credits for an engine family that has an FEL above the otherwise applicable standard.~~ [Reserved]

(b) DELETE,
REPLACE WITH:
(b) For each participating ~~engine~~ family, calculate positive or negative emission credits relative to the otherwise applicable emission standard. ~~Round calculated~~ Calculate positive emission credits for a family that has an FEL below the standard. Calculate negative emission credits for a family that has an FEL above the standard. Sum your positive and negative credits for the model year before rounding. Round the sum of emission credits to the nearest kilogram (kg), using consistent units throughout the following equation:

$$\text{Emission credits (kg)} = (\text{Std} - \text{FEL}) \times (\text{Volume}) \times (\text{AvgPR}) \times (\text{UL}) \times (10^{-3})$$

Where:

Std = the emission standard, in grams per kilowatt-hour, that applies under subpart B of this part for engines not participating in the ABT program of this subpart (the "otherwise applicable standard").

FEL = the family emission limit for the engine family, in grams per kilowatt-hour.

Volume = the number of engines eligible to participate in the averaging, banking, and trading program within the given engine family during the model year, as described in paragraph (c) of this section.

AvgPR = the average maximum engine power of all the engine configurations within an engine family, calculated on a sales-weighted basis, in kilowatts.

UL = the useful life for the given engine family, in hours.

* * * * *

§ 1039.710 How do I average emission credits?

* * * * *

§ 1039.715 How do I bank emission credits?

DELETE,
REPLACE WITH:
(a) Banking is the retention of emission credits by the manufacturer generating the emission credits for use in future model years for averaging or trading ~~in future model years. You may use banked emission credits only within the averaging set in which they were generated~~.

(b) ~~In your application for certification,~~ You may designate any emission credits you ~~intend~~ plan to bank~~. These emission credits will be considered~~ in the reports you submit under §1039.730 as reserved credits. During the model year and before the due date for the final report, you may ~~redesignate these~~ designate your reserved emission credits for averaging or trading.

(c) ~~You may use banked~~ Reserved credits become actual emission credits ~~from the previous model year for averaging or trading before we verify them, but~~ when you submit your final report. However, we may revoke these emission credits if we are unable to verify them after reviewing your reports or auditing your records.

~~(d) Reserved credits become actual emission credits only when we verify them in reviewing your final report.~~

§ 1039.720 How do I trade emission credits?

* * * * *

(b) DELETE,
REPLACE WITH:
(b) You may trade actual emission credits as described in this subpart. You may also trade reserved emission credits, but we may revoke these emission credits based on our review of your records or reports or those of the company with which you traded emission credits. You may trade banked credits within an averaging set to any certifying manufacturer.

* * * * *

§ 1039.725 What must I include in my application for certification?

* * * * *

(b)(2) DELETE,
REPLACE WITH:
(b)(2) Detailed calculations of projected emission credits (positive or negative) based on projected production volumes. ~~If your engine family will generate positive emission credits, state specifically where the emission credits will be applied (for example, to which engine family they will be applied in averaging, whether they will be traded, or whether they will be reserved for banking). If you have projected~~ We may require you to include similar calculations from your other engine families to demonstrate that you will be able to avoid a negative credit balance for the model year. If you project negative emission credits for ~~an engine~~ a family, state the source of positive emission credits you expect to use to offset the negative emission credits. ~~Describe whether the emission credits are actual or reserved and whether they will come from averaging, banking, trading, or a combination of these. Identify from which of your engine families or from which manufacturer the emission credits will come.~~

§ 1039.730 What ABT reports must I send to ARB?

* * * * *

(b)(3) DELETE,
REPLACE WITH:
(b)(3) The FEL for each pollutant. If you ~~changed an FEL during the model year~~ change the FEL after the start of production, identify the date that you started using the new FEL and/or give the engine identification number for the first engine covered by the new FEL. In this case, identify each applicable FEL ~~you used~~ and calculate the positive or negative emission credits ~~under each FEL. Also, describe how the applicable FEL can be identified for each engine you produced. For example, you might keep a list of engine identification numbers that correspond with certain FEL values~~ as specified in §1039.225.

(b)(4) DELETE,
REPLACE WITH:
(b)(4) The projected and actual U.S.-directed production volumes, and California production volumes if available, for the model year ~~with a point of retail sale in the United States~~. If you changed an FEL during the model year, identify the actual production volume associated with each FEL.

(b)(5) DELETE,
REPLACE WITH:
(b)(5) Maximum engine power for each engine configuration, and the ~~sales-weighted~~ average engine power weighted by U.S.-directed production volumes, and California production volumes if available, for the engine family.

* * * * *

(c)(1) DELETE,
REPLACE WITH:
(c)(1) Show that your net balance of emission credits from all your participating engine families in each averaging set in the applicable model year is not negative.

* * * * *

(f)(2) DELETE,
REPLACE WITH:
(f)(2) If you or we determine within 270 days after the end of the model year that errors mistakenly decreased your balance of emission credits, you may correct the errors and recalculate the balance of emission credits. You may not make these corrections for errors that are determined more than 270 days after the end of the model year. If you report a negative balance of emission credits, we may disallow corrections under this paragraph (f)(2).

* * * * *

§ 1039.735 What records must I keep?

* * * * *

(b) DELETE,
REPLACE WITH:
(b) Keep the records required by this section for at least eight years after the due date for the end-of-year report. You may ~~use any appropriate storage formats or media, including paper, microfilm, or computer diskettes~~ not use emission credits for any engines if you do not keep all the records required under this section. You must therefore keep these records to continue to bank valid credits. Store these records in any format and on any media, as long as you can promptly send us organized, written records in English if we ask for them. You must keep these records readily available. We may review them at any time.

* * * * *

(d)(6) DELETE,
REPLACE WITH:
(d)(6) Purchaser. You must also identify the purchaser and destination for each engine you produce to the extent this information is available.

(e) We may require you to keep additional records or to send us relevant information not required by this section in accordance with the California Health and Safety Code, Division 26, and corresponding regulations.

§ 1039.740 What restrictions apply for using emission credits?

* * * * *

§ 1039.745 What can happen if I do not comply with the provisions of this subpart?

* * * * *

Subpart I – Definitions and Other Reference Information

§ 1039.801 What definitions apply to this part?

* * * * *

ADD:
40 CFR part 1039 or Part 1039 means Part 1039 and applicable subparts of the California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, PART I-D, when referenced in unrevised (i.e., " * * * * * ") sections. When referenced in revised sections, the term 40 CFR part 1039 refers to the federal regulations of the same title, last amended on June 28, 2011.

40 CFR part 1065 DELETE,
REPLACE WITH:
40 CFR part 1065 or Part 1065 means Part 1065 and applicable subparts ~~of these 2008 and Later Test procedures~~ of the California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, PART I-E, when referenced in unrevised (i.e., " * * * * * ") sections. When referenced in revised sections, the term 40 CFR part 1065 refers to the federal regulations of the same title, last amended on June 28, 2011.

40 CFR part 1068 DELETE,
REPLACE WITH:
40 CFR part 1068 or Part 1068 means Part 1068 and applicable subparts ~~of these 2008 and Later Test procedures~~ of the California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, PART I-F, when referenced in unrevised (i.e., " * * * * * ") sections. When referenced in revised sections, the term 40 CFR part 1068 refers to the federal regulations of the same title, last amended on June 28, 2011.

* * * * *

ADD:
Alcohol-fueled engine means an engine that is designed to run using an alcohol fuel. For purposes of this definition, alcohol fuels do not include fuels with a nominal alcohol content below 25 percent by volume.

* * * * *

ADD:
Carryover means relating to certification based on emission data generated from an earlier model year as described in §1039.235(d).

Certification DELETE,
REPLACE WITH:
Certification means relating to the process of obtaining an executive order for an engine family complying with the off-road compression-ignition engine emission standards and requirements specified in Title 13, CCR, Chapter 9, §§ 2420-2427.

* * * * *

Constant Speed Operation DELETE,
REPLACE WITH:
Constant-speed operation ~~means engine operation with a governor that controls the operator input to maintain an engine at a reference speed, even under changing load. For example, an isochronous governor changes reference speed temporarily during a load change, then returns the engine to its original reference speed after the engine stabilizes. Isochronous governors typically allow speed changes up to 1.0 %. Another example is a speed-droop governor, which has a fixed reference speed at zero load and allows the reference speed to decrease as load increases. With speed-droop governors, speed typically decreases (3 to 10) % below the reference speed at zero load, such that the minimum reference speed occurs near the engine's point of maximum power~~ has the meaning given in §1065.1001.

* * * * *

ADD:
Date of manufacture has the meaning given in §1068.30.

* * * * *

Emission-control system DELETE,
REPLACE WITH:

Emission-control system means any device, system, or element of design that controls or reduces the emissions of regulated ~~emissions~~ pollutants from an engine.

* * * * *

Engine configuration DELETE,
REPLACE WITH:
Engine configuration means a unique combination of engine hardware and calibration within an engine family. Engines within a single engine configuration differ only with respect to normal production variability or factors unrelated to emissions.

* * * * *

Intermediate test speed DELETE,
REPLACE WITH:
Intermediate test speed has the meaning ~~we~~ given in §1065.~~515~~1001.

Model year (2) DELETE,
REPLACE WITH:
(2) For an engine that is converted to an off-road engine after being placed into service as a ~~motor-vehicle engine or a~~ stationary engine, or being certified and placed into service as a vehicle ~~engine~~, model year means the calendar year in which the engine was originally produced. For a vehicle that is converted to be an off-road engine without having been certified, model year means the calendar year in which the engine becomes a new off-road engine. (see definition of “new off-road engine,” paragraph (2).).

* * * * *

ADD:
Model year (5)(iii) For imported engines described in paragraph (5)(iii) of the definition of "new off-road engine," model year means the calendar year in which the engine is first assembled in its imported configuration, unless specified otherwise in this part or in §1068.

* * * * *

New nonroad engine DELETE,
REPLACE WITH:
New ~~non~~off-road engine means any of the following things:
(1) A freshly manufactured off-road engine for which the ultimate purchaser has never received the equitable or legal title. This kind of engine might commonly be thought of as "brand new." In the case of this paragraph (1), the engine ~~becomes~~ is new ~~when it is fully assembled for the first time. The engine is no longer new when~~ from the time it is

produced until the ultimate purchaser receives the title or the product is placed into service, whichever comes first.

(2) An engine originally manufactured as a ~~motor~~ vehicle ~~engine~~ or a stationary engine that is later used or intended to be used in a piece of off-road equipment. In this case, the engine is no longer a ~~motor~~ vehicle or stationary engine and becomes a "new off-road engine." The engine is no longer new when it is placed into off-road service. This paragraph (2) applies if a vehicle or a stationary engine is installed in off-road equipment, or if a vehicle or a piece of stationary equipment is modified (or moved) to become off-road equipment.

(3) An off-road engine that has been previously placed into service in an application we exclude under §1039.5, whe~~re~~n that engine is installed in a piece of equipment that is covered by this part 1039. The engine is no longer new when it is placed into off-road service covered by this part 1039. For example, this would apply to a marine diesel engine that is no longer used in a marine vessel but is instead installed in a piece of off-road equipment subject to the provisions of this part.

(4) An engine not covered by paragraphs (1) through (3) of this definition that is intended to be installed in new off-road equipment. This generally includes installation of used engines in new equipment. The engine is no longer new when the ultimate purchaser receives a title for the equipment or the product is placed into service, whichever comes first. ~~This generally includes installation of used engines in new equipment.~~

(5) An imported off-road engine, subject to the following provisions:

(i) An imported off-road engine covered by a certificate of conformity issued under this part that meets the criteria of one or more of paragraphs (1) through (4) of this definition, where the original engine manufacturer holds the certificate, is new as defined by those applicable paragraphs.

(ii) An imported ~~nonroad~~ engine covered by a certificate of conformity issued under this part, where someone other than the original engine manufacturer holds the certificate (such as when the engine is modified after its initial assembly), ~~becomes~~ is a new off-road engine when it is imported. It is no longer new when the ultimate purchaser receives a title for the engine or it is placed into service, whichever comes first.

(iii) An imported off-road engine that is not covered by a certificate of conformity issued under this part at the time of importation is new, but only if it was produced on or after the dates shown in the following table. This addresses uncertified engines and equipment initially placed into service that someone seeks to import into the United States. Importation of this kind of ~~new nonroad~~ engine (or equipment containing such an engine) is generally prohibited by §1068. However, the importation of such an engine is not prohibited if the engine has an earlier model year than that identified in the following table:

* * * * *

Nonmethane hydrocarbon DELETE,
REPLACE WITH:
Nonmethane hydrocarbons (NMHC) means the sum of all hydrocarbon species except methane. Refer to §1065.660 for NMHC determination. ~~means the difference between the emitted mass of total hydrocarbons and the emitted mass of methane.~~

* * * * *

ADD:
Owners manual means a document or collection of documents prepared by the engine manufacturer for the owner or operator to describe appropriate engine maintenance, applicable warranties, and any other information related to operating or keeping the engine. The owners manual is typically provided to the ultimate purchaser at the time of sale.

Oxides of Nitrogen DELETE,
REPLACE WITH:
Oxides of nitrogen has the meaning ~~we~~ given in §1065.1001.

* * * * *

Power Category (5) Round DELETE,
REPLACE WITH:
(5) Round ~~means to round numbers according to NIST Special Publication 811(incorporated by reference in §1039.810), unless otherwise specified~~ has the meaning given in §1065.1001.

* * * * *

Steady-state DELETE,
REPLACE WITH:
Steady-state ~~means relating to emission tests in which engine speed and load are held at a finite set of essentially constant values. Steady-state tests are either discrete-mode tests or ramped-modal tests~~ has the meaning given in §1065.1001.

* * * * *

Total hydrocarbon DELETE,
REPLACE WITH:
Total hydrocarbon has the meaning given in 40 CFR 1065.1001. This generally means the combined mass of organic compounds measured by the specified procedure for measuring total hydrocarbon, expressed as a hydrocarbon with ~~a~~an atomic hydrogen-to-carbon ~~mass~~ ratio of 1.85:1.

Total hydrocarbon equivalent DELETE,
REPLACE WITH:
Total hydrocarbon equivalent has the meaning given in 40 CFR 1065.1001. This generally means the sum of the carbon mass contributions of non-oxygenated hydrocarbons, alcohols and aldehydes, or other organic compounds that are measured separately as contained in a gas sample, expressed as exhaust hydrocarbon from petroleum--fueled engines. The atomic hydrogen-to-carbon ratio of the equivalent hydrocarbon is 1.85:1.

* * * * *

§ 1039.805 What symbols, acronyms, and abbreviations does this part use?

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ADD:
CH_4 methane

* * * * *

ADD:
N_2O nitrous oxide

* * * * *

§ 1039.810 DELETE.

§ 1039.815 What provisions apply to confidential information?

* * * * *

§ 1039.820 How do I request a hearing?

* * * * *

ADD:
§1039.825 What reporting and recordkeeping requirements apply under this part?

~~Under the Paperwork Reduction Act (44 U.S.C. 3501 et seq), the Office of Management and Budget approves the reporting and recordkeeping specified in the applicable regulations.~~ The following items illustrate the ~~kind of~~ reporting and recordkeeping we require for engines and equipment regulated under this part:

(a) We specify the following requirements related to engine certification in this §1039:

(1) In §1039.20 we require engine manufacturers to label stationary engines that do not meet the standards in this part.

(2) In §1039.135 we require engine manufacturers to keep certain records related to duplicate labels sent to equipment manufacturers.

(3) [Reserved]

(4) In subpart C of this part we identify a wide range of information required to certify engines.

(5) [Reserved]

(6) [Reserved]

(7) In subpart G of this part we identify several reporting and recordkeeping items for making demonstrations and getting approval related to various special compliance provisions. For example, equipment manufacturers must submit reports and keep records related to the flexibility provisions in §1039.625.

(8) In §1039.725, 1039.730, and 1039.735 we specify certain records related to averaging, banking, and trading.

(b) We specify the following requirements related to testing in §1065:

(1) In §1065.2 we give an overview of principles for reporting information.

(2) In §1065.10 and 1065.12 we specify information needs for establishing various changes to published test procedures.

(3) In §1065.25 we establish basic guidelines for storing test information.

(4) In §1065.695 we identify data that may be appropriate for collecting during testing of in-use engines using portable analyzers.

(c) We specify the following requirements related to the general compliance provisions in §1068:

(1) In §1068.5 we establish a process for evaluating good engineering judgment related to testing and certification.

(2) In §1068.25 we describe general provisions related to sending and keeping information.

(3) In §1068.27 we require manufacturers to make engines available for our testing or inspection if we make such a request.

(4) In §1068.105 we require equipment manufacturers to keep certain records related to duplicate labels from engine manufacturers.

(5) In §1068.120 we specify recordkeeping related to rebuilding engines.

(6) In §1068, subpart C, we identify several reporting and recordkeeping items for making demonstrations and getting approval related to various exemptions.

(7) In §1068, subpart D, we identify several reporting and recordkeeping items for making demonstrations and getting approval related to importing engines.

(8) In §1068.450 and 1068.455 we specify certain records related to testing production-line engines in a selective enforcement audit.

(9) In §1068.501 we specify certain records related to investigating and reporting emission-related defects.

(10) In §1068.525 and 1068.530 we specify certain records related to recalling nonconforming engines.

Appendix I to Part 1039 – Reserved

* * * * *

Appendix II to Part 1039 DELETE,
REPLACE WITH:
Appendix II to Part 1039 – Steady-state Duty Cycles ~~for Constant-Speed Engines~~

(a) The following duty cycles appl~~ies~~y for ~~discrete-mode testing of~~ constant-speed engines:

(1) The following duty cycle applies for discrete-mode testing:

D2 mode number	Engine speed [1]	Torque (percent) [21]	Weighting factors
1	~~Maximum Test Speed~~Engine governed	100	0.05
2	~~Maximum Test Speed~~Engine governed	75	0.25
3	~~Maximum Test Speed~~Engine governed	50	0.30
4	~~Maximum Test Speed~~Engine governed	25	0.30
5	~~Maximum Test Speed~~Engine governed	10	0.10

[1] ~~Maximum test speed is defined in §1065.~~
[2] ~~Except as noted in §1039.505, t~~ The percent torque is relative to maximum test torque.

~~(b)~~(2) The following duty cycle applies for ramped-modal testing ~~of constant speed engines~~:

RMC mode	Time in mode (seconds)	Engine speed	Torque (percent) [1,2]
1a Steady-state	53	Engine Governed	100
1b Transition	20	Engine Governed	Linear transition
2a Steady-state	101	Engine Governed	10
2b Transition	20	Engine Governed	Linear transition
3a Steady-state	277	Engine Governed	75
3b Transition	20	Engine Governed	Linear transition
4a Steady-state	339	Engine Governed	25
4b Transition	20	Engine Governed	Linear transition
5 Steady-state	350	Engine Governed	50

[1] The percent torque is relative to maximum test torque.
[2] Advance from one mode to the next within a 20-second transition phase. During the transition phase, command a linear progression from the torque setting of the current mode to the torque setting of the next mode.

(b) The following duty cycles apply for variable-speed engines with maximum engine power below 19 kW:

(1) The following duty cycle applies for discrete-mode testing:

G2 mode number	Engine speed [1]	~~Observed~~ Torque (percent) [2]	Weighting factors
1	Maximum test speed	100	0.09
2	Maximum test speed	75	0.20
3	Maximum test speed	50	0.29
4	Maximum test speed	25	0.30
5	Maximum test speed	10	0.07
6	Warm idle	0	0.05

[1] Speed terms are defined in §1065.
[2] ~~Except as noted in §1039.505, t~~The percent torque is relative to the maximum ~~test~~ torque at the commanded test speed.

(2) The following duty cycle applies for ramped-modal testing:

RMC mode	Time in mode (seconds)	Engine speed [1,3]	Torque (percent) [2,3]
1a Steady-state	41	Warm Idle	0
1b Transition	20	Linear transition	Linear transition
2a Steady-state	135	Maximum Test Speed	100
2b Transition	20	Maximum Test Speed	Linear transition
3a Steady-state	112	Maximum Test Speed	10
3b Transition	20	Maximum Test Speed	Linear transition
4a Steady-state	337	Maximum Test Speed	75
4b Transition	20	Maximum Test Speed	Linear transition
5a Steady-state	518	Maximum Test Speed	25
5b Transition	20	Maximum Test Speed	Linear transition
6a Steady-state	494	Maximum Test Speed	50
6b Transition	20	Linear transition	Linear transition
7 Steady-state	43	Warm Idle	0

[1] Speed terms are defined in §1065.
[2] The percent torque is relative to the maximum torque at the commanded engine speed.
[3] Advance from one mode to the next within a 20-second transition phase. During the transition phase, command a linear progression from the torque setting of the current mode to the torque setting of the next mode, and simultaneously command a similar linear progression for engine speed if there is a change in speed setting.

(c) The following duty cycles apply for variable-speed engines with maximum engine power at or above 19 kW:

(1) The following duty cycle applies for discrete-mode testing:

C1 mode number	Engine speed [1]	~~Observed~~ Torque (percent) [2]	Weighting factors
1	Maximum test speed	100	0.15
2	Maximum test speed	75	0.15
3	Maximum test speed	50	0.15
4	Maximum test speed	10	0.10
5	Intermediate test	100	0.10
6	Intermediate test	75	0.10
7	Intermediate test	50	0.10
8	Warm Idle	0	0.15

[1] Speed terms are defined in §1065.
[2] The percent torque is relative to the maximum torque at the commanded test speed.

(2) The following duty cycle applies for ramped-modal testing:

RMC mode	Time in mode (seconds)	Engine speed [1,3]	Torque (percent) [2,3]
1a Steady-state	126	Warm Idle	0
1b Transition	20	Linear Transition [2]	Linear Transition
2a Steady-state	159	Intermediate Speed	100
2b Transition	20	Intermediate Speed	Linear Transition
3a Steady-state	160	Intermediate Speed	50
3b Transition	20	Intermediate Speed	Linear Transition
4a Steady-state	162	Intermediate Speed	75
4b Transition	20	Linear Transition	Linear Transition
5a Steady-state	246	Maximum Test Speed	100
5b Transition	20	Maximum Test Speed	Linear Transition
6a Steady-state	164	Maximum Test Speed	10
6b Transition	20	Maximum Test Speed	Linear Transition
7a Steady-state	248	Maximum Test Speed	75
7b Transition	20	Maximum Test Speed	Linear Transition
8a Steady-state	247	Maximum Test Speed	50
8b Transition	20	Linear Transition	Linear Transition
9 Steady-state	128	Warm Idle	0

[1] Speed terms are defined in 40 CFR part 1065.
[2] The percent torque is relative to the maximum torque at the commanded engine speed.
[3] Advance from one mode to the next within a 20-second transition phase. During the transition phase, command a linear progression from the torque setting of the current mode to the torque setting of the next mode, and simultaneously command a similar linear progression for engine speed if there is a change in speed setting.

Appendix III to Part 1039 DELETE.

Appendix IV to Part 1039 DELETE.

Appendix V to Part 1039 – [Reserved]

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Appendix VI to Part 1039 – Nonroad Compression-Ignition Composite Transient Cycle

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PART 9

FINAL REGULATION ORDER TEST PROCEDURES

Part I – F (Part 1068)

(2011 and Later Model Years)

Tier 4 Off-Road Compression-Ignition Engines

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FINAL REGULATION ORDER TEST PROCEDURES

Note: This appendix shows the entirety of regulatory amendments to the test procedures titled below, which were approved by the Air Resources Board on December 16, 2011, and refined via subsequent conforming modifications authorized under Resolution 11-41. The source for these test procedures is Part 1068 of the "California Exhaust Emission Standards and Test Procedures for New 2008 and Later Tier 4 Off-Road Compression Ignition Engines, Part I-C" (Part I-C), adopted October 20, 2005. Part 1039 and Part 1065 of those test procedures have been updated in separate documents titled "California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression Ignition Engines, Part I-D" (Part I-D), and "California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off Road Compression Ignition Engines, Part I-F" (Part I-F), respectively. The proposed modifications to this document are, in large part, incorporated directly or by reference from 40 Code of Federal Regulations (CFR) part 1068, subparts A, B, C, D, E, F, and G, including Appendix I and II to part 1068, last amended June 28, 2011, and the subparts of 40 CFR Part 60, 40 CFR Part 85, 40 CFR Part 86, 40 CFR Part 89, 40 CFR Part 92, and 40 CFR Part 1033 that are internally referenced within 40 CFR Part 1068. This document is incorporated by reference in Title 13, California Code of Regulations, Section 2421(a)(4)(B). These amendments are formatted in a style to indicate changes from the existing test procedures. All existing language is indicated by plain type. All additions to the existing language are indicated by <u>underlined</u> type (except that some existing headings within the test procedures were underlined originally for emphasis, and remain so, and thus do not constitute new language). All deletions to the existing language are indicated by ~~strikeout~~. Additionally, to facilitate lengthy and extensive revisions of the existing text, the terms "DELETE" and "REPLACE WITH" or "ADD" are used to denote changes from the existing test procedures and do not generally indicate the incorporation of federal provisions as this convention is normally used. Only those sections containing the modifications from the existing language are included. All other portions remain unchanged and are indicated by the notation [* * * * *] for reference. If there is any conflict between the provisions of this document and the California Health and Safety Code, Division 26, or Title 13 of the California Code of Regulations (CCR), the Health and Safety Code and Title 13 apply.

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State of California

AIR RESOURCES BOARD

California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines

PART I-~~C~~F

Adopted: October 20, 2005

Amended: October 25, 2012

Table of Contents

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 20~~08~~11 AND LATER TIER 4 OFF-ROAD COMPRESSION-IGNITION ENGINES, Part I-F

The following provisions of ~~Part 1039, Part 1065, and~~ Part 1068, Title 40, Code of Federal Regulations (CFR), as ~~proposed~~ promulgated and last amended by the United States Environmental Protection Agency on ~~the date listed~~ June 28, 2011, are ~~adopted and~~ incorporated herein by this reference into the existing California test procedures for 2008 model year and later off-road compression-ignition engines, hereafter known as the "California Exhaust Emission Standards and Test Procedures for New 20~~08~~11 and Later Tier 4 Off-Road Compression-Ignition Engines, Part I-F," except as altered or replaced by the provisions set forth below. All proposed changes indicated by the notation " * * * * * " or by ~~strikeout~~/underline refer to the existing 2008 and Later California Test Procedures, Part I-C, as previously adopted by the Air Resources Board on October 20, 2005. References to other 40 CFR parts and sections refer to parts and sections incorporated in this or other ARB Test Procedures unless otherwise indicated.

PART 1068 – GENERAL COMPLIANCE PROVISIONS FOR ~~NONROAD~~ OFF-ROAD COMPRESSION-IGNITION ENGINE PROGRAMS

SOURCE: California Exhaust Emission Standards and Test Procedures for New 2008 and Later Tier 4 Off-Road Compression-Ignition Engines, Part I-C, Adopted October 20, 2005, predicated upon the requirements of 67 FR 68427, November 8, 2002, amended July 13, 2005, unless otherwise noted.

Subpart A – Applicability and Miscellaneous Provisions

§ 1068.1 Does this part apply to me?

* * * * *

{New section} ADD:
§ 1068.2 How does this part apply for engines and how does it apply for equipment?

(a) See Title 13, Division 3, Chapter 9, Article 4, of the California Code of Regulations to determine if engine-based and/or equipment-based standards apply. (Note: Some equipment is subject to engine-based standards for exhaust emission and equipment-based standards for evaporative emissions.)

(b) The provisions of this part apply differently depending on whether the engine or equipment is required to be certified.

(1) Subpart A and subpart B of this part apply to engines and equipment, without regard to which is subject to certification requirements in Title 13, Division 3, Chapter 9, Article 4, of the California Code of Regulations.

(2) Subparts C, D, and E of this part apply to the engines or to the equipment, whichever is subject to certification requirements in Title 13, Division 3, Chapter 9, Article 4, of the California Code of Regulations.

(3) Subpart F of this part generally applies to the engines or to the equipment, whichever is subject to standards under Title 13, Division 3, Chapter 9, Article 4, of the California Code of Regulations. However, since subpart F of this part addresses in-use engines and equipment (in which the engine is installed in the equipment), the requirements in Subpart F do not always distinguish between engines and equipment.

(c) For issues related to testing, read the term "engines/equipment" to mean engines subject to engine-based testing and equipment for equipment subject to equipment-based testing; otherwise, read the term "engines/equipment" to mean engines for sources subject to engine-based standards and equipment for sources subject to equipment-based standards.

(d) When we use the term engines (rather than engines/equipment), read it to mean engines without regard to whether the source is subject to engine-based standards or testing. When we use the term equipment (rather than engines/equipment), read it to mean equipment without regard to whether the source is subject to equipment-based standards or testing. (Note: The definition of "equipment" in §1068.30 includes the engine.)

(e) The terminology convention described in this section is not intended to limit our authority or your obligations under the California Health and Safety Code, Division 26, and corresponding regulations, except where the context indicates otherwise.

§ 1068.5 How must manufacturers apply good engineering judgment?

(a) You must use good engineering judgment for decisions related to any requirements under this chapter. This includes your applications for certification, any testing you do to show that your certification, production-line, and in-use engines/equipment comply with requirements that apply to them, and how you select, categorize, determine, and apply these requirements.

* * * * *

§ 1068.10 What provisions apply to confidential information?

* * * * *

§ 1068.15 ~~Who is authorized to represent the Air Resources Board?~~ What general provisions apply for Air Resources Board decision-making?

* * * * *

§ 1068.20 May ARB enter my facilities for inspections?

DELETE,
REPLACE WITH:
(a) Any engine/equipment manufacturer affected by these regulations, upon receipt of prior notice must admit or cause to be admitted during operating hours any ARB Enforcement Officer that has presented proper credentials to any of the following:

(1) Any facility where tests or procedures or activities connected with such tests or procedures are or were performed.

(2) Any facility where any new off-road compression-ignition engine/equipment is present and is being, has been, or will be tested.

(3) Any facility where a manufacturer constructs, assembles, modifies, or builds-up an engine into a certification engine that will be tested for certification.

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

(b) Upon admission to any facility referred to in paragraph (c)(1) of this Section, any ARB Enforcement Officer must be allowed:

(1) 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 break-in, maintenance, and ~~engine~~ storage procedures.

(2) To verify correlation or calibration of test equipment; and,

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

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

(c) To permit an ARB determination whether production off-road compression-ignition engines/equipment conform in all material respects to the design specifications that apply to those engines/equipment described in the Executive Order certifying such engines and to standards prescribed herein. Engine/equipment manufacturers must, upon receipt of prior notice, admit any ARB Enforcement Officer, upon presentation of credentials, to:

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

(2) Any facility where any off-road compression-ignition engines/equipment to be introduced into commerce are manufactured or assembled.

(3) Any California retail outlet where any off-road compression-ignition engine/equipment is sold.

(d) On admission to any such facility referred to in this Section, any ARB Enforcement Officer must be allowed:

(1) To inspect and monitor any aspects of such manufacture or assembly and other procedures;

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

(3) To inspect and photograph any part or aspect of any such new off-road compression-ignition engines/equipment and any component used in the assembly thereof that are reasonably related to the purpose of the Enforcement Officer's entry.

(e) Any ARB Enforcement Officer must be furnished by those in charge of a facility being inspected with such reasonable assistance as may be necessary to 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 the ARB irrespective of whether or not the applicant controls the facility.

(f) 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 engine manufacturers and facilities. The ARB will not attempt to make any inspections that it has been informed that local law forbids. However, if local law makes it impossible to insure the accuracy of data generated at a facility, no informed judgment that an engine is certifiable or is covered by an Executive Order can properly be based on the data. It is the responsibility of the engine/equipment manufacturer to locate its testing and manufacturing facilities in jurisdictions where this situation will not arise.

(g) For purposes of this Section:

(1) “Presentation of credentials” means a display of a document designating a person to be an ARB Enforcement Officer.

(2) Where engine/equipment, component, or ~~engine~~ storage areas or facilities are

concerned, “operating hours” means all times during which personnel are at work in the vicinity of the area or facility and have access to it.

(3) Where facilities or areas other than those covered by paragraph (g)(2) of this Section are concerned, “operating hours” means all times during which an assembly line is in operation or during which testing, maintenance, break-in procedure, production or compilation of records, or any other procedure or activity is being conducted related to certification testing, translation of designs from the test stage to the production stage, or engine/equipment manufacture or assembly.

(4) “Reasonable assistance” includes, but is not limited to, providing clerical, copying, interpretation and translation services; making personnel available upon request to inform the ARB Enforcement Officer of how the facility operates and to answer questions; and performing requested emissions tests on any engine that is being, has been, or will be used for certification testing. Such tests must be nondestructive, but may require appropriate break-in. The engine/equipment manufacturer must be compelled to cause the personal appearance of any employee at such a facility before an ARB Enforcement Officer, upon written request from the Executive Officer for the appearance of any employee of a facility, and service of such request upon the engine/equipment manufacturer. Any such employee who has been instructed by the engine/equipment manufacturer to appear will be entitled to be accompanied, represented, and advised by counsel.

§ 1068.25 What information must I give to ARB?

* * * * *

(b) DELETE,
REPLACE WITH:
Manufacturers subject to the requirements of this part must establish and maintain records, perform tests, make reports and provide additional information that the Executive Officer may reasonably require under the California Health and Safety Code, Division 26, and corresponding regulations. This also applies to engines or equipment that are exempt from emission standards. Manufacturers must keep required records for eight years unless otherwise directed.

(c) ADD:
(c) Manufacturers are responsible for statements and information in the applications they provide for certification or any other requests or reports. If a manufacturer provides statements or information to another party for submission to ARB, the manufacturer is responsible for these statements and information as if it had submitted them to ARB directly. For example, knowingly submitting false information to someone else for inclusion in an application for certification would be deemed to be a submission of false information in violation of the California Health and Safety Code, Division 26, and corresponding regulations.

§ 1068.27 May ARB conduct testing with my production engines/equipment?

{Entire section text} DELETE,
REPLACE WITH:
If we request it, you must make a reasonable number of production-line engines or pieces of production-line equipment available for a reasonable time so we can test or inspect them for compliance with the requirements of this ~~chapter~~ part.

§ 1068.30 What definitions apply to this part?

{Introductory text} DELETE,
REPLACE WITH:
The definitions in ~~40 CFR~~ §§1039.801 and 1065.1001 of the California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, Parts 1-D and 1-F, respectively, ~~as modified,~~ apply with the following substitutions, revisions, and additions:

40 CFR part 1039 DELETE,
REPLACE WITH:
40 CFR part 1039 or Part 1039 means Part 1039 and applicable subparts ~~contained in these 2008 and Later Test procedures~~ of the California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, PART I-D, when referenced in unrevised (i.e., " * * * * * ") sections. When referenced in revised sections, the term 40 CFR part 1039 refers to the federal regulations of the same title, last amended on June 28, 2011.

ADD:
40 CFR part 1065 or Part 1065 means Part 1065 and applicable subparts of the California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, PART I-E, when referenced in unrevised (i.e., " * * * * * ") sections. When referenced in revised sections, the term 40 CFR part 1065 refers to the federal regulations of the same title, last amended on June 28, 2011.

40 CFR part 1068 DELETE,
REPLACE WITH:
40 CFR part 1068 or Part 1068 means Part 1068 and applicable subparts ~~contained in these 2008 and Later Test procedures~~ of the California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, PART I-F, when referenced in unrevised (i.e., " * * * * * ") sections. When referenced in revised sections, the term 40 CFR part 1068 refers to the federal regulations of the same title, last amended on June 28, 2011.

* * * * *

ADD:
Date of manufacture means one of the following:

(1) For engines, the date on which the crankshaft is installed in an engine block, with the following exceptions:

(i) Reserved.

(ii) Manufacturers may assign a date of manufacture at a point in the assembly process later than the date otherwise specified under this definition. For example, a manufacturer may use the build date printed on the label or stamped on the engine as the date of manufacture.

(2) For equipment, the date on which the engine is installed, unless otherwise specified in Title 13, Division 3, Chapter 9, Article 4, of the California Code of Regulations. Manufacturers may alternatively assign a date of manufacture later in the assembly process.

* * * * *

ADD:
Engine/equipment and engines/equipment mean engine(s) and/or equipment depending on the context. Specifically these terms mean the following:

(1) Engine(s) when only engine-based standards apply.

(2) Engine(s) for testing issues when engine-based testing applies.

(3) Engine(s) and equipment when both engine-based and equipment-based standards apply.

(4) Equipment when only equipment-based standards apply.

(5) Equipment for testing issues when equipment-based testing applies.

Equipment DELETE,
REPLACE WITH:
Equipment means ~~one of the following things~~:
(1) Any vehicle, vessel, or other type of equipment that is subject to the requirements of this part or that uses an engine that is subject to the requirements of this part. An installed engine is part of the equipment, or

(2) Fuel-system components that are subject to an equipment-based standard under this chapter. Installed fuel-system components are part of the engine.

* * * * *

ADD:

Exempted means relating to engines/equipment that are not required to meet otherwise applicable standards. Exempted engines/equipment must conform to regulatory conditions specified for an exemption in this part 1068 or in Title 13, Division 3, Chapter 9, Article 4, of the California Code of Regulations. Exempted engines/equipment not required to comply with the otherwise applicable requirements of Title 13, Division 3, Chapter 9, Article 4, (e.g., certification, reporting, warranty, etc.) of the California Code of Regulations or the applicable test procedures are still deemed to be "subject to" the standards of Title 13, Division 3, Chapter 9, Article 4, of the California Code of Regulations. Engines/equipment exempted with respect to a certain tier of standards may be required to comply with an earlier tier of standards as a condition of the exemption; for example, engines exempted with respect to Tier 3 standards may be required to comply with Tier 1 or Tier 2 standards.

* * * * *

Nonroad engine DELETE,
REPLACE WITH:
Nonroad engine means: an off-road engine as defined in §1039.801 of the California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, Part 1-D.

* * * * *

ADD:
Revoke means to terminate the Executive Order or an exemption for a family. If we revoke an Executive Order or exemption, you must apply for a new Executive Order or exemption before continuing to introduce the affected engines/equipment into California commerce. This does not apply to engines/equipment you no longer possess.

* * * * *

ADD:
United States, when referenced in unrevised sections, generally means California, or within the jurisdiction of the California Air Resources Board, unless indicated otherwise by the context of the section.

* * * * *

ADD:
Void means to invalidate an Executive Order or an exemption ab initio. If we void an Executive Order or withdraw an exemption, all the engines/equipment introduced into California commerce under that family for that model year are considered noncompliant, and you are liable for all engines/equipment introduced into California commerce under the Executive Order and may face civil or criminal penalties or both. This applies equally to all engines/equipment in the family, including engines/equipment introduced into California commerce before we voided the Executive Order. If we void an

exemption, all the engines/equipment introduced into California commerce under that exemption are considered uncertified (or nonconforming), and you are liable for engines/equipment introduced into California commerce under the exemption and may face civil or criminal penalties or both. You may not introduce into California commerce any additional engines/equipment using the voided Executive Order or exemption.

* * * * *

§ 1068.35 What symbols, acronyms, and abbreviations does this part use?

* * * * *

{New section} ADD:
§1068.45 General labeling provisions.

The labeling provisions in Title 13, California Code of Regulations, §2424 apply.

Subpart B – Prohibited Actions and Related Requirements

§ 1068.101 What general actions does this regulation prohibit?

* * * * *

(b)(7) ADD:
(b)(7) Labeling.

(i) You may not remove or alter an emission control information label or other required permanent label except as specified in this paragraph (b)(7) or otherwise allowed by this chapter. Removing or altering an emission control information label is a violation of paragraph (b)(1) of this section. However, it is not a violation to remove a label in the following circumstances:

(A) The engine is destroyed, is permanently disassembled, or otherwise loses its identity such that the original title to the engine is no longer valid.

(B) The regulations specifically direct you to remove the label. For example, see §1068.235.

(C) The part on which the label is mounted needs to be replaced. In this case, you must have a replacement part with a duplicate of the original label installed by the certifying manufacturer or an authorized agent, except that the replacement label may omit the date of manufacture if applicable. Labels must be permanently attached to parts that will not normally be replaced, except for replacements in unusual circumstances, such as damage in a collision or other accident.

(D) The original label is incorrect, provided that it is replaced with the correct label from the certifying manufacturer or an authorized agent. This allowance to replace incorrect labels does not affect whether the application of an incorrect original label is a violation.

(ii) Removing or altering a temporary or removable label contrary to the provisions of this paragraph (b)(7)(ii) is a violation of paragraph (b)(1) of this section.

(A) For labels identifying temporary exemptions, you may not remove or alter the label while the engine/equipment is in an exempt status. The exemption is automatically revoked for each engine/equipment for which the label has been removed.

(B) For temporary or removable consumer information labels, only the ultimate purchaser may remove the label.

(iii) You may not apply a false emission control information label. You also may not manufacture, sell, provide, distribute, or offer to sell false labels. The application, manufacture, sale, provision, distribution, or offer for sale of false labels is a violation of this section (such as paragraph (a)(1) or (b)(2) of this section). Note that applying an otherwise valid emission control information label to the wrong engine is considered to be applying a false label.

* * * * *

{New section} ADD:
§ 1068.103 What are the provisions related to the duration and applicability of Executive Orders?

(a) Engines/equipment covered by an Executive Order are limited to those that are produced during the period specified in the certificate and conform to the specifications described in the certificate and the associated application for certification. For the purposes of this paragraph (a), "specifications" includes any conditions or limitations identified by the manufacturer or ARB. For example, if the application for an Executive Order specifies certain engine configurations, the Executive Order does not cover any configurations that are not specified. We may ignore any information provided in the application that we determine is not relevant to a demonstration of compliance with applicable regulations, such as your projected production volumes in many cases.

(b) Unless Title 13, Division 3, Chapter 9, Article 4, of the California Code of Regulations specifies otherwise, determine the production period corresponding to each Executive Order as specified in this paragraph (b). In general, the production period is the manufacturer's annual production period identified as a model year.

(1) For engines/equipment subject to emission standards based on model years, the first day of the annual production period can be no earlier than January 2 of the calendar year preceding the year for which the model year is named, or the earliest date of manufacture for any engine/equipment in the engine family, whichever is later. The

last day of the annual production period can be no later than December 31 of the calendar year for which the model year is named or the latest date of manufacture for any engine/equipment in the engine family, whichever is sooner.

(2) Reserved.

(c) An Executive Order will not cover engines/equipment you produce with a date of manufacture earlier than the date you submit the application for certification for the family. You may start to produce engines/equipment after you submit an application for certification and before the effective date of an Executive Order, subject to the following conditions:

(1) The engines/equipment must conform in all material respects to the engines/equipment described in your application. Note that if we require you to modify your application, you must ensure that all engines/equipment conform to the specifications of the modified application.

(2) The engines/equipment may not be sold, offered for sale, introduced into commerce, or delivered for introduction into California commerce before the effective date of the Executive Order.

(3) You must notify us in your application for certification that you plan to use the provisions of this paragraph (c) and when you intend to start production. If Title 13, Division 3, Chapter 9, Article 4, of the California Code of Regulations specifies mandatory testing for production-line engines, you must start testing as directed in Title 13, Division 3, Chapter 9, Article 4, of the California Code of Regulations based on your actual start of production, even if that occurs before we approve your certification. You must also agree to give us full opportunity to inspect and/or test the engines/equipment during and after production. For example, we must have the opportunity to specify selective enforcement audits as allowed by Title 13, Division 3, Chapter 9, Article 4, of the California Code of Regulations as if the engines/equipment were produced after the effective date of the Executive Order.

(4) Reserved.

(d) Engines/equipment with a date of manufacture after December 31 of the calendar year for which a model year is named are not covered by the Executive Order for that model year. You must submit an application for a new Executive Order demonstrating compliance with applicable standards even if the engines/equipment are identical to those built before December 31.

(e) The flexible approach to naming the annual production period described in paragraph (b)(1) of this section is intended to allow you to introduce new products at any point during the year. This is based on the expectation that production periods generally run on consistent schedules from year to year. You may not use this flexibility

to arrange your production periods such that you can avoid annual certification as exemplified in 1068.103(f) below.

(f) An engine is generally assigned a model year based on its date of manufacture, which is typically based on the date the crankshaft is installed in the engine (see §1068.30). You may not circumvent the provisions of §1068.101(a)(1) by stockpiling engines with a date of manufacture before new or changed emission standards take effect by deviating from your normal production and inventory practices. (For purposes of this paragraph (f), normal production and inventory practices means those practices you typically use for similar families in years in which emission standards do not change. We may require you to provide us routine production and inventory records that document your normal practices for the preceding eight years.) For most engines you should plan to complete the assembly of an engine of a given model year within the first week after the end of the model year if new emission standards start to apply in that model year. For special circumstances it may be appropriate for your normal business practice to involve more time. For engines with per-cylinder displacement below 2.5 liters, we would consider it to be a violation to complete the assembly of an engine of a given model year more than 30 days after the end of the model year for that engine family if new emission standards start to apply in that year. For example, in the case where new standards apply in the 2010 model year, and your normal production period is based on the calendar year, you must complete the assembly of all your 2009 model year engines before January 31, 2010, or an earlier date consistent with your normal production and inventory practices. For engines with per-cylinder displacement at or above 2.5 liters, this time may not exceed 60 days. Note that for the purposes of this paragraph (f), an engine shipped under §1068.261 is deemed to be a complete engine. Note also that §1068.245 allows flexibility for additional time in unusual circumstances. Note finally that disassembly of complete engines and reassembly (such as for shipment) does not affect the determination of model year; the provisions of this paragraph (f) apply based on the date on which initial assembly is complete.

§ 1068.105 What other provisions apply to me specifically if I manufacture equipment needing certified engines?

* * * * *

(a) DELETE,
REPLACE WITH:
(a) Transitioning to new engine-based standards. If new engine-based emission standards apply in a given model year, your equipment in that ~~model~~ calendar year must have engines that are certified to the new standards, except that you may continue to use up ~~your~~ normal inventor~~y~~ies of earlier engines that were built before the date of the new or changed standards. For purposes of this paragraph (a), normal inventory applies for engines you possess and engines from your engine supplier's inventory. For example, if your normal inventory practice is to keep on hand a one-month supply of engines based on your upcoming production schedules, and a new tier of standard~~s~~ starts to apply for the 2015 model year, you may order engines ~~based on~~ consistent

with your normal inventory requirements late in the engine manufacturer's 2014 model year and install those engines in your equipment, regardless of the date of installation. Also, if your model year starts before the end of the calendar year preceding new standards, you may use engines from the previous model year for those units you produce before January 1 of the year that new standards apply. If emission standards for the engine do not change in a given model year, you may continue to install engines from the previous model year without restriction. (or any earlier model year for which the same standards apply. You may not circumvent the provisions of §1068.101(a)(1) by stockpiling engines that were built before new or changed standards take effect. Similarly, you may not circumvent the provisions of §1068.101(a)(1) by knowingly installing engines that were stockpiled by engine suppliers in violation of §1068.103(f). Note that this allowance does not apply for equipment subject to equipment-based standards.

(b) DELETE:
REPLACE WITH:
(b) Installing engines or certified components. The provisions in §1068.101(a)(1) generally prohibit you from introducing into California commerce any new equipment that includes engines not covered by an Executive Order. In addition, you must follow the engine manufacturer's emission-related installation instructions. For example, you may need to constrain where you place an exhaust aftertreatment device or integrate into your equipment models a device for sending visual or audible signals to the operator. Not meeting the manufacturer's emission-related installation instructions is a violation of one or more of the prohibitions of §1068.101(b)(1). See §1068.261 for special provisions that apply when the engine manufacturer delegates final assembly of emission controls to you.

* * * * *

(d) DELETE,

§ 1068.110 What other provisions apply to engines/equipment in service?

(a) DELETE,
REPLACE WITH:
(a) Aftermarket parts and service. As the engine certifying manufacturer, you may not require anyone to use your parts or service to maintain or repair an engine or a piece of equipment, unless we approve this in your application for certification. It is a violation of the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations for anyone to manufacture an engine or vehicle any part if one of its main effects is to reduce the effectiveness of the emission controls. See §1068.101(b)(2).

(b) DELETE,
REPLACE WITH:

(b) Certifying aftermarket parts. The manufacturer or rebuilder of an aftermarket engine/equipment part shall be required to certify according to the requirements of Title 13, CCR, Chapter 4, Article 2. The aftermarket part rebuilder or manufacturer must keep all records showing how the part affects emissions, and shall provide this information to the Executive Officer within 30 calendar days upon request.

* * * * *

(e) DELETE,
REPLACE WITH:
(e) Warranty and maintenance. Owners are responsible for properly maintaining their engines/equipment; however, owners may make warranty claims against the manufacturer for all expenses related to diagnosing and repairing or replacing emission-related parts, as described in §1068.115. Manufacturers may ask to limit diagnosis and repair to authorized service facilities, provided this does not limit their ability to meet their warranty obligations under §1068.115. The warranty period begins when the ~~engine~~ equipment is first placed into service. See the Title 13, Division 3, Chapter 9, Article 4, of the California Code of Regulations standard-setting part for specific requirements. It is a violation of the applicable provisions of the California Health and Safety Code, Division 26, and corresponding regulations for anyone to disable emission controls; see §1068.101(b)(1) and Title 13, Division 3, Chapter 9, Article 4, of the California Code of Regulations.

§ 1068.115 When must manufacturers honor emission-related warranty claims?

* * * * *

{All occurrences of “engine” and “engines” through (b)(2)} DELETE,
REPLACE WITH:
“engine/equipment” or “engines/equipment” respective.

* * * * *

(b)(6) DELETE,
REPLACE WITH:
(b)(6) The use of any fuel that is commonly available where the ~~engine~~ equipment operates unless your written maintenance instructions state that this fuel would harm the ~~engine's~~ equipment's emission control system and operators can readily find the proper fuel.

§ 1068.120 What requirements must I follow to rebuild engines?

(a) DELETE,
REPLACE WITH:
(a) This section describes the steps to take when rebuilding engines to avoid violating the tampering prohibition in §1068.101(b)(1). These requirements apply to anyone

rebuilding an engine subject to this part, but the recordkeeping requirements in paragraphs (j) and (k) of this section apply only to businesses. For maintenance or service that is not rebuilding, including any maintenance related to evaporative emission controls, you may not make changes that might increase emissions of any regulated pollutant, but you do not need to keep any records.

* * * * *

(c) DELETE,
REPLACE WITH:
(c) [Reserved]

* * * * *

(e) DELETE,
REPLACE WITH:
(e) If the rebuilt engine remains installed or is reinstalled in the same piece of equipment, you must rebuild it to the original configuration ~~or another certified configuration of the same or later model year.~~, except as allowed by this paragraph (e). You may rebuild it to a different certified configuration of the same or later model year. You may also rebuild it to a certified configuration from an earlier model year as long as the earlier configuration is as clean or cleaner than the original configuration. For purposes of this paragraph (e), "as clean or cleaner" means one of the following:

(1) For engines not certified with a Family Emission Limit for calculating credits for a particular pollutant, this means that the same emission standard applied for both model years. This includes supplemental standards such as Not-to-Exceed standards.

(2) For engines certified with a Family Emission Limit for a particular pollutant, this means that the configuration to which the engine is being rebuilt has a Family Emission Limit for that pollutant that is at or below the standard that applied to the engine originally, and is at or below the original Family Emission Limit.

(f) DELETE,
REPLACE WITH:
(f) ~~If the rebuilt engine replaces~~ A rebuilt engine may replace another certified engine in a piece of equipment~~, you must rebuild it~~ only if the engine was rebuilt to a certified configuration ~~of the same~~ meeting equivalent or more stringent emission standards. Note that a certified configuration would generally include more than one model year ~~as, or a later~~. A rebuilt engine being installed that is from the same model year ~~than, the engine you are replacing.~~ or a newer model year than the engine being replaced meets this requirement. The following examples illustrate the provisions of this paragraph (f):

(1) In most cases, you may use a rebuilt Tier 2 engine to replace a Tier 1 engine or another Tier 2 engine.

(2) You may use a rebuilt Tier 1 engine to replace a Tier 2 engine if the two engines differ only with respect to model year or other characteristics unrelated to emissions since such engines would be considered to be in the same configuration. This may occur if the Tier 1 engine had emission levels below the Tier 2 standards or if the Tier 2 engine was certified with a Family Emission Limit for calculating emission credits.

(3) You may use a rebuilt engine that originally met the Tier 1 standards without certification, as provided under §1068.265, to replace a certified Tier 1 engine. This may occur for engines produced under a Transition Program for Equipment Manufacturers such as that described in §1039.625.

(4) You may never replace a certified engine with an engine rebuilt to a configuration that does not meet ARB or U.S. EPA emission standards. Note that a configuration is considered to meet ARB or U.S. EPA emission standards if it was previously certified or was otherwise shown to meet emission standards.

* * * * *

(j)(1) DELETE,
REPLACE WITH:
(j)(1) Identify the hours of operation (or mileage, as appropriate) at the time of rebuild. These may be noted as approximate values if the engine has no hour meter (or odometer).

* * * * *

§ 1068.125 What happens if I violate the regulations?

* * * * *

Subpart C – Exemptions and Exclusions

§ 1068.201 Does ARB exempt or exclude any engines/equipment from the prohibited acts?

* * * * *

{All occurrences of “engine” and “engines” (a) through (f)} DELETE,
REPLACE WITH:
“engine/equipment” or “engines/equipment” respective.

* * * * *

(h) DELETE,
REPLACE WITH:
(h) You may ask us to modify the administrative requirements for the exemptions described in this subpart or in subpart D of this part. We may approve your request if we determine that such approval is consistent with the intent of this part. For example, waivable administrative requirements might include some reporting requirements, but would not include any eligibility requirements or use restrictions.

(i) DELETE,
REPLACE WITH:
(i) If you want to take an action with respect to an exempted or excluded engine /equipment that is prohibited by the exemption or exclusion, such as selling it, you need to certify the engine/equipment. We will issue an Executive Order if you send us an application for certification showing that you meet all the applicable requirements from Title 13, Division 3, Chapter 9, Article 4, of the California Code of Regulations and pay the appropriate fee. ~~Also, in some cases~~ Alternatively, we may allow ~~manufacturers~~ you to include in an existing certified engine family those engines/equipment you modify ~~the engine as needed~~ (or otherwise demonstrate) to ~~make it~~ be identical to engines /equipment already covered by ~~a~~ the Executive Order. We would base such an approval on our review of any appropriate documentation. These engines/equipment must have emission control information labels that accurately describe their status.

§ 1068.210 What are the provisions for exempting test engines/equipment?

(a) DELETE,
REPLACE WITH:
(a) We may exempt engines ~~that are not exempted under other sections of this part~~ that you will use for research, investigations, studies, demonstrations, or training. Note that you are not required to get an exemption under this section for engines that are exempted under other provisions of this part, such as the manufacturer-owned exemption in §1068.215.

* * * * *

{All occurrences of “engine” and “engines” (c) through (d)(5)(vi)} DELETE,
REPLACE WITH:
“engine/equipment” or “engines/equipment” respective.

* * * * *

(e)(3) DELETE,
REPLACE WITH:
(e)(3) Add a permanent, legible label ~~, written in block letters in English,~~ to ~~a readily visible part of each~~ all engines/equipment exempted ~~engine. This label must include~~ under this section, consistent with Title 13, California Code of Regulations, §2424, with at least the following items:

* * * * *

(e)(3)(iii) DELETE,
REPLACE WITH:
(e)(3)(iii) Engine displacement, ~~engine~~ family identification ~~(as applicable)~~, and model year of the engine/equipment (as applicable), or whom to contact for further information.

(e)(3)(vi) DELETE,
REPLACE WITH:
(e)(3)(vi) ~~The statement~~ One of these statements (as applicable):

(A) "THIS ENGINE IS EXEMPT ~~UNDER 40 CFR 1068.210 OR 1068.215~~ FROM CALIFORNIA EMISSION STANDARDS AND RELATED REQUIREMENTS."

(B) "THIS EQUIPMENT IS EXEMPT FROM CALIFORNIA EMISSION STANDARDS AND RELATED REQUIREMENTS."

The combining of similar federal statements and/or citations with California statements and/or citations on these labels is permitted with Executive Officer approval.

* * * * *

(e)(5) DELETE,
REPLACE WITH:
(e)(5) Tell us the final disposition of the engines/equipment.

§ 1068.215 What are the provisions for exempting manufacturer-owned engines/equipment?

(a) DELETE,
REPLACE WITH:
(a) You are eligible for the exemption for manufacturer-owned engines/equipment only if you are ~~a certificate holder~~ the certifying manufacturer of record.

(b) DELETE,
REPLACE WITH:
(b) By provision of the California Health and Safety Code, Division 24, Part 5, Chapter 1, § 43014, a manufacturer may request the Executive Officer to issue an experimental permit for a nonconforming engine/equipment under the ownership and control of the manufacturer for the purposes of developing products, assessing production methods, or promoting engines/equipment in the marketplace. The engine/equipment shall not be loaned, leased, or sold to generate revenue, either by itself or for an engine installed in a piece of equipment.

(c) DELETE,

REPLACE WITH:
(c) To use this exemption, you must do three things:

(1) Establish, maintain, and keep adequately organized and indexed information on ~~each~~ all exempted ~~engine~~ engines/equipment, including the engine/equipment identification number, the use of the engine/equipment on exempt status, and the final disposition of any engine/equipment removed from exempt status.

(2) Let us access these records, as described in §1068.20.

(3) Add a permanent~~, legible~~ label~~, written in block letters in English,~~ to ~~a readily visible part of each~~ all engines/equipment exempted ~~engine. This label must include~~ under this section, consistent with Title 13, California Code of Regulations, §2424, with at least the following items:

(i) The label heading "EMISSION CONTROL INFORMATION".

(ii) Your corporate name and trademark.

(iii) ~~Engine displacement, engine~~ Family identification ~~(as applicable),~~ and model year of the engine/equipment (as applicable), or whom to contact for further information.

(iv) ~~The statement~~ One of these statements (as applicable):

(A) “THIS ENGINE IS COVERED BY AN EXPERIMENTAL PERMIT AND IS EXEMPT FROM MEETING CALIFORNIA EMISSION REQUIREMENTS.”. ~~The referencing of similar federal requirements in combination with California references under this provision is permitted.~~

(B) “THIS EQUIPMENT IS EXEMPT FROM CALIFORNIA EMISSION STANDARDS AND RELATED REQUIREMENTS.”

The combining of similar federal statements and/or citations with California statements and/or citations on these labels is permitted with Executive Officer approval.

§ 1068.220 What are the provisions for exempting display engines/equipment?

* * * * *

{All occurrences of “engine” and “engines” (a) through (d)} DELETE,
REPLACE WITH:
“engine/equipment” or “engines/equipment” respective.

(e) DELETE,
REPLACE WITH:

(e) To use this exemption, you must add a permanent~~, legible~~ label~~, written in block letters in English,~~ to ~~a readily visible part of each~~ all engines/equipment exempted ~~engine. This label must include~~ under this section, consistent with Title 13, California Code of Regulations, §2424, with at least the following items:

(1) The label heading "EMISSION CONTROL INFORMATION".

(2) Your corporate name and trademark.

(3) Engine displacement, ~~engine~~ family identification ~~(as applicable)~~, and model year of the engine/equipment (as applicable), or whom to contact for further information.

(4) ~~The statement~~ One of these statements (as applicable):

(i) "THIS ENGINE IS EXEMPT ~~UNDER 40 CFR 1068.220~~ FROM CALIFORNIA EMISSION STANDARDS AND RELATED REQUIREMENTS."

(ii) "THIS EQUIPMENT IS EXEMPT FROM CALIFORNIA EMISSION STANDARDS AND RELATED REQUIREMENTS."

The combining of similar federal statements and/or citations with California statements and/or citations on these labels is permitted with Executive Officer approval.

* * * * *

§ 1068.225 What are the provisions for exempting engines/equipment for national security?

Entire section DELETE,
REPLACE WITH:
The federal provisions in Title 40, Code of Federal Regulations, §1068.225 (76 FR 37977, June 28, 2011) apply.

§ 1068.230 What are the provisions for exempting engines/equipment for export?

* * * * *

§ 1068.235 What are the provisions for exempting engines/equipment used solely for competition?

(a) DELETE,
REPLACE WITH:
(a) New engines/equipment you produce that are used solely for competition are generally excluded from emission standards. See Title 13, Division 3, Chapter 9, Article 4, of the California Code of Regulations s for specific provisions where applicable.

(b) DELETE,
REPLACE WITH:
(b) If you modify ~~an engine~~ any engines/equipment after ~~it has~~ they have been placed into service in California so ~~it~~ they will be used solely for competition, ~~it is~~ they are exempt without request. This exemption applies only to the prohibition in §1068.101(b)(1) and is valid only as long as the engine/equipment is used solely for competition. You may not use the provisions of this paragraph (b) to circumvent the requirements that apply to the sale of new competition engines under Title 13, Division 3, Chapter 9, Article 4, of the California Code of Regulations.

(c) DELETE,
REPLACE WITH:
(c) If you modify ~~an engine~~ any engines/equipment under paragraph (b) of this section, you must destroy the original emission labels. If you loan, lease, sell, or give ~~one~~ any of these engines/equipment to someone else, you must tell the new owner (or operator, if applicable) in writing that ~~it~~ they may be used only for competition.

§ 1068.240 What are the provisions for exempting new replacement engines?

* * * * *

(c) DELETE,
REPLACE WITH:
(c) If the replacement engine ~~being replaced~~ is built to a configuration that was not ~~certified~~ subject to any emission standards under ~~this chapter~~ 13 CCR 2423, add a permanent label with your corporate name and trademark and the following language:

"THIS ENGINE DOES NOT COMPLY WITH CALIFORNIA OFF-ROAD EMISSION REQUIREMENTS. SALE OR INSTALLATION OF THIS ENGINE FOR ANY PURPOSE OTHER THAN AS A REPLACEMENT ENGINE FOR AN ENGINE MANUFACTURED PRIOR TO JANUARY 1, [Insert appropriate year reflecting when the earliest tier of emission standards began to apply to engines of that size and type] ~~IS~~ MAY BE A VIOLATION OF CALIFORNIA LAW SUBJECT TO CIVIL PENALTY."

Beginning January 1, 2013, the following additional information shall also be included on the emission control label:

ENGINE POWER:	{insert the advertised power of the specific engine configuration or the applicable power category for the engine family in kilowatts}
DATE OF MANUFACTURE:	{insert the engine build date per §1068.30}"

In lieu of including “Engine Power” or “Date of Manufacture” on the emissions control label, manufacturers may provide this information on a supplemental label attached to the engine in accordance with the provisions of this part and 13 CCR 2424.

The referencing of similar federal requirements in combination with California references under this provision is permitted.

(d) DELETE,
REPLACE WITH:
(d) If the replacement engine ~~being replaced~~ is built to a configuration that was ~~certified~~ subject to emission standards under 13 CCR 2423 ~~less stringent than those in effect when you produce the replacement engine~~, add a permanent label with your corporate name and trademark and the following language:

“THIS ENGINE COMPLIES WITH CALIFORNIA OFF-ROAD ~~AND U.S. EPA NONROAD~~ EMISSION REQUIREMENTS FOR ~~[Insert~~ [Identify the appropriate ~~year reflecting when the applicable tier of~~ emission standards (by model year, tier, or emission levels) for the replaced engine ~~began to apply~~] ENGINES UNDER 13 CCR 2423(j) ~~AND 40 CFR 1068.240~~. SELLING OR INSTALLING THIS ENGINE FOR ANY PURPOSE OTHER THAN TO REPLACE A~~N OFF-ROAD ENGINE BUILT BEFORE JANUARY 1 [Insert~~ [Identify the appropriate ~~year reflecting when the next tier of~~ emission standards (by model year, tier, or emission levels) for the replaced engine ~~began to apply~~] OFF-ROAD ENGINE MAY BE A VIOLATION OF CALIFORNIA ~~AND FEDERAL~~ LAW SUBJECT TO CIVIL PENALTY.~~”~~

Beginning January 1, 2013, the following additional information shall also be included on the emission control label:

ENGINE POWER:	{insert the certified power in kilowatts of the specific engine configuration, if applicable, otherwise insert advertised power in kilowatts}
REFERENCE FAMILY NAME:	{insert the engine family name of the replacement engine as recorded in the Executive Order for the engine family to which the replacement engine was originally certified}
DATE OF MANUFACTURE:	{insert the engine build date per §1068.30}”

In lieu of including “Engine Power,” Reference Family Name,” or “Date of Manufacture” on the emissions control label, manufacturers may provide this information on a supplemental label attached to the engine in accordance with the provisions of this part and 13 CCR 2424. Manufacturers may alternately state the applicable power category in kilowatts for the certified engine family on the emission control or supplemental label when indicating “Engine Power.”

Additionally, manufacturers may indicate the “Emissions Tier” of the replacement engine on the emissions control or supplemental label instead of the “Reference Family Name.” For the purpose of this section, “Emissions Tier” is the emissions standard designation (e.g., Tier 1, Tier 2, Tier 3, Tier 4i, Tier 4f) of the engine recorded in the Executive Order for the engine family to which the replacement engine was originally certified. Certified power means the configuration-specific power of the replacement engine as originally identified in the application for certification of the reference engine family (see §1039.205(a)). Advertised power means engine power as stated by the manufacturer in sales literature.

The referencing of similar federal requirements in combination with California references under this provision is permitted.

* * * * *

§ 1068.245 What temporary provisions address hardship due to unusual circumstances?

(a) DELETE,
REPLACE WITH:
(a) After considering the circumstances, we may permit you to introduce into California commerce engines ~~or~~/equipment that do not comply with emission-related requirements for a limited time if all the following conditions apply:

(a)(1) DELETE,
REPLACE WITH:
(a)(1) Unusual circumstances that are clearly outside your control ~~and that could not have been avoided with reasonable discretion~~ prevent you from meeting requirements from this ~~chapter~~ part.

* * * * *

(a)(3) through (f) DELETE,
REPLACE WITH:
(a)(3) ~~Not having the exemption will jeopardize the solvency of your company.~~

~~(4)~~ No other allowances are available under the regulations in this chapter to avoid the impending violation, including the provisions of §1068.250.

(4) Not having the exemption will jeopardize the solvency of your company

(b) If your unusual circumstances are only related to compliance with the model-year provisions of §1068.103(f), we may grant hardship under this section without a demonstration that the solvency of your company is in jeopardy as follows:

(1) You must demonstrate that the conditions specified in paragraphs (a)(1) through (3) of this section apply.

(2) Your engines/equipment must comply with standards and other requirements that would have applied if assembly were completed on schedule.

(3) You may generally request this exemption only for engines/equipment for which assembly has been substantially completed; you may not begin assembly of any additional engines/equipment under this exemption after the cause for delay has occurred. We may make an exception to this general restriction for secondary engine manufacturers.

(4) As an example, if your normal production process involves purchase of partially complete engines and a supplier fails to deliver all the ordered engines in time for your assembly according to your previously established schedule as a result of a fire at its factory, you may request that we treat those engine as if they had been completed on the original schedule. Note that we would grant relief only for those engines where you had a reasonable basis for expecting the engines to be delivered on time based on past performance and terms of purchase.

~~(b)~~(c) To apply for an exemption, you must send the Executive Officer or his/her designee a written request as soon as possible before you are in violation. In your request, show that you meet all the conditions and requirements in paragraph (a) of this section.

~~(c)~~(d) Include in your request a plan showing how you will meet all the applicable requirements as quickly as possible.

~~(d)~~(e) You must give us other relevant information if we ask for it.

~~(e)~~(f) We may include reasonable additional conditions on an approval granted under this section, including provisions to recover or otherwise address the lost environmental benefit or paying fees to offset any economic gain resulting from the exemption. For example, in the case of multiple tiers of emission standards, we may require that you meet the standards from the previous tier whether or not your hardship is granted under paragraph (b) of this section.

~~(f)~~(g) Add a permanent~~, legible~~ label~~, written in block letters in English,~~ to ~~a readily visible part of each engine~~ all engines/equipment exempted under this section~~. This label must include~~, consistent with the labeling provisions in Title 13, California Code of Regulations, §2424, with at least the following items:

(1) The label heading "EMISSION CONTROL INFORMATION".

(2) Your corporate name and trademark.

(3) Engine displacement (in liters~~), rated power,~~ or cubic centimeters), certified engine power if available, otherwise advertised power or power category (as applicable), and model year of the engine/equipment, (as applicable); or whom to contact for further information.

(4) ~~One of the following statements:~~ A statement describing the engine's status as an exempted engine:

(i) If the engine/equipment does not meet any emission standards~~:~~, add one of the following statements:

(A) "THIS ENGINE IS EXEMPT ~~UNDER 40 CFR 1068.245~~ UNDER 13 CCR 2423(f) FROM EMISSION STANDARDS AND RELATED REQUIREMENTS."~~.~~

(B) "THIS EQUIPMENT IS EXEMPT UNDER 13 CCR 2423(f) FROM EMISSION STANDARDS AND RELATED REQUIREMENTS."

The combining of similar federal statements and/or citations with California statements and/or citations on these labels is permitted with Executive Officer approval.

(ii) If the engines/equipment meet~~s~~ alternate emission standards as a condition of an exemption under this section, we may specify a different statement to identify the alternate emission standards.

§ 1068.250 What are the provisions for extending compliance deadlines for small volume manufacturers and small businesses under hardship?

* * * * *

(k) DELETE,
REPLACE WITH:
(k) Add a permanent~~, legible~~ label~~, written in block letters in English, to a readily visible part of each engine~~ to all engines/equipment exempted under this section~~. This label must include~~, consistent with the labeling provisions in Title 13, California Code of Regulations, §2424, with at least the following items:

(1) The label heading "EMISSION CONTROL INFORMATION".

(2) Your corporate name and trademark.

(3) Engine displacement (in liters~~), rated power,~~ or cubic centimeters), certified engine power if available, otherwise advertised power or power category (as applicable), and model year of the engine/equipment (as applicable); or whom to contact for further information.

(4) ~~One of the following statements:~~ A statement describing the engine's status as an exempted engine:

(i) If the engine/equipment does not meet any emission standards~~:~~, add one of the following statements:

(A) "THIS ENGINE IS EXEMPT UNDER ~~40 CFR 1068.250~~ 13 CCR 2423(f) FROM EMISSION STANDARDS AND RELATED REQUIREMENTS."~~.~~

(B) "THIS EQUIPMENT IS EXEMPT UNDER 13 CCR 2423(f) FROM EMISSION STANDARDS AND RELATED REQUIREMENTS."

The combining of similar federal statements and/or citations with California statements and/or citations on these labels is permitted with Executive Officer approval.

(ii) If the engine/equipment meets alternate emission standards as a condition of an exemption under this section, we may specify a different statement to identify the alternate emission standards.

§ 1068.255 What are the provisions for exempting engines and components for hardship for equipment manufacturers and secondary engine manufacturers?

* * * * *

(b) DELETE,
REPLACE WITH:
(b) Engine exemption. As an engine manufacturer, you may produce nonconforming engines for the equipment we exempt in paragraph (a) of this section. You do not have to request this exemption for your engines, but you must have written assurance from equipment manufacturers that they need a certain number of exempted engines under this section. ~~Add a permanent, legible label, written in block letters in English, to a readily visible part of each exempted engine. This label must include at least the following items:~~ Label engines as follows, consistent with the labeling provisions in Title 13, California Code of Regulations, §2424:

(1) Engines. Add a permanent label to all engines/equipment exempted under this section with at least the following items:

~~(1)~~(i) The label heading "EMISSION CONTROL INFORMATION".

~~(2)~~(ii) Your corporate name and trademark.

~~(3)~~(iii) Engine displacement (in liters~~), rated power,~~ or cubic centimeters), certified engine power if available, otherwise advertised power or power category (as applicable), and model year of the engine/equipment, or whom to contact for further information.

~~(4) One of the following statements:~~
(iv) If the engine does not meet any emission standards: “THIS ENGINE IS EXEMPT UNDER 13 CCR 2423(f) FROM EMISSION STANDARDS AND RELATED REQUIREMENTS.”~~. The referencing of similar federal requirements in combination with California references under this provision is permitted.~~

~~(ii) If the engine meets alternate emission standards as a condition of an exemption under this section:~~
~~“THIS ENGINE COMPLIES WITH U.S. EPA NONROAD EMISSION REQUIREMENTS UNDER 40 CFR 1068.255.”.~~

The combining of similar federal statements and/or citations with California statements and/or citations on these labels is permitted with Executive Officer approval. Additionally, if the engine meets alternate emission standards as a condition of an exemption under this section, we may specify a different statement to identify the alternate emission standards.

(2) [Reserved].

* * * * *

{New section} ADD:
§ 1068.260 What general provisions apply for selling or shipping engines that are not yet in their certified configuration?

Except as specified in paragraph (e) of this section, all new engines in California are presumed to be subject to the prohibitions of §1068.101, which generally require that all new engines be in a certified configuration before being introduced into California commerce. All emission-related components generally need to be installed on an engine for such an engine to be in its certified configuration. This section specifies clarifications and exemptions related to these requirements for engines. The provisions of this section apply for engine-based standards.

(a) The provisions of this paragraph (a) apply for emission-related components that cannot practically be assembled before shipment because they depend on equipment design parameters.

(1) You do not need an exemption to ship an engine that does not include installation or assembly of certain emission-related components, if those components are shipped along with the engine. For example, you may generally ship aftertreatment devices along with engines rather than installing them on the engine before shipment. We may require you to describe how you plan to use this provision.

(2) You may ask us at the time of certification for an exemption to allow you to ship your engines without emission-related components. If we allow this, we may specify

conditions that we determine are needed to ensure that shipping the engine without such components will not result in the engine being operated outside of its certified configuration. See paragraph (d) of this section for additional provisions that apply in certain circumstances.

(b) You do not need an exemption to ship engines without specific components if they are not emission-related components identified in Appendix I of this part. For example, you may generally ship engines without radiators needed to cool the engine.

(c) If you are the certifying manufacturer of record, partially complete engines shipped between two of your facilities are exempt, subject to the provisions of this paragraph (c), as long as you maintain ownership and control of the engines until they reach their destination. We may also allow this where you do not maintain actual ownership and control of the engines (such as hiring a shipping company to transport the engines), but only if you demonstrate that the engines will be transported only according to your specifications. See §1068.261(b) for the provisions that apply instead of this paragraph (c) for the special case of integrated manufacturers using the delegated-assembly exemption. Notify us of your intent to use this exemption in your application for an Executive Order, if applicable. Your exemption is effective when we grant you an Executive Order. You may alternatively request an exemption in a separate submission; for example, this would be necessary if you will not be the certifying manufacturer of record for the engines in question. We may require you to take specific steps to ensure that such engines are in a certified configuration before reaching the ultimate purchaser. Note that since this is a temporary exemption, it does not allow you to sell or otherwise distribute to ultimate purchasers an engine in an uncertified configuration. Note also that the exempted engine remains new and subject to emission standards (see definition of "exempted" in §1068.30) until its title is transferred to the ultimate purchaser or it otherwise ceases to be new.

(d) See §1068.261 for delegated-assembly provisions in which certifying manufacturers of record introduce into U.S. commerce engines that are not yet equipped with certain emission-related components.

(e) Engines used in hobby vehicles are not presumed to be engines subject to the prohibitions of §1068.101. Hobby vehicles are reduced-scale models of vehicles that are not capable of transporting a person. Some gas turbine engines are subject to the prohibitions of §1068.101, but we do not presume that all gas turbine engines are subject to these prohibitions. Other engines that do not have a valid Executive Order or exemption when introduced into U.S. commerce are presumed to be engines subject to the prohibitions of §1068.101 unless we determine that such engines are excluded from the prohibitions of §1068.101.

(f) While we presume that new non-hobby engines are subject to the prohibitions of §1068.101, we may determine that a specific engine is not subject to these prohibitions based on information you provide or other information that is available to us. For example, the provisions of this part 1068 and the standard-setting parts provide for

exemptions in certain circumstances. Also, some engines are subject to separate prohibitions under subchapter C instead of the prohibitions of §1068.101 (see for example, §89.1003).

§ 1068.260 DELETE,
REPLACE WITH:
§ 1068.260~~0~~1 What ~~general~~ provisions apply for selling or shipping certified engines that are not yet in the~~ir~~ certified configuration?

{Entire section text} DELETE,
REPLACE WITH:
This section describes an exemption that allows certifying manufacturers of record to sell or ship engines that are missing certain emission-related components if those components will be installed by an equipment manufacturer. This section does not apply to equipment subject to equipment-based standards. See the standard-setting part to determine whether and how the provisions of this section apply. This exemption is temporary as described in paragraph (f) of this section.

(a) Shipping an engine separately from an aftertreatment component that you have specified as part of its certified configuration will not be a violation of the prohibitions in §1068.101(a)(1~~), if you do all the following:~~) subject to the provisions in this section.

(b) If you manufacture engines and install them in equipment you also produce, you must take steps to ensure that your facilities, procedures, and production records are set up to ensure that equipment and engines are assembled in their proper certified configurations. For example, you may demonstrate compliance with the requirements of this section by maintaining a database showing how you pair aftertreatment components with the appropriate engines such that the final product is in its certified configuration.

(c) If you include the price of all aftertreatment components in the price of the engine and ship the aftertreatment components directly to the equipment manufacturer, or arrange for separate shipment by the component manufacturer to the equipment manufacturer, all the following conditions apply:

(1) Apply for and receive an Executive Order for the engine and its emission control system before shipment~~.~~ as described in the standard-setting part. For an existing Executive Order, amend the application for certification by describing your plans to use the provisions of this section as described in paragraph (c)(8) of this section.

(2) Provide installation instructions in enough detail to ensure that the engine will be in its certified configuration if someone follows these instructions. Provide the installation instructions in a timely manner, generally directly after you receive an order for shipping engines or earlier. If you apply removable labels as described in paragraph (c)(7)(i) of this section, include an instruction for the equipment manufacturer to remove the label after installing the appropriate aftertreatment component.

(3) Have a contractual agreement with ~~an~~ the equipment manufacturer obligating the equipment manufacturer to complete the final assembly of the engine so it is in its certified configuration when ~~installed in the equipment.~~ final assembly is complete. This agreement must also obligate the equipment manufacturer to provide the affidavits ~~and cooperate with the audits~~ required under paragraph ~~(a)(6)~~ (c)(4) of this section.

~~(4) Include the cost of all aftertreatment components in the cost of the engine.~~

~~(5) Ship the aftertreatment components directly to the equipment manufacturer, or arrange for separate shipment by the component manufacturer to the equipment manufacturer.~~

~~(6)~~(4) Take appropriate additional steps to ensure that all engines will be in ~~their~~ a certified configuration when installed by the equipment manufacturer. At a minimum ~~do the following:~~

~~(i),~~ you must obtain annual affidavits from every equipment manufacturer to ~~whom~~ which you sell engines under this section. Include engines that you sell ~~through~~ to distributors or dealers. The affidavits must list the part numbers of the aftertreatment devices that equipment manufacturers install on each engine they purchase from you under this section and include confirmation that the number of aftertreatment devices received were sufficient for the number of engines involved.

~~(ii) If you sell more than 50~~

(5) [Reserved]

(6) Keep records to document how many engines ~~per~~ you produce under this exemption. Also, keep records to document your contractual agreements under paragraph (c)(3) of this section. Keep all these records for five years after the end of the applicable model year ~~under this~~ and make them available to us upon request.

(7) Make sure the engine has the emission control information label we require under the standard-setting part. Include additional labeling using one of the following approaches:

(i) Apply an additional removable label in a way that makes it unlikely that the engine will be installed in equipment other than in its certified configuration. The label must identify the engine as incomplete and include a clear statement that failing to install the aftertreatment device, or otherwise failing to bring the engine into its certified configuration, is a violation of federal law subject to civil penalty.

(ii) Add the statement “DELEGATED ASSEMBLY” to the permanent emission control information label. You may alternatively add the abbreviated statement “DEL ASSY” if there is not enough room on the label.

(8) Describe the following things in your application for certification:

(i) How you plan to use the provisions of this section.

(ii) A detailed plan for auditing equipment manufacturers, as described in paragraph (d)(3) of this section, if applicable.

(iii) All other steps you plan to take under paragraph (c)(4) of this section.

(9) If one of your engines produced under this section is selected for production-line testing or a selective enforcement audit, you must arrange to get a randomly selected aftertreatment component from either the equipment manufacturer or the equipment manufacturer's supplier. You may keep an inventory of these randomly selected parts, consistent with good engineering judgment and the intent of this section. You may obtain such aftertreatment components from any point in the normal distribution from the aftertreatment component manufacturer to the equipment manufacturer. Keep records describing how you randomly selected these aftertreatment components, consistent with the requirements specified in the standard-setting part.

(10) Note that for purposes of importation, you may itemize your invoice to identify separate costs for engines and aftertreatment components that will be shipped separately. A copy of your invoice from the aftertreatment manufacturer may be needed to avoid payment of importation duties for the engine that also include the value of aftertreatment components.

(d) If you do not include the price of all aftertreatment components in the price of the engine, you must meet all the conditions described in paragraphs (c)(1) through (9) of this section, with the following additional provisions:

(1) The contractual agreement described in paragraph (c)(3) of this section must include a commitment that the equipment manufacturer will do the following things:

(i) Purchase the aftertreatment components you have specified in your application for certification and keep records to document these purchases.

(ii) Cooperate with the audits described in paragraph (d)(3) of this section.

(2) You must have written confirmation that the equipment manufacturer has ordered the appropriate type of aftertreatment components for an initial shipment of engines under this section. For the purpose of this paragraph (d)(2), initial shipment means the first shipment of engines that are subject to new or more stringent emissions standard (or the first shipment of engines using the provisions of this section) to a given equipment manufacturer for a given engine family. For the purpose of this paragraph (d)(2), you may treat as a single engine family those engine families from different model years that differ only with respect to model year or other characteristics unrelated

to emissions. You must receive the written confirmation within 30 days after shipment. If you do not receive written confirmation within 30 days, you may not ship any more engines from that engine family to that equipment manufacturer until you have the written confirmation. Note that it may be appropriate to obtain subsequent written confirmations to ensure compliance with this section, as described in paragraph (c)(4) of this section.

(3) You must perform or arrange for audits of equipment manufacturers as follows:

(i) If you sell engines to 16 or more equipment manufacturers under the provisions of this section, you must annually ~~audit~~ perform or arrange for audits of four equipment manufacturers to whom you sell engines under this section. To select individual equipment manufacturers, divide all the affected equipment manufacturers into quartiles based on the number of engines they buy from you; select a single equipment manufacturer from each quartile each model year. Vary the equipment manufacturers ~~you audit~~ selected for auditing from year to year, though you may repeat an audit in a later model year if you find or suspect that a particular equipment manufacturer is not properly installing aftertreatment devices.

(ii) If you sell engines to fewer than 16 equipment manufacturers under the provisions of this section, ~~you may instead~~ set up a plan to ~~audit~~ perform or arrange for audits of each equipment manufacturer on average once every four model years. ~~Audits~~

(iii) Starting with the 2019 model year, if you sell engines to fewer than 40 equipment manufacturers under the provisions of this section, you may ask us to approve a reduced auditing rate. We may approve an alternate plan that involves audits of each equipment manufacturer on average once every ten model years as long as you show that you have met the auditing requirements in preceding years without finding noncompliance or improper procedures.

(iv) To meet these audit requirements, you or your agent must ~~involve~~ at a minimum inspect the assembling ~~companies' facilities,~~ companies' procedures~~,~~ and production records to monitor their compliance with your instructions, ~~must include investigation of~~ investigate some assembled engines, and ~~must~~ confirm that the number of aftertreatment devices shipped were sufficient for the number of engines produced. ~~Where an equipment manufacturer is not located in the United States, you may conduct the audit at a distribution or port facility in the United States. You must keep records of these audits for five years after the end of the model year and provide a report to us describing any uninstalled or improperly installed aftertreatment components. Send us these reports within 90 days of the audit, except as specified in paragraph (d) of this section.~~

~~(iii) If you sell up to 50 engines per model year under this section, you must conduct audits as described in paragraph (a)(6)(ii) of this section or propose an alternative plan for ensuring that equipment manufacturers properly install aftertreatment devices.~~

~~(iv) If you produce engines and use them to produce equipment under the provisions of this section, you must take steps to ensure that your facilities, procedures, and production records are set up to ensure compliance with the provisions of this section, but you may meet your auditing responsibilities under this paragraph (a)(6) by maintaining a database showing how you pair aftertreatment components with the appropriate engines.~~

~~(7) Describe the following things in your application for certification:~~

~~(i) How you plan to use the provisions of this section.~~

~~(ii) A detailed plan for auditing equipment manufacturers, as described in paragraph (a)(6) of this section.~~

~~(iii) All other steps you plan to take under paragraph (a)(6) of this section.~~

~~(8) Keep records to document how many engines you produce under this exemption. Also,~~

(v) You must keep records ~~to document your contractual agreements under paragraph (a)(3) of this section. Keep all~~ of these ~~records~~ audits for five years after the end of the applicable model year ~~and make them available to us upon request~~.

~~(9) Make sure the engine has the emission control information label we require under the standard-setting~~

(e) The following provisions apply if you ship engines without air filters or other portions of the air intake system that are specifically identified by part~~. Apply an additional temporary label number~~ (or ~~tag in a way that makes it unlikely that the engine will be installed in equipment~~ other ~~than~~ specific part reference) in the application for certification such that the shipped engine is not in its certified configuration. ~~The label or tag must identify the~~ You do not need an exemption under this section to ship engines without air intake system components if you instead describe in your installation instructions how equipment manufacturers should use components meeting certain functional specifications.

(1) If you are using the provisions of this section to ship an engine without aftertreatment, apply all the provisions of this section to ensure that each engine ~~as incomplete and include a clear statement that failing to install the aftertreatment device, or otherwise bring the engine into~~, including its intake system, is in its certified configuration~~, is~~ before it reaches the ultimate purchaser.

(2) If you are not using the provisions of this section to ship an engine without aftertreatment, shipping an engine without air-intake components that you have specified as part of its certified configuration will not be a violation of ~~federal law subject to civil penalty~~ the prohibitions in §1068.101(a) if you follow the provisions specified in

paragraph (b) or paragraphs (c)(1) through (9) of this section. We may require you to perform audits as specified in paragraph (d)(3) of this section should we have reason to suspect you have employed the provisions of this section improperly.

~~(b) An engine you produce under this section becomes new when it is fully assembled, except for aftertreatment devices, for the first time. Use this date to determine the engine's model year.~~

~~(c)~~(f) Once the equipment manufacturer takes possession of an engine exempted under this section and the engine reaches the point of final equipment assembly, the exemption expires and the engine is subject to all the prohibitions in ~~40 CFR 1068.101.~~ §1068.101. Note that the engine's model year does not change based on the date the equipment manufacturer adds the aftertreatment device and/or air filter under this section.

~~(d)~~(g) You may use the provisions of this section for engines you sell to a distributor as described in this paragraph (g) using one of the following approaches:

(1) You may sell engines through a distributor if you comply with the provisions of paragraph (d) of this section with respect to the equipment manufacturer.

(2) You may treat the distributor as the equipment manufacturer as described in this paragraph (g)(2) for all applicable requirements and prohibitions, except that flexibility engine allocations normally afforded to equipment manufacturers under the provisions in §§1039.625 and 1039.626 would not apply, unless the distributor also qualifies as an equipment manufacturer under §1039.625. Such distributors must bring engines into their final certified configuration. This may include shipping the engine with the appropriate aftertreatment device and/or air filter, but without completing the assembly with all the components. The exemptions expire for such engines when the distributor no longer has control of them.

(h) You must notify us within 15 days if you find from an audit or another source that engines produced under this section are not in a certified configuration at the point of final assembly or that an equipment manufacturer has otherwise failed to meet its obligations under this section. If this occurs, send us a report describing the circumstances related to the noncompliance within 75 days after you notify us.

~~(e)~~(i) We may suspend, revoke, or void an exemption under this section, as follows:

(1) We may suspend or revoke your exemption for ~~the entire engine family if we determine that~~ a specific equipment manufacturer if any of the engines are not in ~~their~~ a certified configuration after installation in ~~the equipment, or if you fail~~ that manufacturer's equipment, or if we determine that the equipment manufacturer has otherwise failed to comply with the requirements of this section. We may also suspend or revoke your exemption for other engine families with respect to the equipment manufacturer unless you demonstrate that the noncompliance is limited to a specific engine family. You may

not use this exemption for future shipments to the affected equipment manufacturer without taking action beyond the minimum steps specified in this section, such as performing on-site audits.

(2) We may suspend or revoke your exemption for the entire engine family if we determine that you have failed to comply with the requirements of this section. If we ~~suspend or revoke~~ make an adverse decision with respect to the exemption for any of your engine families under this paragraph ~~(d)~~(i), this exemption will not apply for future certificates unless you ~~demonstrate~~ convince us that the factors causing the ~~nonconformity~~ noncompliance do not apply to the other engine families. We may ~~suspend or revoke the exemption for shipments to a single facility where final assembly occurs~~ also set additional conditions beyond the provisions specified in this section.

~~(2)~~(3) We may void your exemption for the entire engine family if you intentionally submit false or incomplete information or fail to keep and provide to EPA the records required by this section. Note that all records and reports required under this section (whether generated by the engine manufacturer, equipment manufacturer, or others) are subject to the prohibition in §1068.101(a)(2), which prohibits the submission of false or incomplete information. For example, the affidavits required by this section are considered a submission.

~~(f)~~(j) Engine manufacturers are liable for the in-use compliance, including misbuilds, of any engine that is exempt under this section.

~~(g)~~(k) It is a violation of the California Health and Safety Code, Division 26, and corresponding regulations and §1068.101(a)(1) for any person to ~~complete assembly of the~~ introduce into California commerce a previously exempted engine, including as part of a piece of equipment, without complying fully with the installation instructions.

* * * * *

§ 1068.265 What provisions apply to engines/equipment that are conditionally exempted from certification?

* * * * *

Subpart D – Imports

§ 1068.301 What general provisions apply?

{Entire section text} DELETE,
REPLACE WITH:
The provisions in Title 40, Code of Federal Regulations, §1068 Subpart D (76 FR 37977, June 28, 2011) apply for equipment introduced into commerce in California, but produced outside the United States. ARB may seek independent enforcement action against manufacturers for violations of this subpart D per the provisions of California

Health and Safety Code, Division 26, and corresponding regulations, which may include civil penalties and/or the revoking of Executive Orders.

§ 1068.305 How do I get an exemption or exclusion for imported engines/equipment?

{Entire section text} DELETE,
REPLACE WITH:
The provisions in §1068.301 apply.

* * * * *

(e) ADD:
~~(f)~~(e) For any engine whose destination is California, send the completed form to the Executive Officer of the Air Resources Board.

§ 1068.310 What are the exclusions for imported engines/equipment?

{Entire section text} DELETE,
REPLACE WITH:
The provisions in §1068.301 apply.

§ 1068.315 What are the permanent exemptions for imported engines/equipment?

{Entire section text} DELETE,
REPLACE WITH:
The provisions in §1068.301 apply.

§ 1068.320 How must I label an imported engine with a permanent exemption?

DELETE:

§ 1068.325 What are the temporary exemptions for imported engines/equipment?

{Entire section text} DELETE,
REPLACE WITH:
The provisions in §1068.301 apply.

§ 1068.330 DELETE.

§ 1068.335 What are the penalties for violations?

{Entire section text} DELETE,
REPLACE WITH:
The provisions in §1068.301 apply.

* * * * *

ADD:
(c) Under § 43017 of the California Health and Safety Code, the Air Resources Board may enjoin any violation of any provision of Subpart D of this part 1068.

§ 1068.360 What restrictions apply to assigning a model year to imported engines and equipment?

{Entire section text} DELETE,
REPLACE WITH:
The provisions in §1068.301 apply.

Subpart E – Selective Enforcement Auditing

§ 1068.401 What is a selective enforcement audit?

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§ 1068.405 What is in a test order?

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§ 1068.410 How must I select and prepare my engines?

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(e)(1) DELETE,
REPLACE WITH:
(e)(1) ~~We may adjust or require you to adjust idle speed outside the physically adjustable range as needed until the engine has stabilized emission levels (see paragraph (f) of this section). We may ask you for information needed to establish an alternate minimum idle speed.~~ [Reserved]

* * * * *

(f) DELETE,
REPLACE WITH:
(f) Stabilizing emission levels. (1) Before you test production-line engines, you may operate the engine to stabilize the emission levels. Using good engineering judgment, operate your engines in a way that represents the way production engines will be used. You may operate each engine for no more than the greater of two periods:

(~~1~~i) 50 hours.

(~~2~~ii) The number of hours you operated your emission-data engine for certifying the engine family (see 40 CFR part 1065, subpart E, 76 FR 37977, June 28, 2011, 2010).

(2) [Reserved]

* * * * *

§ 1068.415 How do I test my engines?

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(d) DELETE,
REPLACE WITH:
(d) Accumulate service on test engines at a minimum rate of 6 hours per engine during each 24-hour period. The first 24-hour period for service accumulation begins when you finish preparing an engine for testing. The minimum service accumulation rate does not apply on weekends or holidays. You may ask us to approve a lower service accumulation rate. We may require you to accumulate hours more rapidly than the minimum rate, as appropriate. Plan your service accumulation to allow testing at the rate specified in paragraph (c) of this section. Select engine operation for accumulating operating hours on your test engines to represent normal in-use engine operation for the engine family.

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§ 1068.420 How do I know when my engine family fails an SEA?

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§ 1068.425 What happens if one of my production-line engines exceeds the emission standards?

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§ 1068.430 What happens if an engine family fails an SEA?

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(c) DELETE,
REPLACE WITH:
(c) ~~Up to 15 days after we suspend the certificate for an engine family, y~~ You may ask for a hearing to determine whether the tests and sampling methods were proper (see subpart G of this part)~~.~~ up to 15 days after we suspend the Executive Order for a family. If we agree ~~before a hearing~~ that we used erroneous information in deciding to suspend the Executive Order before a hearing is held, we will reinstate the Executive Order.

§ 1068.435 May I sell engines from an engine family with a suspended Executive Order?

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§ 1068.440 How do I ask ARB to reinstate my suspended Executive Order?

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§ 1068.445 When may ARB revoke my Executive Order under this subpart and how may I sell these engines again?

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§ 1068.450 What records must I send to ARB?

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§ 1068.455 What records must I keep?

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Appendix A to Subpart E of Part 1068-Plans for Selective Enforcement Auditing

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Subpart F – Reporting Defects and Recalling Engines/Equipment

§ 1068.501 How do I report emission-related defects?

{Entire section text} DELETE,
REPLACE WITH:
The provisions in Title 40, Code of Federal Regulations, §1068.501 (76 FR 37977, June 28, 2011) apply.

§ 1068.505 How does the recall program work?

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§ 1068.510 How do I prepare and apply my remedial plan?

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§ 1068.515 How do I mark or label repaired engines/equipment?

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§ 1068.520 How do I notify affected owners?

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§ 1068.525 What records must I send to ARB?

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§ 1068.530 What records must I keep?

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§ 1068.535 How can I do a voluntary recall for emission-related problems?

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Subpart G – Hearings

§ 1068.601 What are the procedures for hearings?

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Appendix I to Part 1068 – Emission-Related Components

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Appendix II to Part 1068 – Emission-Related Parameters and Specifications

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PART 8

FINAL REGULATION ORDER TEST PROCEDURES

Part I – E (Part 1065)

(2011 and Later Model Years)

Tier 4 Off-Road Compression-Ignition Engines

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FINAL REGULATION ORDER TEST PROCEDURES

NOTE: This appendix shows the entirety of regulatory amendments to the test procedures titled below, which were approved by the Air Resources Board on December 16, 2011, and refined via subsequent conforming modifications authorized under Resolution 11-41. Incorporated by reference into these test procedures are portions of 40 Code of Federal Regulations (CFR) Part 1065, Subparts A, B, C, D, E, F, G, H, I, J, and K, as amended June 28, 2011, and the subparts of 40 CFR Part 60, 40 CFR Part 85, 40 CFR Part 86, 40 CFR Part 89, 40 CFR Part 92, and 40 CFR Part 1033 that are internally referenced within 40 CFR Part 1065. Sections that have been included in their entirety are set forth with the section number and title. California provisions that replace specific federal language provisions are denoted by the words “DELETE” for the federal language and “REPLACE WITH” or “ADD” for the California language. The notation [* * * * *] or [...] means that the remainder of the CFR text for a specific section is not shown in these procedures but has been incorporated by reference, with only the printed text changed. CFR sections that are not listed are not part of the test procedures. If there is any conflict between the provisions of this document and the California Health and Safety Code, Division 26, or Title 13 of the California Code of Regulations (CCR), the Health and Safety Code and Title 13 apply.

This document is all newly adopted text.

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State of California

AIR RESOURCES BOARD

California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines

PART I-E

Adopted: October 25, 2012

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CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2011 AND LATER TIER 4 OFF-ROAD COMPRESSION-IGNITION ENGINES

The following provisions of Part 1065, Title 40, Code of Federal Regulations, as promulgated by the United States Environmental Protection Agency on the date listed, are adopted and incorporated herein by this reference for 2011 model year and later off-road compression-ignition engines as the California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, Part I-E, except as altered or replaced by the provisions set forth below.

PART 1065 – ENGINE-TESTING PROCEDURES

SOURCE: 76 FR 37977.

Subpart A – Applicability and General Provisions

§ 1065.1 Applicability.

(a)(1) DELETE,

REPLACE WITH:

(a)(1) Reserved.

(a)(2) DELETE,

REPLACE WITH:

(a)(2) Reserved.

(a)(3) DELETE,

REPLACE WITH:

(a)(3) Land-based off-road compression-ignition engines regulated under Title 13, CCR, Chapter 9, Article 4, and subject to the emission standards in § 2423(b)(1)(B) of that Article.

(a)(4) DELETE,

REPLACE WITH:

(a)(4) Reserved.

(a)(5) DELETE,

REPLACE WITH:

(a)(5) Reserved.

(a)(6) DELETE,

REPLACE WITH:

(a)(6) Reserved.

(a)(7) DELETE,

REPLACE WITH:

(a)(7) Reserved.

(a)(8) DELETE,

REPLACE WITH:

(a)(8) Reserved.

* * * * *

(g) DELETE.

§ 1065.2 Submitting information to ARB under this part.

* * * * *

§ 1065.5 Overview of this part 1065 and its relationship to the standard-setting part.

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§ 1065.10 Other procedures.

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§ 1065.12 Approval of alternate procedures.

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§ 1065.125 Engine intake air.

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§ 1065.130 Engine exhaust.

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§ 1065.140 Dilution for gaseous and PM constituents.

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§ 1065.145 Gaseous and PM probes, transfer lines, and sampling system components.

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§ 1065.150 Continuous sampling.

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§ 1065.170 Batch sampling for gaseous and PM constituents.

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§ 1065.205 Performance specifications for measurement instruments.

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§ 1065.245 Sample flow meter for batch sampling.

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§ 1065.695 Data requirements.

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Subpart H – Engine Fluids, Test Fuels, Analytical Gases and Other Calibration Standards

§ 1065.701 General requirements for test fuels.

* * * * *

(b) DELETE,

REPLACE WITH:

With Executive Officer approval, the certifying entity may use other test fuels so long as they do not affect the demonstration of compliance.

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§ 1065.703 Distillate diesel fuel.

* * * * *

ADD:

(d) The Executive Officer may allow other fuel specifications, such as California diesel fuel, so long as they do not affect the demonstration of compliance.

§ 1065.705 Residual and intermediate residual fuel.

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§ 1065.710 Gasoline.

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§ 1065.715 Natural gas.

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§ 1065.720 Liquefied petroleum gas.

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§ 1065.740 Lubricants.

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§ 1065.745 Coolants.

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§ 1065.750 Analytical gases.

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§ 1065.790 Mass standards.

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Subpart I – Testing with Oxygenated Fuels

§ 1065.801 Applicability.

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§ 1065.805 Sampling system.

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§ 1065.845 Response factor determination.

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§ 1065.850 Calculations.

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Subpart J – Field Testing and Portable Emission Measurement Systems

§ 1065.901 Applicability.

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§ 1065.905 General provisions.

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§ 1065.910 PEMS auxiliary equipment for field testing.

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§ 1065.915 PEMS instruments.

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§ 1065.920 PEMS Calibrations and verifications.

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§ 1065.925 PEMS preparation for field testing.

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§ 1065.930 Engine starting, restarting, and shutdown.

* * * * *

§ 1065.935 Emission test sequence for field testing.

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§ 1065.940 Emission calculations.

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Subpart K – Definitions and Other Reference Information

§ 1065.1001 Definitions.

ADD:

40 CFR part 1039 or Part 1039 means Part 1039 and applicable subparts of the California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, PART I-D, when referenced in unrevised (i.e., " * * * * * * ") sections. When referenced in revised sections, the term 40 CFR part 1039 refers to the federal regulations of the same title, last amended on June 28, 2011.

ADD:

40 CFR part 1065 or Part 1065 means Part 1065 and applicable subparts of the California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, PART I-E, when referenced in

unrevised (i.e., " * * * * * * ") sections. When referenced in revised sections, the term 40 CFR part 1065 refers to the federal regulations of the same title, last amended on June 28, 2011.

ADD:

40 CFR part 1068 or Part 1068 means Part 1068 and applicable subparts of the California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, PART I-F, when referenced in

unrevised (i.e., " * * * * * * ") sections. When referenced in revised sections, the term 40 CFR part 1068 refers to the federal regulations of the same title, last amended on June 28, 2011.

* * * * *

Designated Compliance Officer DELETE.

REPLACE WITH:

Designated Compliance Officer means the Executive Officer of the Air Resources Board, or a designee of the Executive Officer.

* * * * *

ADD:

ADDENDUM: The definitions in §1039.801 of the California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, PART I-D, apply.

§ 1065.1005 Symbols, abbreviations, acronyms, and units of measure.

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§ 1065.1010 Reference materials.

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State of California
AIR RESOURCES BOARD

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 2001 MODEL YEAR AND LATER SPARK-IGNITION MARINE ENGINES

Adopted: October 21, 1999
Amended: June 6, 2002
Amended: September 22, 2006
Amended: June 5, 2009

FINAL REGULATION ORDER TEST PROCEDURES

Note: This document is printed in a style to indicate changes from the existing provisions. All existing language is indicated by plain type. All additions to language are indicated by underlined text. All deletions to language are indicated by ~~strikeout~~. Only those portions containing the suggested modifications from the existing provisions are included. All other portions remain unchanged and are indicated by the symbol "* * * * *" for reference.

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES
FOR 2001 MODEL YEAR AND LATER SPARK-IGNITION MARINE ENGINES

Part I. Emission Regulations for 2001 and Later New Spark-Ignition Marine Engines, General Provisions.

* * * * *

2. Definitions.

* * * * *

"Rebuild" or "Rebuilding" refers to a major overhaul in which you replace the engine's pistons or power assemblies or make other changes that significantly increase the service life of the engine. It also includes replacing or rebuilding an engine's turbocharger or aftercooler or the engine's systems for fuel metering or electronic control so that it significantly increases the service life of the engine. For these provisions, rebuilding may or may not involve removing the engine from the equipment. Rebuilding does not normally include scheduled emission-related maintenance as allowed in Part I, subsection 7. of these Test Procedures during the useful life period (such as replacing fuel injectors) or unscheduled maintenance that occurs commonly within the useful life period. For example, replacing a water pump is not rebuilding an engine.

* * * * *

6. Defeat Devices, Prohibition.

(a)

* * * * *

(b) Defeat device means any element of design that:

* * * * *

(2) Reduces the effectiveness of the emission control system under conditions that may reasonably be expected to be encountered in normal equipment operation and use, unless:

~~(i)~~(A) Such conditions are substantially included in the test procedure; or,

~~(ii)~~(B) The need for the device is justified in terms of protecting the spark-ignition marine engine against damage or accident; or,

~~(iii)~~(C) The device does not go beyond the requirements of engine starting or warm-up.

~~7. [Reserved].~~

7. Practices for Rebuilding Engines.

(a) These requirements apply to anyone rebuilding an engine subject to this part, but the recordkeeping requirements in paragraphs (h) and (i) of this section apply only to businesses. For maintenance or service that is not rebuilding, including any maintenance related to evaporative emission controls, changes may not be made that might increase emissions of any pollutant, but recordkeeping is not required.

(b) Anyone rebuilding an engine or engine system must have a reasonable technical basis for knowing that the rebuilt engine's emission control system performs as well as, or better than, it performs in its certified configuration. The model year of the resulting engine configuration must be identified. A reasonable technical basis is met under two main conditions:

(1) Install parts—new, used, or rebuilt—so a person familiar with engine design and function would reasonably believe that the engine with those parts will control emissions of all pollutants at least to the same degree as with the original parts. For example, it would be reasonable to believe that parts performing the same function as the original parts (and to the same degree) would control emissions to the same degree as the original parts.

(2) Adjust parameters or change design elements only according to the original engine manufacturer's instructions. To differ from these instructions requires verifiable data or some other technical basis to show that an increase in in-use emissions would not result.

(c) If the rebuilt engine remains installed or is reinstalled in the same piece of equipment, it must be rebuilt to the original configuration or another certified configuration of the same or later model year.

(d) If the rebuilt engine replaces another certified engine in a piece of equipment, it must be rebuilt to a certified configuration of the same model year as, or a later model year than, the engine being replaced.

(e) Emission-related codes or signals from onboard monitoring systems must not be erased or reset without diagnosing and responding appropriately to any diagnostic codes. This requirement applies regardless of the manufacturer's reason for installing the monitoring system and regardless of its form or interface. Upon returning the rebuilt engine into service, clear any codes from the diagnostic systems. Do not disable a diagnostic signal without addressing its cause.

(f) When rebuilding an engine, check, clean, adjust, repair, or replace as needed all emission-related components (listed in § 2445.1., title 13, CCR) according to the original manufacturer's recommended practice. In particular, replace oxygen sensors, replace

the catalyst if there is evidence of malfunction, clean gaseous fuel-system components, and replace fuel injectors (if applicable), unless there exists a reasonable technical basis for believing that any of these components do not need replacement.

(g) When installing an engine that was rebuilt by another source, the installer must check all emission-related components listed in § 2445.1., title 13, CCR, as needed, according to the original manufacturer's recommended practice.

(h) Businesses must keep at least the following records:

(1) Identify the hours of operation (or mileage, as appropriate) at time of rebuild.

(2) Identify the work done on the engine or any emission-related control components, including a listing of parts and components used.

(3) Describe any engine parameter adjustments.

(4) Identify any emission-related codes or signals responded to and reset.

(i) Records must be available or made available upon request. Records must be kept for at least two years after rebuilding an engine. Records may be kept in any format that is readily reviewable.

(1) Keeping information that is not reasonably available through normal business practices is not expected..

(2) Keeping records of what other companies do is not necessary.

(3) Keeping records based on families rather than individual engines is allowable.

8. Replacement Engines.

~~No new spark-ignition marine engines may be produced for sale to replace spark-ignition marine engines in pre-2001 model year equipment after the 2004 model year, unless those engines comply with the 2001 model year emission standards.~~

A new spark-ignition marine engine produced solely to replace an engine originally manufactured in accordance with the requirements of § 2442 shall be identical in specifications to the most stringent certified emissions configuration currently available that can be installed in a vessel or personal watercraft without unreasonable modifications, as determined by the Executive Officer. A new replacement engine with emissions performance less than maximum stringency shall be allowed only if all engines of greater stringency are incompatible with the vessel or personal watercraft and so long as the emissions performance of the new replacement engine is at least as stringent as that of the engine being replaced. New replacement engines that do not comply with current year emission requirements must be labeled as follows:

"SALE OR INSTALLATION OF THIS ENGINE FOR ANY PURPOSE OTHER THAN TO REPLACE AN ENGINE OF SIMILAR OR LESS STRINGENT EMISSIONS PERFORMANCE IS A VIOLATION OF CALIFORNIA LAW SUBJECT TO CIVIL PENALTY."

9. Exhaust Emission Standards for 2001 and Later Spark-Ignition Marine Engines

* * * * *

Table 1.1
Corporate Average Emission Standards by Implementation Date
$HC+NO_x$ (g/kW-hr)

Model Year	Max. Family Emission Limit (FEL)	$P_{tx} < 4.3$ kW[1]	$P_{tx} \geq 4.3$ kW[1]
2001-2003	Not Applicable	81.00	$(0.25 \times (151+557/P_{tx}^{0.9})) + 6.0$
2004-2007	80	64.80	$(0.20 \times (151+557/P_{tx}^{0.9})) + 4.8$
2008 and Later[2]	44	30.00	$(0.09 \times (151+557/P_{tx}^{0.9})) + 2.1$

1. For 2010 and subsequent model years, an engine or engine family's power category is based on maximum engine power; otherwise maximum rated power may be used.
2. For 2010 and subsequent model years, standards are measured in total hydrocarbons plus oxides of nitrogen.

Table 1.2
Carbon Monoxide Exhaust Emission Standards

ENGINE CATEGORY	MODEL YEAR	POWER CATEGORY[1] *[kilowatts]*	CO STANDARD *[grams per kilowatt-hour]*
OB/PWC[2]	2010 and later	kW ≤ 40	500 - 5 x P[3]
		kW > 40	300.0[3]

1. For 2010 and subsequent model years, an engine or engine family's power category is based on maximum engine power; otherwise maximum rated power may be used.
2. Abbreviation for "Outboard and Personal Water Craft" engines
3. P is defined as maximum rated power or maximum engine power (see footnote 1) in kilowatts (kW)

* * * * *

(2) An engine manufacturer may comply with the standards directly on an individual engine family basis. Consequently in Table 1.1, FELs are not applicable for any model year and P_{tx} means the average power in kW (sales-weighted) of the subject engine family produced for sale in California in model year x.

Compliance with the $HC+NO_x$ standards on a corporate average basis is determined as follows:

$$\frac{\sum_{j=1}^{n}(PROD_{jx})(FEL_{jx})(P_{jx})}{\sum_{j=1}^{n}(PROD_{jx})(P_{jx})} = STD_{ca}$$

where:

n	=	total number of engine families (by category)
$PROD_{jx}$	=	number of units each engine family j produced for sale in California in model year x.
FEL_{jx}	=	the Family Emission Limit (FEL) for engine family j in model year x, which must be determined by the engine manufacturer subject to the following conditions: (1) no individual engine family FEL shall exceed the maximum allowed value as specified in Table 1.1; (2) no engine family designation or FEL shall be amended in a model year unless the engine family is recertified; and (3) prior to sale or offering for sale in California, each engine family must be certified in accordance with the test procedures referenced in section 2447 and must meet the engine manufacturer's FEL as a condition of the Executive Order. Before certification, the engine manufacturer must also submit estimated production volumes for each engine family to be offered for sale in California.
P_{jx}	=	the average power in kW (sales-weighted) of engine family j produced for sale in California in model year x. Engine power must be calculated using SAE standard J1228, November 1991, incorporated herein by reference.
STD_{ca}	=	an engine manufacturer's calculated corporate average $HC+NO_x$ exhaust emissions from those

California spark-ignition marine engines subject to the California corporate average $HC+NO_x$ exhaust emission standard determined from Table 1.1, as established by an Executive Order certifying the California production for the model year. This Executive Order must be obtained prior to the issuance of certification Executive Orders for individual engine families for the model year.

* * * * *

(b) Model year 2003 and later model year spark-ignition inboard and sterndrive marine engines:

(1) Exhaust emissions from all new model year 2003 and later spark-ignition ~~inboard and sterndrive~~sterndrive/inboard marine engines must not exceed the ~~exhaust~~ emission standards listed in Table 2.1(a) for standard performance engines and 2.1(b) for high performance engines, for the designated emission durability test period.

(A) Prior to Model Year 2007 certification, each engine manufacturer must select either Option 1 (OPT 1) or Option 2 (OPT 2) for its entire production of standard performance engines for the 2007 and 2008 model years.

Table 2.1(a)
Standard Performance ~~Inboard/Sterndrive~~/Inboard Marine Engine Standards

ODEL /EAR	~~RATED~~ POWER CATEGORY[1] [kilowatts]	COMPLIANCE OPTION[12]	DURABILITY [hours / years]	EXHAUST STANDARDS ~~NMHC[23]~~+NO_x [grams per kilowatt-hour]	TYPE[34]	CO [grams per kilowatt-hour]	SUPPLEMENTAL MEASURE[45]
2003 - 2006	kW ≤ 373	N/A	N/A	16.0	AVE[6]	N/A	None
2007	kW ≤ 373	OPT 1	N/A	16.0 (55%)	AVE[6]		None
			480 / 10	5.0 (45%)	FIXED		
		OPT 2	N/A	14.0	FIXED		Low-Permeation Fuel Line Hoses
2008	kW ≤ 373	OPT 1	N/A	16.0 (25%)	AVE[6]		None
			480 / 10	5.0 (75%)	FIXED		
		OPT 2	480 / 10	5.0	FIXED		Low-Permeation Fuel Line Hoses
2009 nd later	kW ≤ 373	N/A	480 / 10	5.0[6,7,8]	FIXED	75.0[7,9]	Carryover[7,10]
	~~373 < kW ≤ 485~~		~~150[5] / 3~~	~~5.0[6]~~	~~AVE~~		
	~~kW > 485~~		~~50[5] / 1~~	~~5.0[6]~~	~~AVE~~		

otes:
For 2010 and subsequent model years, an engine or engine family's power category is based on maximum engine power; otherwise maximum rated power may be used
2. Once a manufacturer has chosen an option, that option must continue to be used exclusively across product lines
3. ~~The non-methane component of hydrocarbon~~For 2010 and subsequent model years, standards are measured in total hydrocarbons plus oxides of nitrogen; however, the non-methane component of hydrocarbon may be substituted in prior years
4. Corporate averaging (AVE) may be used to demonstrate compliance with the exhaust emission standard, except where a FIXED standard is required
5. Supplemental measures may be different than shown, but must provide equal and verifiable emission reductions to those indicated
~~For the purpose of durability testing, engine components that have been approved with an hourly warranty period shorter than the full hourly durability period per § 2445.1 (c)(3)(C)4. may be replaced at the specified warranty interval~~
The corporate average calculation may be met with or without power weighting for these years
7. ~~All engines ≤ 373 kW must meet a 5.0 g/kW-hr NMHC+NO_x capping standard. For engines > 373 kW, the standard may be met by sales averaging with engines equal to or less than 373 kW~~A single engine family certified under the discontinuation allowance in § 2442(g)(2) may continue to meet current certification levels for HC+NO_x and no more than 150 g/kW-hr for CO over the engine's useful life provided that the manufacturer certifying such an engine family also certifies one or more engine families to family emissions limits sufficiently low to enable compliance on a corporate average basis
Large volume manufacturers that produce high performance engines and qualified intermediate volume manufacturers are required to certify one or more engine families to a family emissions limit lower than the HC+NO_x standard when complying with high performance engines on a corporate average basis
Standard performance engines ≥ 6.0 liter displacement may alternatively meet a 25 g/kW-hr standard for Modes 2-5 of the ISO 8178-4 E4 marine test cycle
10. The same or better supplemental emission control hardware used to ~~meet the standard~~ comply in 2007 must be used every model year thereafter and all fuel hoses (i.e., not just ne fuel line hose) must be low-permeation hoses

(B) At the time of, or prior to, model year 2009 certification, each large volume manufacturer that intends to produce high performance engines or qualified intermediate volume manufacturer must declare whether it will comply with the high performance exhaust standard of 5.0 g/kW-hr HC+NO_x through averaging or whether it will comply with the less stringent small volume high performance HC+NO_x exhaust standard through the incorporation of enhanced evaporative control systems on vessels using standard performance engines for 2009 and subsequent model year engine production.

Table 2.1(b)
High Performance Sterndrive/Inboard Marine Engine Standards

MODEL YEAR	POWER[a] CATEGORY *[kilowatts]*	DURABILITY *[hours / years]*	HC^b+NO_x STANDARD *[grams per kilowatt-hour]*		CO STANDARD *[grams per kilowatt-hour]*
			Small Volume Manufacturers or Intermediate Volume Manufacturers that are not Qualified Intermediate Volume Manufacturers	Large Volume or Qualified Intermediate Volume Manufacturers	
2009 - 2010	373 < kW ≤ 485	150[c] / 3	16.0[d]	5.0[e]	350.0[d]
	kW > 485	50[c] / 1	25.0[d]		
2011 and later	373 < kW ≤ 485	150[c] / 3	16.0[d]	5.0[e]	350.0[d]
	kW > 485	50[c] / 1	22.0[d]		

a. For 2010 and subsequent model years, an engine or engine family's power category is based on maximum engine power; otherwise maximum rated power may be used

b. For 2010 and subsequent model years, standards are measured in total hydrocarbons plus oxides of nitrogen; however, the non-methane component of hydrocarbon may be substituted in prior years

c. For the purpose of durability testing, engine components that have been approved with an hourly warranty period shorter than the full hourly durability period per § 2445.1 (c)(3)(C)4. may be replaced at the specified warranty interval

d. These standards are fixed except that engine families certified under the discontinuation allowance in Title 13, California Code of Regulations, § 2442(g)(2) may continue to meet current certification levels for $HC+NO_x$ over the engine's useful life provided that the manufacturer certifying such an engine family also certifies one or more engine families to family emissions limits sufficiently low to enable compliance on a corporate average basis

e. This standard may be met on a corporate average basis between high performance engines and/or between standard performance and high performance engines. Alternately, large volume manufacturers that produce high performance engines and qualified intermediate volume manufacturers may comply with the exhaust standards for small volume manufacturers provided a sufficient number of vessels with the manufacturer's standard performance engines are equipped with enhanced evaporative control systems as noted in Title 13, California Code of Regulations, § 2442(b)(5). Manufacturers must declare their intent to use this alternative prior to certifying engines for the 2009 model year and must continue to certify future model year engines using this alternative exclusively across product lines

~~(A)~~(C) No crankcase emissions shall be discharged into the ambient atmosphere from 2003 and later spark-ignition sterndrive/inboard ~~and sterndrive~~ marine engines.

~~(B)~~(D) Production and sale of spark-ignition marine engines that result in noncompliance with the California standard for the model year shall cause an engine manufacturer to be subject to: revocation or suspension of Executive Orders for the applicable engine families; enjoinment from any further sales, or distribution, of such noncompliant engine families, in the State of California pursuant to section 43017 of the Health and Safety Code; and all other remedies available under Part 5, Division 26 of the Health and Safety Code. Before seeking remedial action against the engine manufacturer, the Executive Officer will consider any information provided by the equipment manufacturer.

~~(C)~~(E) For each engine family, the engine manufacturer shall submit the total number of engines produced for sale in California, or the total number of engines produced for sale nationally, ninety (90) days after the end of the model year.

(2) Evaporative Requirements for All High Performance Engine Manufacturers and Boat Manufacturers:

(A) For 2009 and subsequent model year engines, each engine manufacturer must provide written instructions, as part of the installation materials provided to boat manufacturers, to use enhanced evaporative control systems on any boat that is manufactured for sale, sold, or offered for sale in California, or that is introduced, delivered or imported into California for introduction into commerce. The engine manufacturer shall also provide evidence to the Executive Officer, as part of its application for certification, that the supplier(s) of the enhanced evaporative control system has designed the system components to meet or exceed the diurnal and permeation design specifications listed in Table 2.2 throughout the useful life of the engine.

Table 2.2 Sterndrive/Inboard Marine Evaporative Design Specifications

	PERMEATION STANDARDS[1] *[grams per square meter per day]*	DIURNAL STANDARD[2] *[grams per gallon per day]*	TEST TEMPERATURES *[degrees Celsius]*
Fuel Hoses	15.0	—	23 ± 2
Fuel Tank	1.5	—	28 ± 2
Trailerable Boat	—	0.40	25.6 – 32.2
Nontrailerable Boat	—	0.16	27.6 – 30.2

1. Fuel hoses and tank permeation testing requires fuel with 10% ethanol content.
2. Diurnal testing requires fuel with 9 pounds per square inch (psi) Reid Vapor Pressure volatility and a 24-hour fuel temperature cycle.

(B) For 2009 and subsequent model year engines, each boat manufacturer must install an enhanced evaporative control system on every boat that is manufactured for sale, sold, or offered for sale in California that uses a high performance engine.

(3)~~(2)~~ Compliance with the standards on a corporate averaging basis is calculated as follows:

$$\frac{\sum_{j=1}^{n}(PROD_{jx})(EL_{jx})}{\sum_{j=1}^{n}(PROD_{jx})} = Corporate\ \ Average$$

$$\frac{\sum_{j=1}^{n}(PROD_{jx})(EL_{jx})(P_{jx})}{\sum_{j=1}^{n}(PROD_{jx})(P_{jx})} = \text{Corporate Average}$$

where:

n = Total number of engine families available for averaging.

$PROD_{jx}$ = Number of engines in engine family j produced for sale in California in model year x.

EL_{jx} = The measured ~~NMHC~~+NO_x emission levels for engine family j in model year x~~; or for engines > 485 kW, the manufacturer may choose to use 30 g/kW-hr as per paragraph (F) below~~.

P_{jx} = The average power in kW (sales-weighted) of engine family j produced for sale in California in model year x. Engine power must be calculated using SAE standard J1228, November 1991, incorporated herein by reference.

(A) During the engine manufacturer's production year, for each engine family, the engine manufacturer shall provide the Executive Officer within 45 days after the last day in each calendar quarter the total number of spark-ignition marine engines produced for sale in California and their applicable EL(s).

(B) The Executive Order certifying the California production for a model year must be obtained prior to the issuance of certification Executive Orders for individual engine families for the model year.

(C) The engine manufacturer's average ~~NMHC~~+NO_x exhaust emissions must meet the corporate average standard at the end of the engine manufacturer's production for the model year. At the end of the model year, the manufacturer must calculate a corrected corporate average using sales or eligible sales rather than projected sales.

(D) Production and sale of spark-ignition marine engines that result in noncompliance with the California standard for the model year shall cause an engine manufacturer to be subject to: revocation or suspension of Executive Orders for the applicable engine families; enjoinment from any further sales, or distribution, of such noncompliant engine families, in the State of California pursuant to section 43017 of the Health and Safety Code; and all other remedies

available under Part 5, Division 26 of the Health and Safety Code. Before seeking remedial action against the engine manufacturer, the Executive Officer will consider any information provided by the engine manufacturer.

(E) For each engine family, the engine manufacturer shall submit California sales data within one hundred eighty (180) days after the end of the model year.

~~(F) Engines exceeding 485 kilowatts maximum rated power: In lieu of exhaust emission testing, manufacturers may certify using a default exhaust emissions level of 30.0 grams per kilowatt hour of NMHC+NO_x in their corporate averaging calculation.~~

~~(3)~~ (4) Alternate Requirements for Standard Performance Manufacturers:

(A) Requirements of engine manufacturers and boat manufacturers under Option 2 and using Low Permeation Fuel Line Hose:

> ~~(A)~~1. Each engine manufacturer that chooses Option 2 must provide written instructions, as part of the installation materials provided to purchasers of the engine, to use Low Permeation Fuel Line Hose for the primary fuel line connecting the fuel tank to the engine of any boat that is manufactured for sale, sold, or offered for sale in California, or that is introduced, delivered or imported into California for introduction into commerce.
>
> ~~(B)~~2. Each boat manufacturer must install Low Permeation Fuel Line Hose for the primary fuel line connecting the fuel tank to the engine of any boat that is manufactured for sale, sold, or offered for sale in California that uses an engine from a manufacturer that chooses Option 2.

~~(4)~~(B) Supplemental Measures. Prior to Model Year 2007 certification, manufacturers choosing Option 2 may request Executive Officer approval of a supplemental measure as an alternative to meeting the requirements of paragraph (b)(3). In determining whether to approve a request, the Executive Officer will consider the following:

> ~~(A)~~1. Whether the proposed supplemental measure would achieve reductions in ~~NM~~HC+NO_x equivalent to using Low Permeation Fuel Line Hoses,
>
> ~~(B)~~2. The engine manufacturer's measures to ensure successful implementation of the proposed supplemental measure,
>
> ~~(C)~~3. The durability of the proposed supplemental measure, and
>
> ~~(D)~~4. Any additional information the Executive Officer deems relevant.

(5) Alternate Requirements for Large Volume and Qualified Intermediate Volume Manufacturers.

In lieu of complying with the 5.0 g/kW-hr HC+NOx exhaust standard in Table 2.1(b) for high performance engines, a large volume or qualified intermediate volume engine manufacturer may certify high performance engines to the same HC+NOx exhaust standards as required for small volume manufacturers in Table 2.1(b) provided that they do either (A) or (B):

(A) The manufacturer ensures that a sufficient number of boats using standard performance engines are equipped with enhanced evaporative control systems to fully compensate for the change in emission benefits from allowing compliance to the less stringent standard. Unless a lower percentage is demonstrated sufficient by the certifying manufacturer, a minimum of fifteen percent annually of the manufacturer's standard performance engine production for California must be installed in boats equipped with enhanced evaporative control systems. Beginning with the 2009 model year and for all model years thereafter, the following would apply:

1. Each engine manufacturer must provide written instructions, as part of the installation materials provided to purchasers of the engine, to use enhanced evaporative control systems on any boat that is manufactured for sale, sold, or offered for sale in California, or that is introduced, delivered or imported into California for introduction into commerce that uses a standard performance engine intended to qualify the engine manufacturer to certify its high performance engines using the HC+NOx standards intended for small volume high performance manufacturers in Table 2.1(b) of this section. The engine manufacturer shall also provide evidence to the Executive Officer, as part of its application for certification, that the supplier(s) of the enhanced evaporative control system has designed the system components to meet or exceed the diurnal and permeation design specifications listed in Table 2.2 throughout the useful life of the engine.

2. Each boat manufacturer must install an enhanced evaporative control system on every boat that is manufactured for sale, sold, or offered for sale in California that uses a standard performance engine

intended to qualify the engine manufacturer to certify its high performance engines using the $HC+NO_x$ standards intended for small volume high performance manufacturers in Table 2.1(b) of this section.

(B) The manufacturer reduces by other means emissions sufficient to fully compensate for the change in emission benefits from allowing compliance to the less stringent standard.

1. The manufacturer must submit a plan prior to certification of any high performance engine family. The Executive Officer must approve a plan before certifying any of the manufacturer's engine families. To be approved, the plan must meet the following criteria:

   i. The total emissions benefit of the measures must provide reductions equivalent to the 5.0 g/kw-hr $HC+NO_x$ standard.

   ii. The emissions reductions achieved from the measures must be verifiable.

   iii. The measures must be enforceable.

   iv. Except as allowed by Sections 2442(g)(2), or 2442(g)(3), no engine families can exceed the emissions standards in 2442(b).

   v. The plan must include backstop provisions to be followed in the event that a measure or measures are not able to be fully implemented.

2. If the manufacturer does not implement the plan as approved, the Executive Officer may rescind certification of the affected engine families until a revised plan is approved.

(c) Not-to-Exceed (NTE) Limits

Exhaust emissions from all new model year 2010 and later spark-ignition marine engines subject to the standards in Tables 1.1, 1.2, and 2.1(a) of 13 CCR § 2442, and measured according to the methods in Part I, section 20., paragraph (c) of these Test Procedures, must not exceed the applicable NTE limits defined as follows:

(1) NTE limits are calculated for each pollutant as the product of the individual standard (STD) for that pollutant and the applicable NTE multiplier (M). The mathematical expression of this equation is "NTE Limit = (STD) × (M)."

(A) (STD) is defined as either:

1. the emission standard specified in Tables 1.1, 1.2, or 2.1(a) of 13 CCR § 2442 for each pollutant for an engine family not certified using averaging, or;

2. the FEL (or corporate averaging equivalent) for each pollutant for an engine family certified using any form of averaging.

(B) (M) is defined as follows:

1. For engine families certified with a catalytic converter, the values listed in Table 2.3 below shall apply across the applicable zone specified in Part I, section 20., paragraph (c) of these Test Procedures; or

Table 2.3
NTE Multipliers for Catalyst-Equipped Engines

Pollutant	Subzone 1	Subzone 2
$HC+NO_x$	1.50	1.00
CO	N/A	1.00

2. For two-stroke engine families certified without a catalytic converter, the values listed in Table 2.4 below shall apply. Compliance with the NTE Limits for these engine families shall be based on the weighted discrete mode emissions measurement method specified in Part I, section 20., paragraph (c) of these Test Procedures; or

Table 2.4
NTE Multipliers for Two-Stroke Engines without Catalysts

Pollutant	All Test Points
$HC+NO_x$	1.2
CO	1.2

3. For all other engine families that do not meet the criteria in (c)(1)(B)1. or (c)(1)(B)2. above, the values listed in Table 2.5 below shall apply across the applicable zone specified in Part I, section 20., paragraph (c) of these Test Procedures.

Table 2.5
NTE Multipliers for Four-Stroke Engines without Catalysts

Pollutant	Subzone 1	Subzone 2
$HC+NO_x$	1.40	1.60
CO	1.50	1.50

(2) Each NTE Limit shall be rounded to the same number of decimal places as the applicable standard in Tables 1.1, 1.2, or 2.1(a) of 13 CCR § 2442 for each pollutant.

(3) NTE limits do not apply in the 2010 through 2012 model years to engine families that are certified based on carryover emission data from the 2009 model year. This may include models that were certified to federal requirements only, so long as no new testing is otherwise required per the provisions for certification and the

issuance of an Executive Order contained in title 13, CCR, chapter 9, article 4.7, or these test procedures;

(4) NTE limits do not apply to high performance engines.

(d) Voluntary Standards. Model Year 2009 and later spark-ignition marine engines:

(1) Manufacturers may voluntarily certify their engines to the exhaust and evaporative emission standards in Table 3 below.

(2) Marine vessels powered by engines certified to the voluntary standards in Table 3 below and equipped with a fully compliant OBD-M system (see § 2444.2) shall display a five-star consumer/environmental emission label (see § 2443.2 and § 2443.3).

Table 3 - Voluntary Standards

HC^1+NO_X STANDARD *[grams per kilowatt-hour]*	CO STANDARD *[grams per kilowatt-hour]*	PERMEATION STANDARDS *[grams per square meter per day]*		DIURNAL STANDARD[2] *[grams per gallon per day]*
		Hose[3]	Tank[4]	
2.50	50.0	15.0	1.5	0.4

1. The exhaust standard includes total hydrocarbons
2. Diurnal testing assumes a trailerable boat and requires fuel with 9 pounds per square inch (psi) volatility and a 24 hour fuel temperature cycle of 25.6 to 32.2 °Celsius
3. Fuel line permeation testing requires gasoline fuel with 10% ethanol content and must be performed at a test temperature of 23 ± 2 °Celsius
4. Fuel tank permeation testing requires gasoline fuel with 10% ethanol content and must be performed at a test temperature of 28 ± 2 °Celsius

(3) Spark-ignition marine engines certified to the voluntary standards are subject to the same in-use compliance and recall requirements as engines certified to the required exhaust and evaporative standards.

(e) Special Provisions for Engine and/or Vessel Manufacturers

(1) Jet Boat Engines

(A) Jet boat engine families previously certified to the $HC+NO_X$ standards for outboard engines and personal watercraft in § 2442(a) may continue to be certified to those standards until 2012 with the additional requirement for 2010 and subsequent model years to comply with the applicable carbon monoxide standards for OB/PWC engines in Table 1.2.

(B) Beginning in 2010, all new jet boat engine families shall comply with the standards for sterndrive/inboard engines in § 2442(b) upon introduction, except that these new jet boat engine families may be cross-category averaged with any other jet boat or personal watercraft engine family to comply with those standards until 2012.

1. Notwithstanding subparagraph 2. below, an engine family certified to the § 2442(a) standards prior to 2010, but not previously used in a jet boat application would be considered a new jet boat engine family in 2010.

2. Replacements for discontinued jet boat engine families. In 2010 and 2011, if a jet boat engine certified to the § 2442(a) standards prior to 2010 is discontinued, the manufacturer may introduce a replacement engine family that complies with the § 2442(a) standards, provided that the replacement engine family is certified to an FEL at or below the certified emissions level of the family it replaces.

(C) Jet boat engines previously certified in the same engine family with personal watercraft engines must be certified separately and to a unique engine family beginning in 2012. All other jet boat engines, including replacements for discontinued jet boat engine families, must be certified separately and to a unique engine family beginning in 2010.

(D) The OBD-M requirements in § 2444.2 would apply to new jet boat engine families in 2010 and to all jet boat engine families in 2012.

(2) Discontinuation of Marinized Sterndrive/Inboard Engines.

Sterndrive/inboard engine manufacturers who marinize base engines produced by another manufacturer may request a discontinuation allowance from the Executive Officer, subject to the following:

(A) The base engine manufacturer has announced that it plans to discontinue the base engine.

(B) Each marinizer may have a discontinuation allowance for only one engine family in effect at any time. As an alternative to the "one engine family" stipulation, manufacturers may petition the Executive Officer to allow a

modified grouping of engines based on factors that logically link the engines to be discontinued including, but not necessarily limited to, the pre-marinized base configuration of the engines (e.g., the same base engine offered in one family with fuel injection and another family with carburetion).

(C) The discontinuation allowance would allow the marinizing manufacturer to continue to certify the engine family to be discontinued to emission levels that are less stringent than the standards otherwise required for sterndrive/inboard engines in § 2442 (b) for a total of four model years, provided that on a corporate average basis, the manufacturer meets the required standards in § 2442 (b).

(D) Manufacturers shall not certify engine families to emission levels less stringent than those in effect for previous model year versions of the same or similar engine family. Fluctuations in certification levels from year to year due to component variation would not violate this prohibition unless the fluctuations result in an exceedance of the standards to which the engine family was previously certified.

(E) Manufacturers shall comply with all applicable OBD-M and evaporative requirements in effect for:

1. any previously uncertified engine family certified for the first time under paragraph (g)(2) of this section to emission levels that are less stringent than the standards otherwise required for sterndrive/inboard engines in § 2442(b); and

2. any current production engine family that has previously been certified with OBD-M or evaporative systems.

(F) The applicable requirements of §§ 2442(b)(3), 2443.1, and 2443.2, including averaging, records keeping, reporting, and labeling, shall be applicable to manufacturers employing the discontinuation allowance provisions of this paragraph (g)(2).

~~(e)~~(f) In 2001 and subsequent model years, fire and police departments, and other entities that specialize in emergency response may purchase emergency equipment powered by a non-California-certified spark-ignition marine engine only when such equipment with a California-certified spark-ignition marine engine is not available. For purposes of this section, a request to purchase emergency equipment powered by a non-California-certified engine must be submitted for approval to the Executive Officer.

* * * * *

14. Application for Certification.

* * * * *

(b) New spark-ignition marine engines are covered by the following:

* * * * *

(2) The certification application must be signed by an authorized representative of the engine manufacturer. The certification application must include the following:

~~(i)~~(A) Identification and description of the engines covered by the engine family certification application; descriptions of the engine designs (e.g., combustion chamber, valves, etc.); and, identifications (i.e., part numbers) and descriptions of the emission control system and components, auxiliary emission control devices, fuel system and components, air inlet system and components, exhaust system and components, and any optional equipment. For purposes of this section, "auxiliary emission control device" means any element of design that senses temperature, engine RPM, manifold vacuum, or any other parameter for the purpose of activating, modulating, delaying, or deactivating the operation of any part of the emission control system.

~~(ii)~~(B) Emission control warranty information as set forth in section 10.

~~(iii)~~(C) Emission control and consumer/environmental label information as set forth in section 11, including actual production labels and descriptions of all applicable label attachment locations.

~~(iv)~~(D) Identification and description (i.e., range, value, etc.) of any adjustable engine parameters (e.g., idle fuel/air, ignition timing, etc.); and a description of the method used to ensure that the emission characteristics of the certification test engines remain representative of those of the production engines with respect to any adjustments of such engine parameters.

~~(v)~~(E) Projected California sales data of the engine family for which certification is requested. Where applicable, the sales for each engine model within the engine family should be provided. Such estimated sales data must include an explanation of the method used to make the estimate.

~~(vi)~~(F) A description of the facility and equipment used to test the engines for certification including (as applicable) specifications about the dynamometers, gas analyzers, data collection devices, etc.

~~(vii)~~(G) Information about the certification test fuels and lubricants, and information about the commercially available fuels and lubricants recommended for use in the production engines.

~~(viii)~~(H) A description of the proposed certification test engine service accumulation (e.g., break-in) procedure and the certification test engine maintenance schedule.

~~(ix)~~(I) A statement of recommended periodic and anticipated procedures for maintenance necessary to assure that the engine covered by an Executive Order conforms to the regulations. The statement must include a listing of the fuels and lubricants recommended for use by the ultimate purchaser and a description of the training program for personnel who will perform such maintenance, and the equipment required to perform such maintenance

~~(x)~~(J) The engine family's FEL and an estimate of the overall corporate average emissions for that model year.

~~(xi)~~(K) Information about high-altitude adjustments, and an engineering evaluation of one engine family within the manufacturer's line that demonstrates emissions compliance at high altitudes.

(3) Completed copies of the engine family certification application and of any amendments thereto, and all notifications under sections 28 and 29 must be submitted in such multiple copies as the Executive Officer requires.

* * * * *

18. Test Engines.

* * * * *

(c) Concurrent with the selection of an engine family test engine, the Executive Officer will determine the engine parameters subject to adjustment for certification, assembly-line quality-audit and compliance tests. The Executive Officer will also evaluate the adequacy of the limits, stops, seals, or other methods utilized to control, restrict or inhibit adjustment, and will evaluate resultant adjustable ranges of each parameter. The Executive Officer will notify the engine manufacturer of each determination.

* * * * *

(3) The Executive Officer will determine an adjustable parameter to be adequately inaccessible when either or both of the following apply:

~~(i)~~(A) The physical device that controls the adjustable parameter can be accessed only by the disassembly of the engine or equipment, and this disassembly requires the use of special tools.

~~(ii)~~(B) Adequate deterrence to restrict access to an adjustable parameter will not be demonstrated by the necessity to remove an engine component that is routinely removed in maintenance, or that is required to be removed in order to perform an adjustment.

(4) The Executive Officer shall determine an adjustable parameter to be adequately controlled or restricted when one or more of the following apply:

~~(i)~~(A) The device that controls the adjustable parameter is restricted from adjustment beyond the range or values specified in the engine family certification application.

~~(ii)~~(B) The restriction may be circumvented only through the use of special tools.

~~(iii)~~(C) Attempts to misadjust the parameter would result in breakage of the restrictive device and/or the parameter and thereby result in unsatisfactory engine operation.

(5) The Executive Officer may also determine an adjustable parameter to be adequately controlled or restricted when either one or both of the following apply:

~~(i)~~(A) Attempts to misadjust the parameter are ineffective. For example, an adjustment beyond the values or positions specified in the engine family certification application would not alter significantly the engine performance; hence, the emission levels as projected in certification are representative of in-use engine family emissions.

~~(ii)~~(B) Any solid-state memory devices that control or monitor emission control systems or components are protected adequately against unauthorized or inappropriate changes.

* * * * *

20. Test Procedures, General Requirements.

* * * * *

(b) Certification testing of exhaust emissions.

* * * * *

(4) The exhaust emission test uses prescribed sequences of engine operation as indicated in Table 20-1.

Table 20-1.
Spark-Ignition Marine Engine Test Cycle

Mode Number	1	2	3	4	5
Speed (%)	100	80	60	40	Idle
Torque (%)	100	71.6	46.5	25.3	0[1]
Weighting Factor	0.06	0.14	0.15	0.25	0.40

1. For high performance engines (i.e., engines greater than 373 kilowatts), manufacturers have the option of measuring the emissions under mode 5 with a 15 percent torque load applied.

(5) Engine power (in kilowatts) must be calculated using the Society of Automotive Engineers (SAE) standard J1228, November 1991, incorporated herein by reference.

(c) In addition to the test procedures in Part IV of this document, or alternately those contained in Title 40, Code of Federal Regulations, Subpart F, Section 1045.501, manufacturers of SI sterndrive/inboard marine engines with maximum power less than or equal to 373 kilowatts shall use the procedures contained in Title 40, Code of Federal Regulations, Subpart F, Section 1045.515 for determining compliance with NTE limits required in Title 13, California Code of Regulations, Section 2442(c) (synonymously referred to as "NTE standards" in the Code of Federal Regulations). Section 1045.515 and all nested references are incorporated by reference herein. Prior to the 2015 model year, compliance with the NTE requirements for supercharged four-stroke outboard engines above 150 kW that are not equipped with catalysts may optionally be determined by dividing the NTE zone specified in Title 40, Code of Federal Regulations, Subpart F, Section 1045.515(c)(6) based on a speed cutpoint of 70 percent of maximum test speed instead of 50 percent of maximum test speed.

Figure 20-1 NTE Zone and Subzones for Catalyst-Equipped Engines

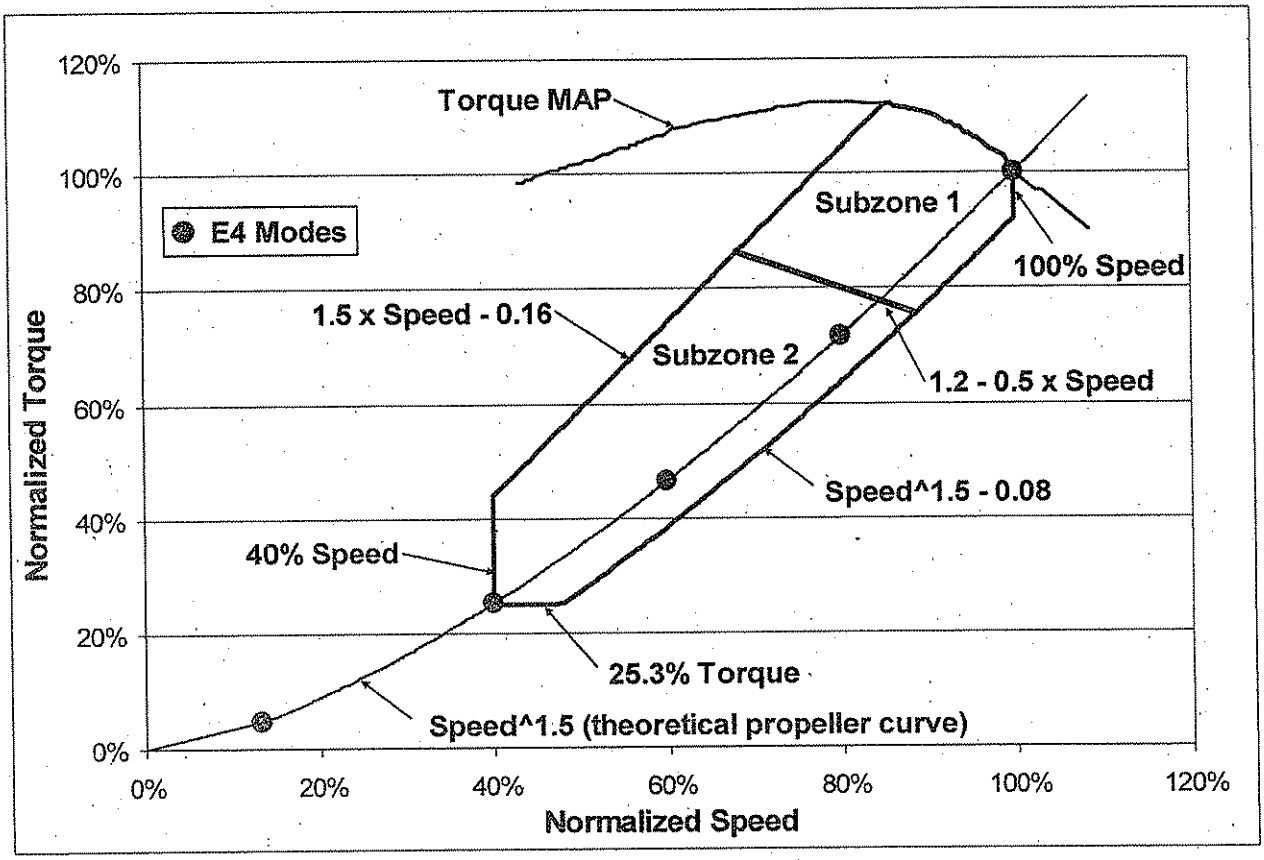


Figure 20-2 NTE Zone and Subzones for Two-Stroke Engines without Catalysts

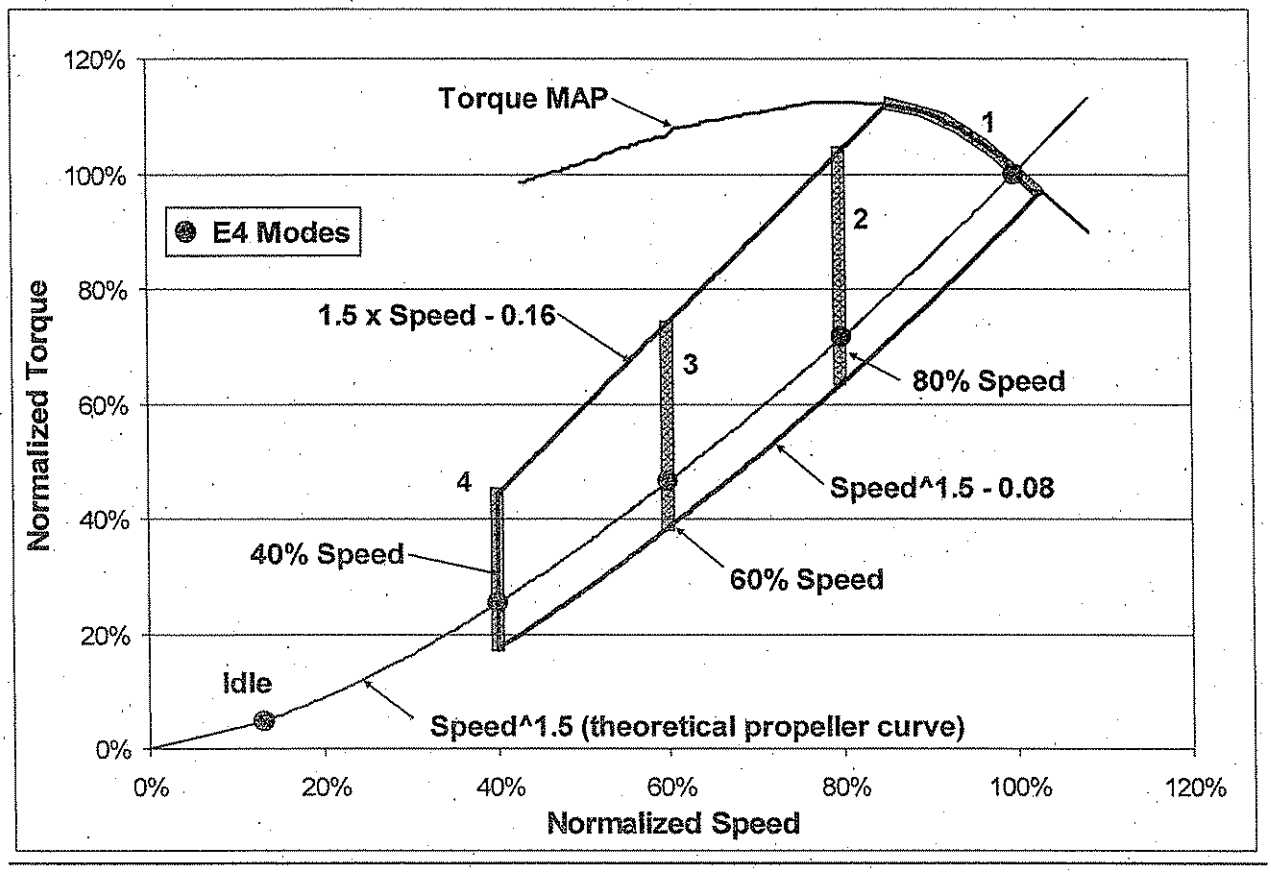
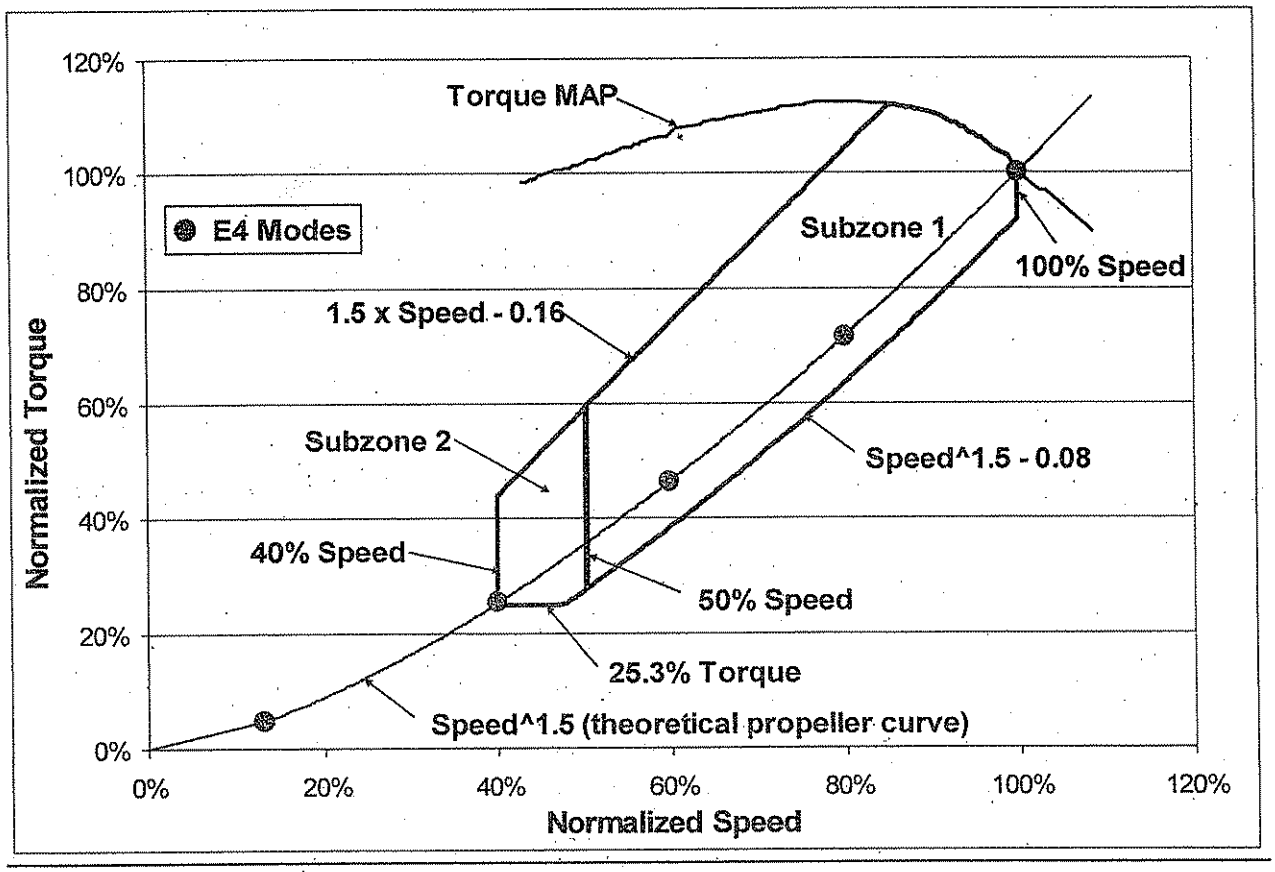


Figure 20-3 NTE Zone and Subzones for Four-Stroke Engines without Catalysts



(d) In lieu of the test procedures in Part IV, manufacturers of SI sterndrive/inboard marine engines that produce no more than 75 engines per year nationally may use portable emissions measurement systems (PEMS) to demonstrate compliance of their engines greater than 373 kilowatts to the exhaust emission standards. The test procedures for using a PEMS are contained in Title 40, Code of Federal Regulations, Subpart J, Sections 1065.901 through 1065.940, and are incorporated by reference herein. These measurements can be performed in the laboratory or in the field.

~~(c)~~(e) The Executive Officer will prescribe emission test procedures for any spark-ignition marine engine that the Executive Officer determines is not susceptible to satisfactory testing by the methods set forth in the test procedures.

~~(d)~~(f) The Executive Officer may revise these test procedures on a case-by-case basis when a request to do so is supported by data and results, or other information, showing the necessity for the revision.

* * * * *

23. Unscheduled Maintenance; Test Engines.

(a) Engine manufacturers must not perform any unscheduled engine, emission control system, or fuel system adjustment, repair, removal, disassembly, cleaning, or replacement on engines without the advance approval of the Executive Officer.

(1) In the case of unscheduled maintenance the Executive Officer will approve such maintenance if the Executive Officer:

~~(i)~~(A) Has made a preliminary determination that part failure or system malfunction, or the repair of such failure or malfunction, does not render the engine unrepresentative of engines in use, and does not require direct access to the combustion chamber, except for spark plug, fuel injection component, or removable prechamber removal or replacement; and

~~(ii)~~(B) Has made a determination that the need for maintenance or repairs is indicated by an overt indication of malfunction such as persistent misfire, engine stall, overheating, fluid leakage, loss of oil pressure, or charge indicator warning.

* * * * *

27. Certification.

(a) New spark-ignition marine engines produced by a manufacturer are covered by the following certification requirements:

* * * * *

(2)~~(i)~~(A) If, after review of the test reports and data submitted by the engine manufacturer, data derived from any inspection carried out under section 31, and any other pertinent data or information, the Executive Officer determines that a test engine(s) meets the requirements of section 43013 of the California Clean Air Act and of these provisions, the Executive Officer will issue an Executive Order certifying such engine(s) except for engines covered by section 32.

~~(ii)~~(B) The engine family certification will be granted only for the model-year engine production as specified by the Executive Officer in the Executive Order; and upon such terms as the Executive Officer may deem necessary to assure that any new spark-ignition marine engine covered by the Executive Order will meet the requirements of these provisions.

~~(iii)~~(C) The Executive Order will apply to all engines within the engine family represented by the test engine and will certify compliance with no more than one set of applicable standards.

~~(iv)~~(D) The engine manufacturer may, at its option, proceed with any of the following alternatives with respect to engines represented by a test engine(s) determined not to be in compliance with applicable standards:

~~(A)~~(i) Delete from the application for certification engines that were represented by the failed test engine. The Executive Officer will then select in place of each failed engine an alternate engine chosen in accordance with the selection criteria that were employed in selecting the engine that failed; or,

~~(B)~~(ii) Repair and retest the failed engine to demonstrate that it meets the applicable standards. The engine manufacturer must then test a second engine that is in all material respects the same as the first engine (as repaired) in accordance with the applicable test procedures.

~~(v)~~(E) If the engine manufacturer does not submit the data required under paragraphs (2)~~(i)~~(A), ~~(ii)~~(B) and ~~(iii)~~(C) of this section, the Executive Officer will deny certification.

* * * * *

30. Maintenance of Records.

(a) The manufacturer of any spark-ignition marine engine subject to any of the standards or procedures prescribed in these provisions must establish, maintain and retain the following adequately organized and indexed records;

(1) General records.

~~(i)~~(A)

~~(A)~~(i) Identification and description of all certification engines for which testing is required under this Part.

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

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

~~(ii)~~(B) A properly completed application, following the format prescribed by the California Air Resources Board for the appropriate year of production, must fulfill each of the requirements set forth in paragraph (a)(1)~~(i)~~(A) of this section.

(2) Individual records.

~~(i)~~(A) A brief history of each spark-ignition marine engine used for certification under these provisions including:

~~(A)~~(i)~~(1)~~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.

~~(2)~~b. In the case where the certification engine is not derived from a current production engine, a general description of the build-up of the engine (e.g., experimental heads were cast and machined according to supplied drawings, etc.).

~~(3)~~c. In both of the above cases, a description (as applicable) of the origin and selection process for the carburetor, fuel system, emission control system components, and exhaust aftertreatment device must be included. The required description must specify the steps taken to assure that the certification engine is representative of production engines with respect to its fuel system, emission control system components, exhaust aftertreatment device, or any other device or component that can reasonably be expected to influence exhaust emissions. The description must also state that all components and/or engine construction processes, component inspection and selection techniques, and assembly techniques employed in constructing such 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)~~(ii) A complete record of all certification emission tests performed (except tests performed by ARB directly) including test results, and the date and purpose of each test, and the hours accumulated on the engine.

~~(C)~~(iii) The date of each service accumulation procedure.

~~(D)~~(iv) [Reserved].

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

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

~~(G)~~(vii) [Reserved].

~~(H)~~(viii) A brief description of any significant events affecting the engine during the period covered by the history, including such extraordinary events as engine accidents or dynamometer runaway.

(ii)(B) Each such history must state the date that any of the selection or build-up activities in paragraph (a)(2)~~(i)(A)~~(A)(i) of this section occurred with respect to the certification engine. The history must be updated each time the operation status of the engine changes or additional work is performed on it.

* * * * *

32. Denial, Revocation, or Suspension of Certification.

(a) Notwithstanding the fact that any engine(s) tested for certification may comply with the provisions set forth herein, 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:

* * * * *

(3) Any ARB Enforcement Officer is denied access on the terms specified in section 31 to any facility that contains any of the following:

~~(i)~~(A) The engine;

~~(ii)~~(B) Any components used or considered for use in its modification or build-up into a certification engine;

~~(iii)~~(C) Any production engine that is or will be claimed by the engine manufacturer to be covered by the certificate;

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

~~(v)~~(E) Any records, documents, reports, or histories required by this Part to be kept concerning any of the above.

* * * * *

Part II. Spark-Ignition Marine Engines - Determination of Deterioration Factors.

* * * * *

36. Deterioration Factor.

* * * * *

(d) For SI sterndrive/inboard engines greater than 373 kilowatts, manufacturers have the option to use an ARB-assigned deterioration factor. Use of this option must be indicated in the manufacturer's application for certification.

Part III. Emission Test Equipment Provisions.

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42. Dynamometer Torque Cell Calibration.

* * * * *

(b) Option. A master load-cell or transfer standard may be used to verify the torque measurement system.

* * * * *

(3) Load the dynamometer to a minimum of three equally spaced torque values as indicated by the master load-cell for each in-use range used.

~~(3)~~
(4) The in-use torque measurement must be within two percent of the torque measured by the master system for each load used.

(5) If the in-use torque is not within two percent of the master torque, adjust or repair the system. Repeat steps in paragraphs (b)(2) through (b)(4) of this section with the adjusted or repaired system.

(c) Calibrated resistors may not be used for dynamometer torque transducer calibration, but may be used to span the transducer before engine testing.

(d) Other engine dynamometer system calibrations such as speed are performed as specified by the dynamometer manufacturer or as dictated by good engineering practice.

43. Engine Cooling System.

An engine cooling system is required with sufficient capacity to maintain the engine at normal operating temperatures as prescribed by the engine manufacturer. Auxiliary fan(s) may be used to maintain sufficient engine cooling during dynamometer operation.

44. Lubricating Oil and Test Fuel.

(a) Lubricating oil.

(1) Use the engine lubricating oil which meets the engine manufacturer's requirements for a particular engine and intended usage. Record the specifications of the lubricating oil used for service accumulation and the certification test.

(2) For two-stroke engines, the fuel/oil mixture ratio must be that which is recommended by the manufacturer. If the flow rate of the oil in the engine is greater than two percent of the fuel flow rate, then the oil supplied to the engine must be added to the fuel flow in the emission calculations described in Part IV, section 19 and section 26. Good engineering judgment may be used to estimate oil flow when oil injection is used.

(b) Test fuels – certification.

(1) Petroleum-based fuels. The manufacturer must use gasoline having the specifications or substantially equivalent specifications approved by the Executive Officer, as specified in Table 8-1 below for exhaust emission testing of gasoline fueled engines. As an alternative, the manufacturer may use the fuel specifications as outlined in the California Code of Regulations, Title 13, section 1960.1, and the latest amendment of the "California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," incorporated herein by reference. The test fuel specification in either case should remain consistent from batch to batch. The specification range of the fuel to be used under this paragraph must be reported in accordance with Part I, section 14(b)(2)~~(vi)~~(F).

Table 8-1
Test Fuel Specifications

Item	Property	Tolerance	Procedure (ASTM)[1]
Sulfur, ppm max.	1000	—	D 2622
Benzene, max. percent	1.5	—	D 3606
RVP, psi	8.6	±0.6	D 323
Octane, R+M/2	89.9	±3.1	D 2699 D 2700
IBP, °C	32.8	±11.0	D 86
10% point, °C	53.3	±5.5	D 86
50% point, °C	101.7	±8.3	D 86
90% point, °C	160.0	±11.1	D 86
End Point, max. °C	212.8	—	D 86
Phosphorus, g/l, max.	0.02	—	D 3231
Lead, g/l, max.	0.02	—	—
Manganese, g/l, max.	0.004	—	—
Aromatics, max. percent	35	—	D 1319
Olefins, max. percent	10	—	D 1319
Saturates, percent	remainder	—	D 1319

1. All ASTM Procedures in this table have been incorporated by reference.

(2) Alcohol-based fuels. Alcohol-based fuels must be allowed for emission test purposes when the appropriate emission standards with respect to such fuels are a part of these provisions. Such fuels must be as specified in paragraph (b)(1) above.

(c) Test fuels – service accumulation.

(1)(A) Gasoline. Unleaded gasoline representative of commercial gasoline which will be generally available through retail outlets must be used in service accumulation for spark-ignition marine engines. As an alternative, the certification test fuels specified under paragraph (b) of this section for engine service accumulation. Leaded fuel may not be used during service accumulation.

(B) The octane rating of the gasoline used may not be higher than 4.0 research octane numbers above the minimum recommended by the manufacturer and have a minimum sensitivity of 7.5 octane numbers, where sensitivity is defined as research octane number minus motor octane number.

(C) The Reid Vapor Pressure of a gasoline must be characteristic of the engine fuel during the season in which the service accumulation takes place in the outdoors, or must be characteristic of the engine fuel appropriately suited to the ambient conditions of an indoor test cell in which the entire service accumulation takes place.

(2) Alternative fuels.

(A) Liquefied petroleum gas meeting the ASTM D1835 or NGPA HD-5 specifications must be used for service accumulation.

(B) Natural gas representative of commercial natural gas that will be generally available through retail outlets must be used in service accumulation.

(d) Other fuels may be used for testing provided:

(1) They are commercially viable,

(2) Information, acceptable to the Executive Officer, is provided to show that only the designated fuel would be used in customer service;

(3) Use of a fuel listed under paragraph (b) of this section would have a detrimental effect on emissions or durability; and

(4) The Executive Officer provides written approval of the fuel specifications before the start of testing.

45. Engine Intake Air Temperature Measurement.

(a) Engine intake air temperature measurement must be made within 100 cm of the air-intake of the engine. The measurement location must be either in the supply system or in the air stream entering the engine.

(b) The temperature measurements must be accurate to within ± 2 degrees Celsius.

46. Engine Intake Air Humidity Measurement.

This section refers to engines which are supplied with intake air other than the ambient air in the test cell (i.e., air which has been plumbed directly to the engine air intake system). For engines which use ambient test cell air for the engine intake air, the ambient test cell humidity measurement may be used.

(a) Humidity conditioned air supply. Air that has had its absolute humidity altered is considered humidity-conditioned air. For this type of intake air supply, the humidity measurements must be made within the intake air supply system, and after the humidity conditioning has taken place.

(b) Unconditioned air supply. Humidity measurements in unconditioned intake air supply must be made in the intake air stream entering the engine. Alternatively, the humidity measurements can be measured within the intake air stream entering the supply system.

47. Test Conditions.

(a) General requirements.

(1) Ambient temperature levels encountered by the test engine throughout the test sequence may not be less than 20 degrees Celsius nor more than 30 degrees Celsius.

(2) Calculate all volumes and volumetric flow rates at standard conditions for temperature and pressure. Use these conditions consistently throughout all calculations. Standard conditions for temperature and pressure are 25 degrees Celsius and 101.3 kilopascals.

(b) Engine test conditions. Measure the absolute temperature (designated as T and expressed in degrees Kelvin) of the engine air at the inlet to the engine and the dry atmospheric pressure (designated as p_s and expressed in kilopascals. Determine the parameter *f* according to the following provisions:

(1) Naturally aspirated and mechanically supercharged engines:

$$f = \frac{99}{P_s} x \left(\frac{T}{298} \right)^{0.7}$$

(2) Turbocharged engine with or without cooling of inlet air:

$$f = \left(\frac{99}{P_s} \right)^{0.7} x \left(\frac{T}{298} \right)^{1.5}$$

(3) For a test to be recognized as valid, the parameter *f* must be between the limits as shown below:

$$0.96 < f < 1.04$$

48. Analytical Gases.

(a) The shelf life of a calibration gas may not be exceeded. Record the expiration date stated by the gas supplier for each calibration gas.

(b) Pure gases. The required purity of the gases is defined by the contamination limits given in parenthesis. The following gases must be available for operation.

(1) Purified nitrogen, also referred to as "zero-grade nitrogen"
(Contamination < 1 ppm C, < 1 ppm CO, < 400 ppm CO_2, < 0.1 ppm NO)

(2) Purified oxygen (Purity 99.5 percent vol O_2)

(3) Hydrogen-helium mixture (40 ± 2 percent hydrogen, balance helium)
(Contamination < 1 ppm C, < 400 ppm CO)

(4) Purified synthetic air, also referred to as "zero gas"
(Contamination < 1 ppm C, < 1 ppm CO, < 400 ppm CO_2, < 0.1 ppm NO)
(Oxygen content between 18-21 percent vol.)

(c) Calibration and span gases.

(1) Calibration gas values are to be derived from NIST "Standard Reference Materials" (SRM's) or other local gas standards and are to be single blends as specified in this subsection.

(2) Mixtures of gases having the following chemical compositions must be available:

C_3H_8 and purified synthetic air (dilute measurements); C_3H_8 and purified nitrogen (raw measurements); CO and purified nitrogen; NO_x and purified nitrogen (the amount of NO_2 contained in this calibration gas must not exceed five percent of the NO content); CO_2 and purified nitrogen.

Note: For the HFID or FID, the manufacturer may choose to use as a diluent span gas and the calibration gas either purified synthetic air or purified nitrogen. Any mixture of C_3H_8 and purified synthetic air which contains a concentration of propane higher than what a gas supplier considers to be safe may be substituted with a mixture of 8 C_3H_8 and purified nitrogen. However, the manufacturer must be consistent in the choice of diluent (zero air or purified nitrogen) between the calibration and span gases. If a manufacturer chooses to use C_3H_8 and purified nitrogen for the calibration gases, then purified nitrogen must be the diluent for the span gases.

(3) The true concentration of a span gas must be within ± two percent of the NIST gas standard. The true concentration of a calibration gas must be within ± one percent of the NIST gas standard. The use of precision blending devices (gas dividers) to obtain the required calibration gas concentrations is acceptable. Give all concentrations of calibration gas on a volume basis (volume percent or volume ppm).

(4) The gas concentrations used for calibration and span may also be obtained by means of a gas divider, diluting with purified N_2 or with purified synthetic air. The accuracy of the mixing device must be such that the concentration of the diluted gases may be determined to within ± two percent.

(d) Oxygen interference check gases must contain propane with 350 ppmC ± 75 ppmC hydrocarbon. Determine the concentration value to calibration gas tolerances by chromatographic analysis of total hydrocarbons plus impurities or by dynamic blending. Use nitrogen as the predominant diluent with the balance oxygen.

(e) Fuel for the hydrocarbon flame ionization detector (HC-FID) must be a blend of 40 ± 2 percent hydrogen with the balance being helium. The mixture shall contain less than one ppm equivalent carbon response; 98 to 100 percent hydrogen fuel may be used with advance approval of the Executive Officer.

(f) Hydrocarbon analyzer burner air. The concentration of oxygen must be within one mole percent of the oxygen concentration of the burner air used in the latest oxygen interference check (percent O_2I), see Part III, section 16(d). If the difference in oxygen concentration is greater than one mole percent, then the oxygen interference must be checked and the analyzer adjusted if necessary, to meet the percent O_2I requirements. The burner air must contain less than two ppmC hydrocarbon.

49. Analyzers Required.

(a) Analyzers. Analyze measured gases with the following instruments:

(1) Carbon monoxide (CO) analysis.

~~(i)~~(A) The carbon monoxide analyzer must be of the non-dispersive infrared (NDIR) absorption type.

~~(ii)~~(B) The use of linearizing circuits is permitted.

(2) Carbon dioxide (CO_2) analysis.

~~(i)~~(A) The carbon dioxide analyzer must be of the non-dispersive infrared (NDIR) absorption type.

~~(ii)~~(B) The use of linearizing circuits is permitted.

(3) Oxygen (O_2) analysis. Oxygen (O_2) analyzers may be of the paramagnetic (PMD), zirconia (ZRDO) or electrochemical type (ECS).

(4) Hydrocarbon (HC) analysis.

~~(i)~~(A) For Raw Gas Sampling, the hydrocarbon analyzer must be of the heated flame ionization (HFID) type. For constant volume sampling, the hydrocarbon analyzer may be of the flame ionization (FID) type or of the heated flame ionization (HFID) type.

~~(ii)~~(B) For the HFID system, if the temperature of the exhaust gas at the sample probe is below 190 degrees Celsius, the temperature of the valves, pipe work, and so forth, must be controlled so as to maintain a wall temperature of 190 degrees Celsius ± 11 degrees Celsius. If the temperature of the exhaust gas at the sample probe is above 190 degrees Celsius, the temperature of the valves, pipe work, and so forth, must be controlled so as to maintain a wall temperature greater than 180 degrees Celsius.

~~(iii)~~(C) For the HFID analyzer, the detector, oven, and sample handling components within the oven must be suitable for continuous operation at temperatures to 200 degrees Celsius. It must by capable of maintaining temperature within ± 5.5 degrees Celsius of the set point.

~~(iv)~~(D) Fuel and burner air must conform to the specifications in Part III, section 12.

~~(v)~~(E) The percent of oxygen interference must be less than three percent, as specified in Part III, section 16(d).

(5) Oxides of nitrogen (NO_x) analysis.

~~(i)~~(A) This analysis device consists of the following items:

~~(A)~~(i) A NO_2 to NO converter. The NO_2 to NO converter efficiency must be at least 90 percent.

~~(B)~~(ii) An ice bath located after the NO_x converter (optional).

~~(C)~~(iii) A chemiluminescent detector (CLD) or heated chemiluminescent detector (HCLD).

~~(ii)~~(B) The quench interference must be less than three percent as measured in Part III, section 25.

(b) Other gas analyzers yielding equivalent results may be used with advance approval of the Executive Officer.

(c) The following requirements must be incorporated as indicated in systems used for testing under this Part.

(1)Carbon monoxide and carbon dioxide measurements must be made on a dry basis (for raw exhaust measurement only). Specific requirements for the means of drying the sample can be found in section 13(e).

(2) Calibration or span gases for the NO_x measurement system must pass through the NO_2 to NO converter.

(d) The electromagnetic compatibility (EMC) of the equipment must be on a level as to minimize additional errors.

(e) Gas drying. Chemical dryers are not an acceptable method of removing water from the sample. Water removal by condensation is acceptable. If water is removed by condensation, the sample gas temperature or sample dew point must be monitored either within the water trap or downstream and its temperature must not exceed 7 degrees Celsius. A water trap performing this function is an acceptable method. Means other than condensation may be used only with prior approval from the Executive Officer.

50. Analyzer Accuracy and Specifications.

(a) Measurement accuracy – general. The analyzers must have a measuring range which allows them to measure the concentrations of the exhaust gas sample pollutants with the accuracies shown in Table 1 in Appendix A to this Part.

(1) Precision. The precision of the analyzer must be, at worst, ± one percent of full-scale concentration for each range used. The precision is defined as 2.5 times the standard deviation(s) of 10 repetitive responses to a given calibration or span gas.

(2) Noise. The analyzer peak-to-peak response to zero and calibration or span gases over any 10-second period may not exceed two percent of full-scale chart deflection on all ranges used.

(3) Zero drift. The analyzer zero-response drift during a one-hour period must be less than two percent of full-scale chart deflection on the lowest range used. The zero-response is defined as the mean response including noise to a zero-gas during a 30-second time interval.

(4) Span drift. The analyzer span drift during a one-hour period must be less than two percent of full-scale chart deflection on the lowest range used. The analyzer span is defined as the difference between the span-response and the zero-response. The span-response is defined as the mean response including noise to a span gas during a 30-second time interval.

(b) Operating procedure for analyzers and sampling system. Follow the start-up and operating instructions of the instrument manufacturer. Adhere to the minimum requirements given in Part III, sections 16 through 25 and Part IV, section 9.

(c) Emission measurement accuracy – Bag sampling.

(1) Good engineering practice dictates that exhaust emission sample analyzer readings below 15 percent of full scale chart deflection should generally not be used.

(2) Some high resolution read-out systems, such as computers, data loggers, and so forth, can provide sufficient accuracy and resolution below 15 percent of full scale. Such systems may be used provided that additional calibrations are made to ensure the accuracy of the calibration curves. The following procedure for calibration below 15 percent of full scale may be used:

Note: If a gas divider is used, the gas divider must conform to the accuracy requirements as follows: The use of precision blending devices (gas dividers) to obtain the required calibration gas concentrations is acceptable, provided that the blended gases are accurate to within ± 1.5 percent of NIST gas standards or

other gas standards which have been approved by the Executive Officer. This accuracy implies that primary gases used for blending must be "named" to an accuracy of at least ± 1 percent, traceable to NIST or other approved gas standards.

~~(i)~~(A) Span the full analyzer range using a top range calibration gas. The span gases must be accurate to within ± 2 percent of NIST gas standards or other gas standards which have been approved by the Executive Officer.

~~(ii)~~(B) Generate a calibration curve according to, and meeting the requirements of the sections describing analyzer calibrations which are found in sections 16, 17, 18, and 20 of this Part.

~~(iii)~~(C) Select a calibration gas (a span gas may be used for calibrating the CO_2 analyzer) with a concentration between the two lowest non-zero gas divider increments. This gas must be "named" to an accuracy of ± 2 percent of NIST gas standards, or other standards approved by the Executive Officer.

~~(iv)~~(D) Using the calibration curve fitted to the points generated in paragraphs (c)(2)~~(i)~~(A) and ~~(ii)~~(B) of this section, check the concentration of the gas selected in paragraph (c)(2)~~(iii)~~(C) of this section. The concentration derived from the curve must be within ± 2.3 percent (± 2.8 percent for CO_2 span gas) of the gas' original named concentration.

~~(v)~~(E) Provided the requirements of paragraph (c)(2)~~(iv)~~(D) of this section are met, use the gas divider with the gas selected in paragraph (c)(2)~~(iii)~~(C) of this section and determine the remainder of the calibration points. Fit a calibration curve per sections 16, 17, 18, and 20 of this chapter for the entire analyzer range.

(d) Emission measurement accuracy – continuous sampling. Analyzers used for continuous analysis must be operated such that the measured concentration falls between 15 and 100 percent of full scale chart deflection. Exceptions to these limits are:

(1) The analyzer's response may be less than 15 percent or more than 100 percent of full scale if automatic range change circuitry is used and the limits for range changes are between 15 and 100 percent of full scale chart deflection;

(2) The analyzer's response may be less than 15 percent of full scale if:

~~(i)~~(A) Alternative in paragraph (c)(2) of this section is used to ensure that the accuracy of the calibration curve is maintained below 15 percent; or

~~(ii)~~(B) The full scale value of the range is 155 ppmC or less; or

~~(iii)~~(C) The emissions from the engine are erratic and the integrated chart deflection value for the cycle is greater than 15 percent of full scale; or

~~(iv)~~(D) The contribution of all data read below the 15 percent level is less than 10 percent by mass of the final test results.

51. Analyzer Initial Calibration.

(a) Warming-up time. Follow the warm-up time according to the recommendations of the manufacturer. If not specified, a minimum of two hours should be allowed for warming up the analyzers.

(b) NDIR and HFID analyzer. Tune and maintain the NDIR analyzer per the instrument manufacturer recommendations. The combustion flame of the HFID analyzer must be optimized in order to meet the specifications in Part III, section 16(b).

(c) Zero setting and calibration. Using purified synthetic air (or nitrogen), set the CO, CO_2, NO_x and HC analyzers at zero. Connect the appropriate calibrating gases to the analyzers and record the values. The same gas flow rates shall be used as when sampling exhaust.

(d) Rechecking of zero setting. Recheck the zero setting and, if necessary, repeat the procedure described in paragraph (c) of this section.

52. Hydrocarbon Analyzer Calibration.

(a) Calibrate the FID and HFID hydrocarbon analyzer as described in this section. Operate the HFID to a set point ± 5.5 degrees Celsius between 185 and 197 degrees Celsius.

(b) Initial and periodic optimization of detector response. Prior to introduction into service and at least annually thereafter, adjust the FID and HFID hydrocarbon analyzer for optimum hydrocarbon response as specified by this paragraph. Alternative methods yielding equivalent results may be used, if approved in advance by the Executive Officer.

(1) Follow good engineering practices for initial instrument startup and basic operating adjustment using the appropriate fuel (see Part III, section 12) and purified synthetic air or zero-grade nitrogen.

(2) One of the following procedures is required for FID or HFID optimization:

~~(i)~~(A) The procedure outlined in Society of Automotive Engineers (SAE) paper No. 770141, "Optimization of Flame Ionization Detector for Determination of Hydrocarbons in Diluted Automobile Exhaust"; author, Glenn D. Reschke. This procedure has been incorporated by reference.

~~(ii)~~(B) The HFID optimization procedures outlined in Title 40, Code of Federal Regulations, section 86.331-79 [July 1, 1997], incorporated herein by reference.

~~(iii)~~(C) Alternative procedures may be used if approved in advance by the Executive Officer.

(3) After the optimum flow rates have been determined, they are recorded for future reference.

(c) Initial and periodic calibration. Prior to introduction into service and monthly thereafter, or within one month before the certification test, calibrate the FID or HFID hydrocarbon analyzer on all normally used instrument ranges, using the steps in this paragraph. Use the same flow rate and pressures as when analyzing samples. Introduce calibration gases directly at the analyzer.

(1) Adjust analyzer to optimize performance.

(2) Zero the hydrocarbon analyzer with purified synthetic air or zero-grade nitrogen.

(3) Calibrate on each used operating range with calibration gases having nominal concentrations between 10 and 90 percent of that range. A minimum of six evenly spaced points covering at least 80 percent of the 10 to 90 percent range (64 percent) is required (see following table).

Example calibration points	Acceptable for calibration?
20, 30, 40, 50, 60, 70	No, range covered is 50 percent, not 64 percent.
20, 30, 40, 50, 60, 70, 80, 90	Yes.
10, 25, 40, 55, 70, 85	Yes.
10, 30, 50, 70, 90	No, though equally spaced and entire range covered, a minimum of six points is needed.

(4) For each range calibrated, if the deviation from a least squares best-fit straight line is two percent or less of the value at each data point, calculate concentration values by use of a single calibration factor for that range. If the deviation exceeds two percent at any point, use the best-fit non-linear equation which represents the data to within two percent of each test point to determine concentration.

(d) Oxygen interference optimization. Choose a range where the oxygen interference check gases will fall in the upper 50 percent. Conduct the test, as outlined in this paragraph, with the oven temperature set as required by the instrument manufacturer. Oxygen interference check gas specifications are found in Part III, section 12(d).

(1) Zero the analyzer.

(2) Span the analyzer with the 21 percent oxygen blend.

(3) Recheck zero response. If it has changed more than 0.5 percent of full scale repeat paragraphs (d)(1) and (d)(2) of this section to correct the problem.

(4) Introduce the five percent and 10 percent oxygen interference check gases.

(5) Recheck the zero response. If it has changed more than ± one percent of full scale, repeat the test.

(6) Calculate the percent of oxygen interference (designated as percent O_2I) for each mixture in paragraph (d)(4) of this section according to the following equation:

$$percent\ O_2 I = \frac{B\ Analyzer\ response\ (ppmC)}{B} x(100)$$

Where:

$$analyzer\ response = \left(\frac{A}{\%\ of\ \ fullscale\ analyzer\ response\ (A)} \right) x\ (\%\ of\ \ fullscale\ analyzer\ response\ (B))$$

A = hydrocarbon concentration (ppmC) of the span gas used in paragraph (d)(2) of this section.

B = hydrocarbon concentration (ppmC) of the oxygen interference check gases used in paragraph (d)(4) of this section.

(7) The percent of oxygen interference (designated as percent O_2I) must be less than ± three percent for all required oxygen interference check gases before testing.

(8) If the oxygen interference is greater than the specifications, incrementally adjust the air flow above and below the manufacturer's specifications, repeating paragraphs (d)(1) through (d)(7) of this section for each flow.

(9) If the oxygen interference is greater than the specification after adjusting the air flow, vary the fuel flow and thereafter the sample flow, repeating paragraphs (d)(1) through (d)(7) of this section for each new setting.

(10) If the oxygen interference is still greater than the specifications, repair or replace the analyzer, FID fuel, or burner air before testing. Repeat this section with the repaired or replaced equipment or gases.

53. Carbon Monoxide Analyzer Calibration.

(a) Calibrate the NDIR carbon monoxide analyzer described in this section.

(b) Initial and periodic interference check. Prior to its introduction into service and annually thereafter, check the NDIR carbon monoxide analyzer for response to water vapor and CO_2:

(1) Follow good engineering practices for instrument start-up and operation. Adjust the analyzer to optimize performance on the most sensitive range to be used.

(2) Zero the carbon monoxide analyzer with either purified synthetic air or zero-grade nitrogen.

(3) Bubble a mixture of three percent CO_2 in N_2 through water at room temperature and record analyzer response.

(4) An analyzer response of more than one percent of full scale for ranges above 300 ppm full scale or more than three ppm on ranges below 300 ppm full scale requires corrective action. (Use of conditioning columns is one form of corrective action which may be taken.)

(c) Initial and periodic calibration. Calibrate the NDIR carbon monoxide analyzer before its introduction into service and monthly thereafter.

(1) Adjust the analyzer to optimize performance.

(2) Zero the carbon monoxide analyzer with either purified synthetic air or zero-grade nitrogen.

(3) Calibrate on each normally used operating range with carbon monoxide-in-N_2 calibration gases having nominal concentrations between 10 and 90 percent of that range. A minimum of six evenly spaced points covering at least 80 percent of the 10 to 90 range (64 percent) is required (see following table).

Example calibration points	Acceptable for calibration?
20, 30, 40, 50, 60, 70	No, range covered is 50 percent, not 64 percent.
20, 30, 40, 50, 60, 70, 80, 90	Yes.
10, 25, 40, 55, 70, 85	Yes.
10, 30, 50, 70, 90	No, though equally spaced and entire range covered, a minimum of six points is needed.

(4) Additional calibration points may be generated. For each range calibrated, if the deviation from a least-squares best-fit straight line is two percent or less of the value at each data point, concentration values may be calculated by use of a single calibration factor for that range. If the deviation exceeds two percent at any point, use the best-fit non-linear equation which represents the data to within two percent of each test point to determine concentration.

54. Oxides of Nitrogen Analyzer Calibration.

(a) Calibrate the chemiluminescent oxides of nitrogen analyzer as described in this section.

(b) Initial and periodic interference. Prior to its introduction into service, and monthly thereafter, check the chemiluminescent oxides of nitrogen analyzer for NO_2 to NO converter efficiency. Figure 2 in Appendix B of this Part is a reference for the following paragraphs:

(1) Follow good engineering practices for instrument start-up and operation. Adjust the analyzer to optimize performance.

(2) Zero the oxides of nitrogen analyzer with purified synthetic air or zero-grade nitrogen.

(3) Connect the outlet of the NO_x generator to the sample inlet of the oxides of nitrogen analyzer which has been set to the most common operating range.

(4) Introduce into the NO_x generator analyzer-system an NO-in-nitrogen (N_2) mixture with an NO concentration equal to approximately 80 percent of the most common operating range. The NO_2 content of the gas mixture must be less than 5 percent of the NO concentration.

(5) With the oxides of nitrogen analyzer in the NO mode, record the concentration of NO indicated by the analyzer.

(6) Turn on the NO_x generator O_2 (or air) supply and adjust the O_2 (or air) flow rate so that the NO indicated by the analyzer is about 10 percent less than indicated in paragraph (b)(5) of this section. Record the concentration of NO in this $NO+O_2$ mixture as value "c."

(7) Switch the NO_x generator to the generation mode and adjust the generation rate so that the NO measured on the analyzer is 20 percent of that measured in paragraph (b)(5) of this section. There must be at least 10 percent unreacted NO at this point. Record the concentration of residual NO as value "d."

(8) Switch the oxides of nitrogen analyzer to the NO_x mode and measure total NO_x. Record this value as "a."

(9) Switch off the NO_x generator but maintain gas flow through the system. The oxides of nitrogen analyzer will indicate the NO_x in the $NO+O_2$ mixture. Record this value as "b."

(10) Turn off the NO_x generator O_2 (or air) supply. The analyzer will now indicate the NO_x in the original NO-in-N_2 mixture. This value should be no more than 5 percent above the value indicated in paragraph (b)(4) of this section.

(11) Calculate the efficiency of the NO_x converter by substituting the concentrations obtained into the following equation:

Where:

$$percent\ efficiency = \left(1 + \frac{ab}{cd}\right) x100$$

a = concentration obtained in paragraph (b)(8) of this section,

b = concentration obtained in paragraph (b)(9) of this section,

c = concentration obtained in paragraph (b)(6) of this section,

d = concentration obtained in paragraph (b)(7) of this section.

(c) Initial and periodic calibration. Prior to its introduction into service, and monthly thereafter, calibrate the chemiluminescent oxides of nitrogen analyzer on all normally used instrument ranges. Use the same flow rate as when analyzing samples. Proceed as follows:

(1) Adjust analyzer to optimize performance.

(2) Zero the oxides of nitrogen analyzer with zero-grade air or zero-grade nitrogen.

(3) Calibrate on each normally used operating range with NO-in-N_2 calibration gases with nominal concentrations between 10 and 90 percent of that range. A minimum of six evenly spaced points covering at least 80 percent of the 10 to 90 percent range (64 percent) is required (see following table).

Example calibration points	**Acceptable for calibration?**
20, 30, 40, 50, 60, 70	No, range covered is 50 percent, not 64 percent.
20, 30, 40, 50, 60, 70, 80, 90	Yes.
10, 25, 40, 55, 70, 85	Yes.
10, 30, 50, 70, 90	No, though equally spaced and entire range covered, a minimum of six points is needed.

(4) Additional calibration points may be generated. For each range calibrated, if the deviation from a least-squares best-fit straight line is two percent or less of the value at each data point, concentration values may be calculated by use of a single calibration factor for that range. If the deviation exceeds two percent at any point, use the best-fit non-linear equation which represents the data to within two percent of each test point to determine concentration.

55. NO_x Converter Check.

(a) The efficiency of the converter used for the conversion of NO_2 to NO is tested as given in paragraphs (a)(1) through (a)(8) of this section (see Figure 2 in Appendix B to this Part).

(1) Using the test setup as shown in Figure 2 in Appendix B to this Part (see also Part III, section 18 of this chapter) and the procedures described in paragraphs

(a)(2) through (a)(8) of this section, test the efficiency of converters by means of an ozonator.

(2) Calibrate the HCLD in the most common operating range following the manufacturer's specifications using zero and span gas (the NO content of which must amount to about 80 percent of the operating range and the NO_2 concentration of the gas mixture less than five percent of the NO concentration). The NO_x analyzer must be in the NO mode so that the span gas does not pass through the converter. Record the indicated concentration.

(3) Calculate the efficiency of the NO_x converter as described in Part III, section 18(b).

(4) Via a T-fitting, add oxygen continuously to the gas flow until the concentration indicated is about 20 percent less than the indicated calibration concentration given in paragraph (a)(2) of this section. Record the indicated concentration as "c." The ozonator is kept deactivated throughout the process.

(5) Activate the ozonator to generate enough ozone to bring the NO concentration down to about 20 percent (minimum 10 percent) of the calibration concentration given in paragraph (a)(2) of this section. Record the indicated concentration as "d." Note that if, with the analyzer in the most common range the NO_x converter cannot give a reduction from 80 percent to 20 percent, then use the highest range which will give the reduction.

(6) Switch the NO analyzer to the NO_x mode, which means that the gas mixture (consisting of NO, NO_2, O_2 and N_2) now passes through the converter. Record the indicated concentration as "a."

(7) Deactivate the ozonator. The mixture of gases described in paragraph (a)(6) of this section passes through the converter into the detector. Record the indicated concentration as "b."

(8) Switched to NO mode with the ozonator deactivated, the flow of oxygen or synthetic air is also shut off. The NO_x reading of the analyzer may not deviate by more than ± five percent of the theoretical value of the figure given in paragraph (a)(2) of this section.

(b) The efficiency of the converter must be tested before each calibration of the NO_x analyzer.

(c) The efficiency of the converter may not be less than 90 percent.

56. Carbon Dioxide Analyzer Calibration.

(a) Prior to its introduction into service, and monthly thereafter, or within one month before the certification test, calibrate the NDIR carbon dioxide analyzer as follows:

(1) Follow good engineering practices for instrument start-up and operation. Adjust the analyzer to optimize performance.

(2) Zero the carbon dioxide analyzer with either purified synthetic air or zero-grade nitrogen.

(3) Calibrate on each normally used operating range with carbon dioxide-in-N_2 calibration or span gases having nominal concentrations between 10 and 90 percent of that range. A minimum of six evenly spaced points covering at least 80 percent of the 10 to 90 percent range (64 percent) is required (see following table).

Example calibration points	Acceptable for calibration?
20, 30, 40, 50, 60, 70	No, range covered is 50 percent, not 64 percent.
20, 30, 40, 50, 60, 70, 80, 90	Yes.
10, 25, 40, 55, 70, 85	Yes.
10, 30, 50, 70, 90	No, though equally spaced and entire range covered, a minimum of six points is needed.

(4) Additional calibration points may be generated. For each range calibrated, if the deviation from a least-squares best-fit straight line is two percent or less of the value at each data point, concentration values may be calculated by use of a single calibration factor for that range. If the deviation exceeds two percent at any point, use the best-fit non-linear equation which represents the data to within two percent of each test point to determine concentration.

57. NDIR Analyzer Calibration.

(a) Detector optimization. If necessary, follow the manufacturer's instructions for initial start-up and basic operating adjustments.

(b) Calibration curve. Develop a calibration curve for each range used as follows:

(1) Zero the analyzer.

predicted by the calibration curve for the gases used in paragraph (b)(4) of this section.

(7) If multiple range analyzers are used, the lowest range used must meet the curve fit requirements below 15 percent of full scale.

(c) Linear calibration criteria. If any range is within two percent of being linear, a linear calibration may be used. To determine if this criterion is met:

(1) Perform a linear least-square regression on the data generated. Use an equation of the form y = mx, where x is the actual chart deflection and y is the concentration.

(2) Use the equation z = y/m to find the linear chart deflection (designated as z) for each calibration gas concentration (designated as y).

(3) Determine the linearity (designated as percent L) for each calibration gas by:

$$percent\ L = \frac{(zx)}{Full\ scale\ linear\ chart\ deflection}(100)$$

(4) The linearity criterion is met if the percent L is less than ± two percent for each data point generated. For each emission test, use a calibration curve of the form y = mx. The slope (designated as m) is defined for each range by the spanning process.

58. Calibration of Other Equipment.

Calibrate other test equipment as often as required by the test equipment manufacturer or as necessary according to good engineering practice.

59. Analyzer Bench Checks.

(a) Prior to initial use and after major repairs, verify that each analyzer complies with the specifications given in Table 1 to this Part.

(b) If a stainless steel NO_2 to NO converter is used, condition all new or replacement converters. The conditioning consists of either purging the converter with air for a minimum of four hours or until the converter efficiency is greater than 90 percent. The converter must be at operational temperature while purging. Do not use this procedure before checking converter efficiency on in-use converters.

60. Analyzer Leakage Check.

(a) Vacuum side leak check.

(1) Check any location within the analysis system where a vacuum leak could affect the test results.

(2) The maximum allowable leakage rate on the vacuum side is 0.5 percent of the in-use flow rate for the portion of the system being checked. The analyzer flows and bypass flows may be used to estimate the in-use flow rates.

(3) The sample probe and the connection between the sample probe and valve V2 (see Figure 1 in Appendix A of this Part) may be excluded from the leak check.

(4) Pressure side leak check. Substantial leaks of the sample on the pressure side of the system may impact sample integrity if the leaks are of sufficient magnitude. As a safety precaution, it is good engineering practice to perform periodic pressure side leak checks on the sampling system.

61. Analyzer Interference Checks.

(a) Gases present in the exhaust other than the one being analyzed can interfere with the reading in several ways. Positive interference occurs in NDIR and PMD instruments when the interfering gas gives the same effect as the gas being measured, but to a lesser degree. Negative interference occurs in NDIR instruments by the interfering gas broadening the absorption band of the measured gas, and in CLD instruments by the interfering gas quenching the radiation. The interference checks described in this section are to be made initially and after any major repairs that could affect analyzer performance.

(b) CO analyzer water and CO_2 interference checks. Bubble through water at room temperature a CO_2 span gas having a concentration of between 80 percent and 100 percent inclusive of full scale of the maximum operating range used during testing and record the analyzer response. For dry measurements, this mixture may be introduced into the sample system before the water trap. The analyzer response must not be more than one percent of full scale for ranges equal to or above 300 ppm or more than three ppm for ranges below 300 ppm.

(c) NO_x analyzer quench check. The two gases of concern for CLD (and HCLD) analyzers are CO_2 and water vapor. Quench responses to these two gases are proportional to their concentrations and, therefore, require test techniques to determine quench at the highest expected concentrations experienced during testing.

(1) NO_x analyzer CO_2 quench check.

~~(i)~~(A) Pass a CO_2 span gas having a concentration of 80 percent to 100 percent of full scale of the maximum operating range used during testing through the CO_2 NDIR analyzer and record the value as "a."

~~(ii)~~(B) Dilute the CO_2 span gas approximately 50 percent with NO span gas and pass through the CO_2 NDIR and CLD (or HCLD). Record the CO_2 and NO values as "b" and "c," respectively.

~~(iii)~~(C) Shut off the CO_2 and pass only the NO span gas through the CLD (or HCLD). Record the NO value recorded as "d."

~~(iv)~~(D) Calculate the percent CO_2 quench as follows, which may not exceed three percent:

$$percent\ CO_2\ quench = 100\ x\left(1 - \frac{(c\ x\ a)}{(d\ x\ a)(d\ x\ b)}\right) x\left(a/b\right)$$

Where:

a	=	Undiluted CO_2 concentration (percent)
b	=	Diluted CO_2 concentration (percent)
c	=	Diluted NO concentration (ppm)
d	=	Undiluted NO concentration (ppm)

(2) NO_x analyzer water quench check.

~~(i)~~(A) This check applies to wet measurements only. Pass an NO span gas having a concentration of 80 percent to 100 percent of full scale of a normal operating range through the CLD (or HCLD). Record the response as D. Bubble through water at room temperature the NO span gas and pass it through the CLD (or HCLD). Record the analyzers response as AR. Determine and record the analyzers absolute operating pressure and the bubbler water temperature. (It is important that the NO span gas contains minimal NO_2 concentration for this check. No allowance for absorption of NO_2 in water has been made in the following quench calculations.)

~~(ii)~~(B) Calculations for water quench must consider dilution of the NO span gas with water vapor and scaling of the water vapor concentration of the mixture to that expected during testing. Determine the mixture's saturated vapor pressure (designated as Pwb) that corresponds to the bubbler water temperature. Calculate the water concentration (Z1", percent) in the mixture by the following equation:

$$Z1 = 100\,x\left(Pwb/GP\right)$$

Where:

GP = the analyzer's standard operating pressure (pascals)

~~(iii)~~(C) Calculate the expected dilute NO span gas and water vapor mixture concentration (designated as "D1") by the following equation:

$$D1 = D\,x\left(1Z1/100\right)$$

62. Pre- and Post-test Analyzer Calibration.

Calibrate the operating range of each analyzer used during the test before and after each test in accordance with the following procedure (A chronic need for parameter adjustment can indicate a need for instrument maintenance.):

(a) Make the calibration using a zero gas and a span gas whose nominal value is between 80 percent and 100 percent of full scale, inclusive, of the measuring range.

(b) Use the same analyzer(s) flow rate and pressure as that used during exhaust emission test sampling.

(c) Warm-up and stabilize the analyzer(s) before the calibration is made.

(d) If necessary, clean and/or replace filter elements before calibration is made.

(e) Calibrate analyzer(s) as follows:

(1) Zero the analyzer using the appropriate zero gas. Adjust analyzer zero if necessary. Zero reading should be stable.

(2) Span the analyzer using the appropriate span gas for the range being calibrated. Adjust the analyzer to the calibration set point if necessary.

(3) Recheck zero and span set points.

(4) If the response of the zero gas or span gas differs more than one percent of full scale, then repeat paragraphs (e)(1) through (3) of this section.

63. Sampling System Requirements.

(a) Sample component surface temperature. For sampling systems which use heated components, use engineering judgment to locate the coolest portion of each component (pump, sample line section, filters, and so forth) in the heated portion of the sampling system that has a separate source of power or heating element. Monitor the temperature at that location. If several components are within an oven, then only the surface temperature of the component with the largest thermal mass and the oven temperature need be measured.

(b) If water is removed by condensation, monitor the sample gas temperature or sample dew point either within the water trap or downstream. It may not exceed 7 degrees Celsius.

64. Measurement Equipment Accuracy/Calibration Frequency Table.

(a) The accuracy of measurements must be such that the maximum tolerances shown in Table 1 in Appendix A to this Part are not exceeded.

(b) Calibrate all equipment and analyzers according to the frequencies shown in Table 1 in Appendix A to this Part.

(c) Prior to initial use and after major repairs, bench check each analyzer (see Part III, section 23).

(d) Calibrate as specified in Part III, section 6 and sections 15 through 22.

(e) At least monthly, or after any maintenance which could alter calibration, perform the following calibrations and checks.

(1) Leak check the vacuum side of the system (see Part III, section 24(a)).

(2) Verify that the automatic data collection system (if used) meets the requirements found in Table 1 in Appendix A of this Part.

(3) Check the fuel flow measurement instrument to insure that the specifications in Table 1 in Appendix A to this Part are met.

(f) Verify that all NDIR analyzers meet the water rejection ratio and the CO_2 rejection ratio as specified in Part III, section 25.

(g) Verify that the dynamometer test stand and power output instrumentation meet the specifications in Table 1 in Appendix A to this Part.

65. Catalyst Thermal Stress Test.

(a) Oven characteristics. The oven used for thermally stressing the test catalyst must be capable of maintaining a temperature of 500 degrees Celsius ± 5 degrees Celsius and 1000 degrees Celsius ± 10 degrees Celsius.

(b) Evaluation gas composition.

(1) A synthetic exhaust gas mixture is used for evaluating the effect of thermal stress on catalyst conversion efficiency.

(2) The synthetic exhaust gas mixture must have the following composition:

Constituent	Volume Percent	Parts per million
Carbon Monoxide[1]	1	—
Oxygen	1.3	—
Carbon Dioxide	9	—
Water Vapor	10	—
Sulfur Dioxide	—	20
Oxides of Nitrogen	—	280
Hydrogen	—	3500
Hydrocarbon[1,2]	—	4000
Nitrogen=Balance	—	—

1 Alternatively, the carbon monoxide and hydrocarbon proportions of the mixture may be changed to 1.2% and 4650 ppm, respectively (using one of these concentrations requires that the other be used simultaneously.
2 Propylene/propane ratio = 2/1.

Appendix A to Part III.

Table 1.
Measurement Accuracy Calibration Frequency

No.	Item	Permissible deviation from reading[1]		Calibration frequency
		non-idle	idle	
1	Engine speed	± 2%	± 2%	Monthly
2	Torque	± 5%	—	Monthly
3	Fuel consumption	± 1%	± 5%	Monthly
4	Air consumption	± 2°C	± 5%	As required
5	Coolant temperature	± 2°C	Same	As required
6	Lubricant temperature	± 2%	Same	As required
7	Exhaust backpressure	± 5%	Same	As required
8	Inlet depression	± 5%	Same	As required
9	Exhaust gas temperature	± 15%	Same	As required
10	Air inlet temperature (combustion air)	± 2°C	Same	As required
11	Atmospheric pressure	± 0.5%	Same	As required
12	Humidity (combustion air) (relative)	± 3.0%	Same	As required
13	Fuel temperature	± 2°C	Same	As required
14	Temperature with regard to dilution system	± 2°C	Same	As required
15	Dilution air humidity	± 3.0% absolute	Same	As required
16	HC analyzer	± 2%[2]	Same	Monthly
17	CO analyzer	± 2%[2]	Same	Monthly
18	NO_x analyzer	± 2%[2]	Same	Monthly
19	NO_x converter check	90%	Same	Monthly
20	CO_2 analyzer	± 2%[2]	Same	Monthly

1. All accuracy requirements pertain to the final recorded value, which is inclusive of the data acquisition system.
2. If reading is under 100 ppm then the accuracy shall be ± 2 ppm.

Appendix B to Part III – Figures.

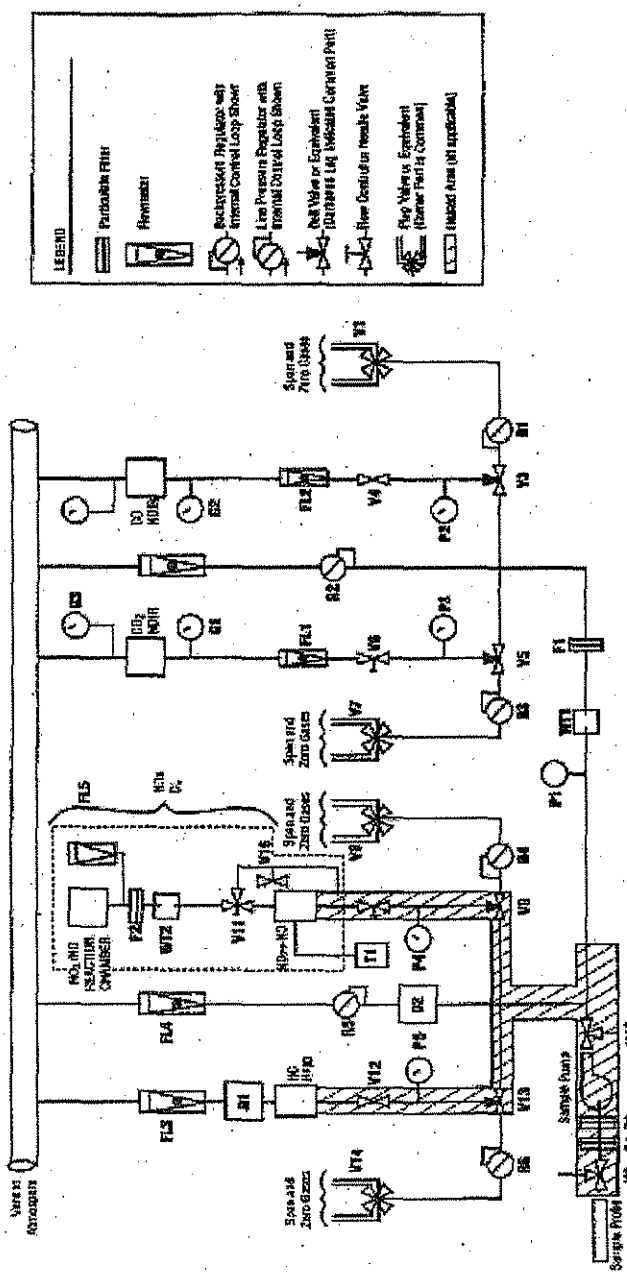

Figure 1. — Exhaust Gas Sampling and Analytical Train, Continuous Sampling

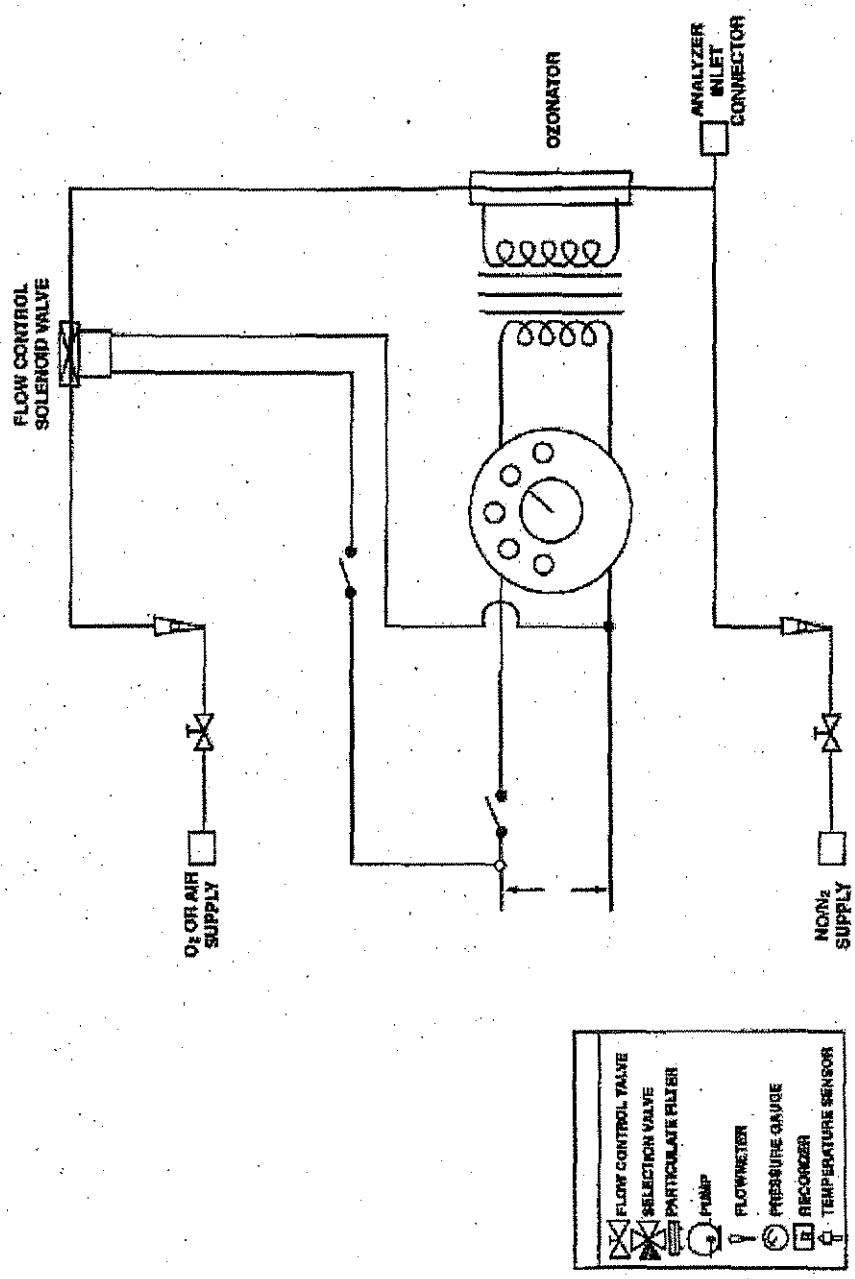

Figure 2. — NOx Converter Efficiency Detector

Part IV. Gaseous Exhaust Test Procedures

66. Scope; Applicability.

(a) This Part describes the procedures to follow in order to perform exhaust emission tests on new spark-ignition marine engines subject to the provisions of Part I. Provisions specific to raw gas sampling are in Part IV, sections 14 through 19, provisions specific to constant volume sampling are in Part IV, sections 20 through 26. All other sections in this Part apply to both raw gas sampling and constant volume sampling unless indicated otherwise.

(b) Requirements for emission test equipment and calibrating this equipment as required to perform the procedures in this Part are found in Part III.

67. Definitions.

The definitions in Part I, section 2 apply to this Part.

68. Abbreviations.

The abbreviations in Part I, section 3 apply to this Part.

69. Test Procedure Overview.

(a)The test consists of prescribed sequences of engine operating conditions to be conducted on an engine dynamometer or equivalent load and speed measurement device. The exhaust gases generated during engine operation are sampled either raw or dilute, and specific components are analyzed through the analytical system.

(b)The tests are designed to determine the brake-specific emissions of hydrocarbons, carbon monoxide, and oxides of nitrogen. The test consists of one idle mode and four power modes with an exponential relationship between torque and speed which span the typical operating range of spark-ignition marine engines. These procedures require the determination of the concentration of each pollutant, fuel flow, and the power output during each mode. The measured values are weighted and used to calculate the grams of each pollutant emitted per brake kilowatt hour (g/kW-hr).

(c) (1) When an engine is tested for exhaust emissions the complete engine is tested, with all emission control devices installed and functioning.

(2) Additional accessories (for example, oil cooler, alternators, and so forth) may be installed, but such accessory loading will be considered parasitic in nature and observed power is used in the emission calculation.

(d) All emission control systems installed on or incorporated in the application must be functioning during all procedures in this Part. In cases of component malfunction or

failure, no maintenance is allowed without prior approval from the Executive Officer in accordance with Part I, section 23.

70. Recorded Information.

(a) Record the information described in this section for each test where applicable.

(b) Test data; general.

(1) Engine identification number.

(2) Engine emissions control system.

(3) Test operator(s).

(4) Number of hours of operation accumulated on the engine before beginning the warm-up portion of the test (to the nearest tenth hour).

(5) Fuel identification.

(6) For two-stroke engines, fuel/oil mixture ratio.

(7) Date of most recent analytical assembly calibration.

(8) All pertinent instrument information such as tuning, gain, serial numbers, detector number, and calibration curve numbers. As long as this information is traceable, it may be summarized by system number or analyzer identification numbers.

(c) Test data; pre-test.

(1) Date and time of day.

(2) Test number.

(3) Barometric pressure; as an option, barometric pressure can be measured as a modal measurement instead of or in addition to a pre- and post-test measurement.

(4) Recorder chart or equivalent. Identify for each test segment zero traces for each range used, and span traces for each range used.

(d) Test data; modal.

(1) Recorder chart or equivalent. Identify for each test mode the emission concentration traces and the associated analyzer range(s).

(2) Observed engine torque.

(3) Observed engine rpm.

(4) Engine intake air flow, if applicable.

(5) Test cell temperature and humidity for each mode.

(6) For raw gas testing; fuel flow for each mode. Fuel flow measurement is not required for dilute testing but is allowed. If the fuel flow measurement is a volume measurement system, record the fuel temperature in the measurement system for fuel density corrections to the mass flow rate. If the fuel temperature is within 3 degrees Celsius of the calibration temperature, no density correction is required.

(7) Engine intake temperature and humidity for each mode, if applicable.

(8) Exhaust sample line temperature, if applicable.

(e) Test data; post-test.

(1) Recorder chart or equivalent. Identify the hang-up check.

(2) Recorder chart or equivalent. Identify the zero traces for each range used and the span traces for each range used.

(3) Total number of hours of operation accumulated on the engine (to the nearest tenth hour).

(4) Barometric pressure, post-test segment.

71. Engine Parameters to be Measured and Recorded.

Measure or calculate, then record, the engine parameters in the table below:

Parameter	Units
Airflow rate (dry), if applicable	g/h
Fuel flow rate	g/h
Engine speed	rpm
Engine torque output	N-m
Power output	kW
Air inlet temperature	°C
Air humidity	mg/kg
Coolant temperature (liquid cooled)	°C
Exhaust mixing chamber surface temperature, if applicable	°C
Total accumulated hours of engine operation	H
Barometric pressure	kilopascals

72. Engine Inlet and Exhaust Systems.

(a) The engine manufacturer is liable for emission compliance over the full range of restrictions that are specified by the engine manufacturer for that particular engine.

(b) The air inlet filter system and exhaust muffler system combination used on the test engine must be the systems expected to yield the highest emission levels.

73. Pre-test Procedures.

(a) Engine service accumulation and stabilization procedure. Use the service accumulation procedure determined by the manufacturer for exhaust emission stabilizing of an engine, consistent with good engineering practice (see Part 1, section 21).

(1) The manufacturer determines, for each engine family, the number of hours at which the engine exhaust emission control system combination is stabilized for emission testing. However, this stabilization procedure may not exceed 12 hours. The manufacturer must maintain, and provide to the Executive Officer upon request, a record of the rationale used in making this determination. If the manufacturer can document that, at some time before the full 12 hour service

accumulation period, the engine emissions are decreasing for the remainder of the 12 hours, the service accumulation may be completed at that time. The manufacturer may elect to accumulate 12 hours on each test engine within an engine family without making this determination.

(2) During service accumulation, the fuel and lubricants specified in Part III, section 8 must be used.

(3) Engine maintenance during service accumulation is allowed only in accordance with Part I, section 22.

(b) Engine pre-test preparation.

(1) Drain and charge the fuel tank(s) with the specified test fuel (see Part III, section 8) to 50 percent of the tank's nominal capacity. If an external fuel tank is used, the engine fuel inlet system pressure must be typical of what the engine will see in use.

(2) Operate the engine on the dynamometer measuring the fuel consumption (fuel consumption required only for raw gas sampling method) and torque before and after the emission sampling equipment is installed, including the sample probe, using mode 1 from Table 1-1 in Part 1, section 20. The emission sampling equipment may not significantly affect the operational characteristics of the engine (typically, the results should agree within five percent).

(c) Analyzer pre-test procedures.

(1) If necessary, warm up and stabilize the analyzer(s) before calibrations are performed.

(2) Replace or clean the filter elements and then vacuum leak check the system per Part III, section 24(a). If necessary, allow the heated sample line, filters, and pumps to reach operating temperature.

(3) Perform the following system checks:

(A) If necessary, check the sample-line temperature. Heated FID sample line temperature must be maintained between 110 degrees Celsius and 230 degrees Celsius, a heated NO_x sample line temperature must be maintained between 60 degrees Celsius and 230 degrees Celsius.

(B) Check that the system response time has been accounted for before sample collection data recording.

(C) A hang-up check is permitted.

(4) Check analyzer zero and span before and after each test at a minimum. Further, check analyzer zero and span any time a range change is made or at the maximum demonstrated time span for stability for each analyzer used.

(d) Check system flow rates and pressures and reset if necessary.

74. Engine Dynamometer Test Run.

(a) Engine and dynamometer start-up.

(1) Only adjustments in accordance with Part I, section 17, may be made to the test engine before starting a test.

(2) If necessary, warm up the dynamometer as recommended by the dynamometer manufacturer or in accordance good engineering practice.

(3) At the manufacturer's option, the engine can be run with the throttle in a fixed position or by using the engine's governor (if the engine is manufactured with a governor). In either case, the engine speed and load must meet the requirements specified in paragraph (b)(12) of this section.

(b) Each test consists of the following:

(1) Record the general test data as specified in section 5 of this Part.

(2) Precondition the engine in the following manner;

~~(i)~~(A) Operate the engine at idle for 2 to 3 minutes;

~~(ii)~~(B) Operate the engine at a power greater than or equal to 50 percent power at the rated speed for 5 to 7 minutes;

~~(iii)~~(C) Operate the engine at rated speed and maximum power for 25 to 30 minutes;

~~(iv)~~(D) Option. For four-stroke engines, where appropriate, it is permitted to precondition the engine at rated speed and maximum power until the oil and water temperatures are stabilized. The temperatures are defined as stabilized if they are maintained within 2 percent of point for 2 minutes. The engine must be operated a minimum of 10 minutes for this option. This optional procedure may be substituted for step in paragraphs (b)(2)~~(iii)~~(C) of this section;

~~(v)~~(E) Option. If the engine has been operating on service accumulation for a minimum of 40 minutes, the service accumulation may be substituted for steps in paragraphs (b)(2)~~(i)~~(A) through ~~(iii)~~(C) of this section.

(3) Record all pre-test data specified in Part IV, section 5(c).

(4) Start the test cycle (see Part IV, section 10) within 10 minutes of the completion of the steps required by paragraph (b)(2) of this section.

(5) During the first mode calculate the torque corresponding to 71.6, 46.5, and 25.3 percent of the maximum observed torque for the rated speed.

(6) Once engine speed and load are set for a mode, run the engine for a sufficient period of time to achieve thermal stability. At the manufacturers option, determine and document the appropriate criterion for thermal stability for each engine family.

(7) Record all modal data specified in Part IV, section 5(e) for a minimum time period of the last two minutes of each mode. Longer averaging periods are acceptable, but the data averaged must be from a continuous time period. The duration of time during which this data is recorded is referred to as the "sampling period." The data collected during the sampling period is used for modal emission calculations.

(8) Continuously record the analyzer's response to the exhaust gas during the sampling period.

(9) Modes may be repeated.

(10) If a delay of more than one hour occurs between the end of one mode and the beginning of another mode, the test is void and must be restarted as described at paragraph (b)(1) of this section.

(11) The engine speed and load must be maintained within the requirements of Part IV, section 10 during the sampling period for each mode. If this requirement is not met, the mode is void and must be restarted.

(12) If at any time during a mode, the test equipment malfunctions or the specifications in Part IV, section 10 can not be met, the test is void, and must be aborted. Corrective action should be taken and the test restarted.

(13) Fuel flow and air flow during the idle condition may be determined just before or immediately following the dynamometer sequence, if longer times are required for accurate measurements. If the dilute sampling method (Constant Volume Sampling) is used, neither fuel flow nor air flow measurements are required.

(c) Exhaust gas measurements.

(1) Measure HC, CO, CO_2, and NO_x concentration in the exhaust sample.

(2) Each analyzer range that may be used during a test segment must have the zero and span responses recorded before the start of the test. Only the range(s) used to measure the emissions during the test is required to have its zero and span recorded after the completion of the test. Depending on the stability of each individual analyzer, more frequent zero checks or spans between modes may be necessary.

(3) It is permitted to change filter elements between test segments.

(4) A leak check is permitted between modes.

(5) A hang-up check is permitted between modes (see Part IV, section 13).

(6) If, during the emission measurement portion of a mode, the value of the gauges downstream of the NDIR analyzer(s) G3 or G4 (See Figure 1 in Appendix B of Part III) differs by more than ± 0.5 kilopascals, the mode is void.

75. Engine Test Cycle.

(a)The 5-mode cycle specified in Part I, section 20 shall be followed in dynamometer operation tests of spark-ignition marine engines.

(b)During each non-idle mode the specified speed and load shall be held to within ± 50 rpm or ± two percent of point, whichever is greater. During each idle mode the engine speed shall be held within ± 75 rpm or ± five percent of the manufacturers specified idle speed, whichever is greater. For direct drive products (no neutral gear), it is acceptable to have an accessory load on the engine during the idle mode provided that the engine speed is within ± five percent of the manufacturers specified idle speed and the accessory load is representative of in use operation.

(c) If the operating conditions specified in paragraph (b) of this section for modes 2, 3, 4, and 5 cannot be maintained, the Executive Officer may authorize deviations from the specified load conditions. Such deviations shall not exceed 10 percent of the maximum torque at the test speed. The minimum deviations, above and below the specified load, necessary for stable operation shall be determined by the manufacturer and approved by the Executive Officer before the test run.

(d) Do not include power generated during the idle mode (mode 5) in the calculation of emissions results.

76. Post-test Analyzer Procedures.

(a) Perform a hang-up check within 60 seconds of the completion of the last mode in the test. Use the following procedure:

(1) Introduce a zero-grade gas or room air into the sample probe or valve V2 (see Figure 1 in Appendix B of Part III) to check the hangup zero response. Simultaneously start a time measurement.

(2) Select the lowest HC range used during the test.

(3) Within four minutes of beginning the time measurement in paragraph (a)(1) of this section, the difference between the zero gas response and the hang-up zero response shall not be greater than 5.0 percent of full scale or 10 ppmC whichever is greater.

(b) Begin the analyzer span checks within six minutes after the completion of the last mode in the test. Record for each analyzer the zero and span response for each range used during the preceding test or test segment.

(c) If during the test, the filter element(s) were replaced or cleaned, a vacuum check must be performed per Part III, section 24(a) immediately after the span checks. If the vacuum side leak check does not meet the requirements of Part III, section 24(a) the test is void.

(d) Read and record the post-test data specified in Part IV, section 5(e).

(e) For a valid test, the analyzer drift between the before-segment and after-segment span checks for each analyzer must meet the following requirements:

(1) The span drift (defined as the change in the difference between the zero response and the span response) must not exceed two percent of full-scale chart deflection for each range used.

(2) The zero response drift must not exceed two percent of fullscale chart deflection for each range used above 155 ppm (or ppm C), or three percent of full-scale chart deflection for each range below 155 ppm (or ppm C).

77. Data Logging.

(a) A computer or any other automatic data collection (ADC) device(s) may be used as long as the system meets the requirements of this Part.

(b) Determine from the data collection records the analyzer responses corresponding to the end of each mode.

(c) Record data at a minimum of one Hz (one time per second).

(d) Determine the final value for power by averaging the individually calculated power points for each value of speed and torque recorded during the sampling period. As an

alternative, the final value for power can be calculated from the average values for speed and torque, collected during the sampling period.

(e) Determine the final value for CO_2, CO, HC, and NO_x concentrations by averaging the concentration of each point taken during the sample period for each mode.

78. Exhaust Sample Procedure – Gaseous Components.

(a) Automatic data collection equipment requirements. The analyzer response may be read by automatic data collection (ADC) equipment such as computers, data loggers, etc. If ADC equipment is used the following is required:

(1) For dilute grab ("bag") analysis, the analyzer response must be stable at greater than 99 percent of the final reading for the dilute exhaust sample bag. A single value representing the average chart deflection over a 10-second stabilized period shall be stored.

(2) For continuous analysis systems, a single value representing the average integrated concentration over a cycle shall be stored. Alternatively, the ADC may store the individual instantaneous values collected during the measurement period.

(3) The chart deflections or average integrated concentrations required in paragraphs (a)(1) and (a)(2) of this section may be stored on long-term computer storage devices such as computer tapes, storage discs, punch cards, and so forth, or they may be printed in a listing for storage. In either case a chart recorder is not required and records from a chart recorder, if they exist, need not be stored.

(4) If ADC equipment is used to interpret analyzer values, the ADC equipment is subject to the calibration specifications of the analyzer as if the ADC equipment is part of analyzer system.

(b) Data records from any one or a combination of analyzers may be stored as chart recorder records.

(c) Grab sample analysis. For dilute grab sample analysis perform the following sequence:

(1) Calibrate analyzers using the procedure described in Part III, section 26.

(2) Record the most recent zero and span response as the preanalysis value.

(3) Measure HC, CO, CO_2, and NO_x background concentrations in the sample bag(s) and background sample bag(s) using the same flow rates and pressures.

(4) Good engineering practice dictates that analyzers used for continuous analysis should be operated such that the measured concentration falls between 15 percent and 100 percent of full scale.

(5) A post-analysis zero and span check of each range must be performed and the values recorded. The number of events that may occur between the pre and post checks is not specified. However, the difference between pre-analysis zero and span values (recorded in paragraph (c)(5) or (c)(6) of this section) versus those recorded for the post-analysis check may not exceed the zero drift limit or the span drift limit of 2 percent of full scale chart deflection for any range used. Otherwise the test is void.

(d) Continuous sample analysis. For continuous sample analysis, perform the following sequence:

(1) Calibrate analyzers using the procedures described in Part III, section 26.

(2) Leak check portions of the sampling system that operate at negative gauge pressures when sampling, and allow heated sample lines, filters, pumps, and so forth to stabilize at operating temperature.

(3) Option: Determine the hang-up for the FID or HFID sampling system:

(A) Zero the analyzer using zero air introduced at the analyzer port.

(B) Flow zero air through the overflow sampling system. Check the analyzer response.

(C) If the overflow zero response exceeds the analyzer zero response by two percent or more of the FID or HFID full-scale deflection, hang-up is indicated and corrective action must be taken (see paragraph (e) of this section).

(D) The complete system hang-up check specified in paragraph (f) of this section is recommended as a periodic check.

(4) Obtain a stable zero reading.

(5) Good engineering practice dictates that analyzers used for continuous analysis should be operated such that the measured concentration falls between 15 percent and 100 percent of full scale.

(6) Record the most recent zero and span response as the preanalysis values.

(7) Collect background HC, CO, CO_2, and NO_x in a sample bag (for dilute exhaust sampling only, see Part IV, section 22).

(8) Perform a post-analysis zero and span check for each range used at the conditions specified in paragraph (d)(1) of this section. Record these responses as the post-analysis values.

(9) Neither the zero drift nor the span drift between the preanalysis and post-analysis checks on any range used may exceed three percent for HC, or two percent for NO_x, CO, and CO_2, of full scale chart deflection, or the test is void. (If the HC drift is greater than three percent of full-scale chart deflection, hydrocarbon hang-up is likely.)

(10) Determine background levels of NO_x, CO, or CO_2 (for dilute exhaust sampling only) by the grab ("bag") technique outlined in paragraph (c) of this section.

(e) Hydrocarbon hang-up. If HC hang-up is indicated, the following sequence may be performed:

(1) Fill a clean sample bag with background air.

(2) Zero and span the HFID at the analyzer ports.

(3) Analyze the background air sample bag through the analyzer ports.

(4) Analyze the background air through the entire sample probe system.

(5) If the difference between the readings obtained is two ppm or more, clean the sample probe and the sample line.

(6) Reassemble the sample system, heat to specified temperature, and repeat the procedure in paragraphs (e)(1) through (e)(5) of this section.

79. Raw Gaseous Exhaust Sampling and Analytical System Description.

(a) Schematic drawing. An example of a sampling and analytical system which may be used for testing under this Part is shown in Figure 4 in Appendix A of this Part. All components or parts of components that are wetted by the sample or corrosive calibration gases shall be either chemically cleaned stainless steel or inert material (e.g., polytetrafluoroethylene resin). The use of "gauge savers" or "protectors" with nonreactive diaphragms to reduce dead volumes is permitted.

(b) Sample probe.

(1) The sample probe shall be a straight, closed end, stainless steel, multi-hole probe. The inside diameter shall not be greater than the inside diameter of the sample line + 0.03 cm. The wall thickness of the probe shall not be greater than 0.10 cm. The

fitting that attaches the probe to the exhaust pipe shall be as small as practical in order to minimize heat loss from the probe.

(2) The probe shall have a minimum of three holes. The spacing of the radial planes for each hole in the probe must be such that they cover approximately equal cross-sectional areas of the exhaust duct. The angular spacing of the holes must be approximately equal. The angular spacing of any two holes in one plane may not be 180 deg. ± 20 deg. (i.e., section C-C of Figure 1 in Appendix A of this Part). The holes should be sized such that each has approximately the same flow. If only three holes are used, they may not all be in the same radial plane.

(3) The exhaust gas probe must be located in a position which yields a well mixed, homogeneous sample of the engine exhaust. The probe must extend radially through the exhaust duct before where the exhaust mixes with the cooling water. The cooling water flow may be rerouted if necessary to obtain an emission sample provided that the modification has no significant effect on the performance or emissions characteristics of the engine. The probe must pass through the approximate center and must extend across at least 80 percent of the diameter of the duct. The exact position of the probe may vary from engine family to engine family.

(c) Sample transfer line.

(1) The maximum inside diameter of the sample line shall not exceed 1.32 cm.

(2) If valve V2 in Figure 1 of Appendix B of Part III is used, the sample probe must connect directly to valve V2 in Figure 1 of Appendix B of Part III. The location of optional valve V2 may not be greater than 1.22 m from the exhaust duct.

(3) The location of optional valve V16 in Figure 1 of Appendix B of Part III may not be greater than 61 cm from the sample pump. The leakage rate for this section on the pressure side of the sample pump may not exceed the leakage rate specification for the vacuum side of the pump.

(d) Venting. All vents including analyzer vents, bypass flow, and pressure relief vents of regulators should be vented in such a manner to avoid endangering personnel in the immediate area.

(e) Any variation from the specifications in this Part including performance specifications and emission detection methods may be used only with prior approval by the Executive Officer.

(f) Additional components, such as instruments, valves, solenoids, pumps, switches, and so forth, may be employed to provide additional information and coordinate the functions of the component systems.

(g) The following requirements must be incorporated in each system used for raw testing under this Part.

(1) Take the sample for all components with one sample probe and split it internally to the different analyzers.

(2) Heat the sample transport system from the engine exhaust pipe to the HC analyzer for the raw gas sampling method as indicated in Figure 1 in Appendix B of Part III. The NO_x analyzer for the raw gas sampling method may be heated as indicated in Figure 1 in Appendix B of Part III. The HC analyzer and the NO_x analyzer for the dilute sampling method may be heated as indicated in Figure 1 in Appendix B of Part III.

80. Raw Gaseous Sampling Procedures.

Fit all heated sampling lines with a heated filter to extract solid particles from the flow of gas required for analysis. The sample line for HC measurement must be heated. The sample line for CO, CO_2, and NO_x may be heated or unheated.

81. Intake Air Flow Measurement Specifications.

(a) If used, the engine intake air flow measurement method used must have a range large enough to accurately measure the air flow over the engine operating range during the test. Overall measurement accuracy must be ± two percent of full-scale value of the measurement device for all modes except the idle mode. For the idle mode, the measurement accuracy shall be ± five percent or less of the full-scale value. The Executive Officer must be advised of the method used before testing.

(b) When an engine system incorporates devices that affect the air flow measurement (such as air bleeds, air injection, pulsed air, and so forth) that result in understated exhaust emission results, make corrections to the exhaust emission results to account for such effects.

82. Fuel Flow Measurement Specifications.

(a) Fuel flow measurement is required only for raw testing but is allowed for dilute testing.

(b) The fuel flow rate measurement instrument must have a minimum accuracy of ± two percent of full-scale flow rate for each measurement range used.

83. Data Evaluation for Gaseous Emissions.

For the evaluation of the gaseous emissions recording, record the last two minutes of each mode and determine the average values for HC, CO, CO_2, and NO_x during each mode from the average concentration readings determined from the corresponding calibration data.

84. Raw Emission Sampling Calculations.

(a) Derive the final test results through the steps described in this section.

(b) Air and fuel flow method. If both air and fuel flow mass rates are measured, the following equations are used to determine the weighted emission values for the test engine:

$$W_{HC} = (G_{AIRD} + G_{FUEL})\, x\, \frac{M_{HC_{exh}}}{M_{exh}}\, x\, WHX\, x\, \frac{1}{10^6}$$

$$W_{NO_x} = (G_{AIRD} + G_{FUEL})\, x\, \frac{M_{NO_2}}{M_{exh}}\, x\, WNO_x\, x\, K_H\, x\, \frac{1}{10^6}$$

Where:

W_{HC} = Mass rate of HC in exhaust [g/hr],

G_{AIRD} = Intake air mass flow rate on dry basis [g/hr],

G_{FUEL} = Fuel mass flow rate [g/hr],

$$W_{CO} = (G_{AIRD} + G_{FUEL})\, x\, \frac{M_{CO}}{M_{exh}}\, x\, WCO\, x\, \frac{1}{10^6}$$

M_{HCexh} = Molecular weight of hydrocarbons in the exhaust; see the following equation:

$$M_{HC_{exh}} = 12.01 + 1.008 x \alpha$$

Where:

α = Hydrocarbon/carbon atomic ratio of the fuel.

M_{exh} = Molecular weight of the total exhaust; see the following equation:

$$M_{exh} = \frac{M_{HC_{exh}} x WHC}{10^6} + \frac{28.01 x WCO}{10^2} + \frac{44.1 x WCO_2}{10^2} + \frac{46.01 x WNO_x}{10^6} + \frac{2.016 x WH_2}{10^2} + 18.01 x (1-K) +$$

$$28.01 x \frac{\left[100 - \frac{WHC}{10^4} - WCO - WCO_2 \frac{WNO_x}{10^4} - WH_2 - 100 x (1-K)\right]}{10^2}$$

Where:

WHC	=	HC volume concentration in exhaust, ppmC wet
WCO	=	CO percent concentration in the exhaust, wet
DCO	=	CO percent concentration in the exhaust, dry
WCO_2	=	CO_2 percent concentration in the exhaust, wet
DCO_2	=	CO_2 percent concentration in the exhaust, dry
WNO_x	=	NO volume concentration in exhaust, ppm wet
WH_2	=	H_2 percent concentration in exhaust, wet
K	=	correction factor to be used when converting dry measurements to a wet basis. Therefore, wet concentration = dry concentration x K, where K is:

$$\frac{1}{1 + 0.005 x (DCO + DCO_2) x \alpha - 0.01 x DH_2}$$

DH_2	=	H2 percent concentration in exhaust, dry, calculated from the following equation:

$$DH_2 = \frac{0.5 x \alpha x DCO x (DCO + DCO_2)}{DCO + (3 x DCO_2)}$$

W_{CO}	=	Mass rate of CO in exhaust, [g/hr]
M_{CO}	=	Molecular weight of CO = 28.01
W_{NOx}	=	Mass rate of NO_x in exhaust, [g/hr]
M_{NO2}	=	Molecular weight of NO_2 = 46.01

K_H = Factor for correcting the effects of humidity on NO_2 formation for four-stroke gasoline engines; see the equation below:

$$K_H = \frac{1}{1 - 0.0329\,x\,(H - 10.71)}$$

Where:

H = specific humidity of the intake air in grams of moisture per kilogram of dry air.

For two-stroke gasoline engines, K_H should be set to 1.

(c) Fuel flow method. The following equations are to be used when fuel flow is selected as the basis for mass emission calculations using the raw gas method.

$$W_{HC} = \frac{G_{FUEL}}{TC}\,x\,\frac{WHC}{10^4}$$

$$W_{CO} = \frac{M_{CO}}{M_F}\,x\,\frac{G_{FUEL}}{TC}\,x\,WCO$$

$$W_{NO_x} = \frac{M_{NO_x}}{M_F}\,x\,\frac{G_{FUEL}}{TC}\,x\,\frac{WNO_x}{10^4}\,x\,K_H$$

Where:

W_{HC} = Mass rate of HC in exhaust, [g/hr]

M_F = Molecular weight of test fuel; see following equation:

$$M_F = 12.01 + 1.008\,x\,\alpha$$

G_{FUEL} = Fuel mass flowrate, [g/hr]

TC = Total carbon; see following equation:

$$TC = WCO + WCO_2 + \frac{WHC}{10^4}$$

WHC = HC volume concentration in exhaust, ppmC wet

WCO = CO percent concentration in the exhaust, wet

DCO = CO percent concentration in the exhaust, dry

WCO_2 = CO_2 percent concentration in the exhaust, wet

DCO_2 = CO_2 percent concentration in the exhaust, dry

WNO_x = NO volume concentration in exhaust, ppm wet

WH_2 = H_2 percent concentration in exhaust, wet

K = correction factor to be used when converting dry measurements to a wet basis. Therefore, wet concentration = dry concentration x K, where K is:

$$K = \frac{1}{1 + 0.005 \, x \, (DCO + DCO_2) \, x \, \alpha - 0.01 \, x \, DH_2}$$

DH_2 = H_2 percent concentration in exhaust, dry, calculated from the following equation:

$$DH_2 = \frac{0.5 \, x \, \alpha \, x \, DCO \, x \, (DCO + DCO_2)}{DCO + (3 \, x \, DCO_2)}$$

W_{CO} = Mass rate of CO in exhaust, [g/hr]

M_{CO} = Molecular weight of CO = 28.01

W_{NOx} = Mass rate of NO_x in exhaust, [g/hr]

M_{NO2} = Molecular weight of NO_2 = 46.01

K_H = Factor for correcting the effects of humidity on NO_2 formation for four-stroke gasoline engines; see the equation below:

$$K_H = \frac{1}{1 - 0.0329 \, x \, (H - 10.71)}$$

Where:

H = specific humidity of the intake air in grams of moisture per kilogram of dry air.

For two-stroke gasoline engines, KH should be set to 1.

(d) The final reported emission test results must be computed by using the following formula for each individual gas component:

$$Y_{wm} = \frac{\sum (W_i \, x \, f_i)}{\sum (P_i \, x \, f_i)}$$

Where:

Y_{wm}	=	Weighted mass emission level (HC, CO, NO_x) for a test [g/kW-hr].
W_i	=	Average mass flow rate (W_{HC}, W_{CO}, W_{NOx}) of an emission from the test engine during mode i, [g/hr].
f_i	=	Weighting factors for each mode according to Part IV, section 10(a).
P_i	=	Average power measured during mode i, [kW], calculated according to the formula given in Part IV, section 23(b). Power for the idle mode shall always be zero for this calculation.

(e) The final reported weighted brake-specific fuel consumption (WBSFC) shall be computed by use of the following formula:

$$WBSFC = \frac{\sum (F_i \, x \, f_i)}{\sum (P_i \, x \, f_i)}$$

Where:

WBSFC	=	Weighted brake-specific fuel consumption in grams of fuel per kilowatt-hour (g/kW-hr).
F_i	=	Fuel mass flow rate of the engine during mode i, [g/hr].
f_i	=	Weighting factors for each mode according to Part IV, section 10(a).
P_i	=	Average power measured during mode i, [kW], calculated according to the formula given in Part IV, section 23(b). Power for the idle mode shall always be zero for this calculation.

85. CVS Concept of Exhaust Gas Sampling System.

(a) A dilute exhaust sampling system is designed to directly measure the true mass of emissions in engine exhaust without the necessity of measuring either fuel flow or intake air flow. This is accomplished by diluting the exhaust produced by an engine under test with ambient background air and measuring the total diluted exhaust flow rate and the concentration of emissions within the dilute flow. Total mass flow of an emission is then easily calculated.

(b) A constant volume sampler (CVS) is typically used to control the total amount of dilute flow through the system. As the name implies, a CVS restricts flow to a known value dependent only on the dilute exhaust temperature and pressure.

(c) For the testing described in this Part, a CVS must consist of: A mixing tunnel into which the engine exhaust and dilutant (background) air are dumped; a dilute exhaust flow metering system; a dilute exhaust sample port; a background sample port; a dilute exhaust sampling system; and a background sampling system.

(1) Mixing tunnel. The mixing tunnel must be constructed such that complete mixing of the engine exhaust and background air is assured before the sampling probe.

(2) Exhaust flow metering system. A dilute exhaust flow metering system must be used to control the total flow rate of the dilute engine exhaust as described in Part IV, section 21.

(3) Exhaust sample port. A dilute exhaust sample port must be located in or downstream of the mixing tunnel at a point where complete mixing of the engine exhaust and background air is assured.

(4) Background sample port. A dilute background sample port must be located in the stream of background air before it is mixed with the engine exhaust. The background probe must draw a representative sample of the background air during each sampling mode.

(5) Exhaust sampling system. The dilute exhaust sampling system controls the flow of samples from the mixing tunnel to the analyzer system. This could be either a continuous sampling system or grab (bag) sampling system. If a critical flow venturi (CFV) is used on the dilute exhaust sample probe, this system must assure that the sample CFV is in choke flow during testing. If no CFV is used, this system must assure a constant volumetric flow rate through the dilute exhaust sample probe or must incorporate electronic flow compensation.

(6) Background sampling system. The background sampling system controls the flow of samples from the background air supply to the analyzer system. This

could be either a continuous sampling system or grab (bag) sampling system. This system must assure a constant volumetric flow rate through the background sample probe.

86. Dilute Gaseous Exhaust Sampling and Analytical System Description.

(a) General. The exhaust gas sampling system described in this section is designed to measure the true mass emissions of engine exhaust. This system utilizes the Constant volume Sampling (CVS) concept (described in Part IV, section 20) of measuring mass emissions of HC, NO_x, CO, and CO_2. Grab sampling for individual modes is an acceptable method of dilute testing for all constituents, HC, NO_x, CO, and CO_2. Continuous dilute sampling is not required for any of the exhaust constituents, but is allowable for all. Heated sampling is not required for any of the constituents, but is allowable for HC and NO_x. The mass of gaseous emissions is determined from the sample concentration and total flow over the test period. As an option, the measurement of total fuel mass consumed over a cycle may be substituted for the exhaust measurement of CO_2. General requirements are as follows:

(1) This sampling system requires the use of a Positive Displacement Pump-Constant Volume Sampler (PDP-CVS) system with a heat exchanger, or a Critical Flow Venturi-Constant Volume Sampler (CFV-CVS) system with CVS sample probes and/or a heat exchanger or electronic flow compensation. Figure 2 in Appendix A of this Part is a schematic drawing of the PDP-CVS system. Figure 3 in Appendix A of this Part is a schematic drawing of the CFV-CVS system.

(2) The HC analytical system requires:

~~(i)~~(A) Grab sampling (see Part IV, section 20, and Figure 2 or Figure 3 in Appendix A of this Part) and analytical capabilities (see Part IV, section 23, and Figure 4 in Appendix A of this Part), or

~~(ii)~~(B) Continuously integrated measurement of diluted HC meeting the minimum requirements and technical specifications contained in paragraph (b)(2) of this section.

~~(iii)~~(C) The dilute HC analytical system for spark-ignition marine engines does not require a heated flame ionization detector (HFID).

~~(iv)~~(D) If used, the HFID sample must be taken directly from the diluted exhaust stream through a heated probe and integrated continuously over the test cycle.

~~(v)~~(E) The heated probe must be located in the sampling system far enough downstream of the mixing area to ensure a uniform sample distribution across the CVS duct at the sampling zone.

(3) The CO and CO_2 analytical system requires:

~~(i)~~(A) Grab sampling (see Part IV, section 20, and Figure 2 or Figure 3 in Appendix A of this Part) and analytical capabilities (see Part IV, section 23, and Figure 4 in Appendix A of this Part), or

~~(ii)~~(B) Continuously integrated measurement of diluted CO and CO_2 meeting the minimum requirements and technical specifications contained in paragraph (b)(4) of this section.

(4) The NO_x analytical system requires:

~~(i)~~(A) Grab sampling (see Part IV, section 20, and Figure 2 or Figure 3 in Appendix A of this Part) and analytical capabilities (see Part IV, section 23, and Figure 4 in Appendix A of this Part), or

~~(ii)~~(B) A continuously integrated measurement of diluted NO_x meeting the minimum requirements and technical specifications contained in paragraph (b)(4) of this section.

(5) Since various configurations can produce equivalent results, exact conformance with these drawings is not required. Additional components such as instruments, valves, solenoids, pumps, and switches may be used to provide additional information and coordinate the functions of the component systems. Other components, such as snubbers, which are not needed to maintain accuracy on some systems, may be excluded if their exclusion is based upon good engineering judgment.

(6) Other sampling and/or analytical systems may be used if shown to yield equivalent results and if approved in advance by the Executive Officer.

(b) Component description. The components necessary for exhaust sampling must meet the following requirements:

(1) Exhaust dilution system. The PDP-CVS must conform to all of the requirements listed for the exhaust gas PDP-CVS in Part IV, section 20 of this chapter. The CFV-CVS must conform to all of the requirements listed for the exhaust gas CFV-CVS in Part IV, section 20. In addition, the CVS must conform to the following requirements:

~~(i)~~(A) The flow capacity of the CVS must be sufficient to maintain the diluted exhaust stream in the dilution system at a temperature of 190 degrees Celsius or less at the sampling zone for hydrocarbon measurement and as required to prevent condensation at any point in the dilution system. Gaseous emission samples may be taken directly from this sampling point.

~~(ii)~~(B) For the CFV-CVS, either a heat exchanger or electronic flow compensation is required (see Figure 3 in Appendix A of this Part).

~~(iii)~~(C) For the CFV-CVS when a heat exchanger is used, the gas mixture temperature, measured at a point immediately ahead of the critical flow venturi, must be within ± 11 degrees Celsius of the average operating temperature observed during the test with the simultaneous requirement that condensation does not occur. The temperature measuring system (sensors and readout) must have an accuracy and precision of ± 2 degrees Celsius. For systems utilizing a flow compensator to maintain proportional flow, the requirement for maintaining constant temperature is not necessary.

(2) Continuous HC measurement system.

~~(i)~~(A) The continuous HC sample system (as shown in Figure 2 or 3 in Appendix A of this Part) uses an "overflow" zero and span system. In this type of system, excess zero or span gas spills out of the probe when zero and span checks of the analyzer are made.

~~(ii)~~(B) No other analyzers may draw a sample from the continuous HC sample probe, line, or system, unless a common sample pump is used for all analyzers and the sample line system design reflects good engineering practice.

~~(iii)~~(C) The overflow gas flow rates into the sample line must be at least 105 percent of the sample system flow rate.

~~(iv)~~(D) The overflow gases must enter the sample line as close as practical to the outside surface of the CVS duct or dilution system.

~~(v)~~(E) The continuous HC sampling system consists of a probe (which for a HFID analyzer must raise the sample to the specified temperature) and, where used, a sample transfer system (which for a HFID must maintain the specified temperature). The HFID continuous hydrocarbon sampling system (exclusive of the probe) must:

> ~~(A)~~(i) Maintain a wall temperature of 190 degrees Celsius ± 11 degrees Celsius as measured at every separately controlled heated component (that is, filters, heated line sections), using permanent thermocouples located at each of the separate components.
>
> ~~(B)~~(ii) Have a wall temperature of 190 degrees Celsius ± 11 degrees Celsius over its entire length. The temperature of the system is demonstrated by profiling the thermal characteristics of the system where possible at initial installation and after any major maintenance performed on the system. The profiling is to be accomplished using the insertion thermocouple probing technique. The system temperature must be

monitored continuously during testing at the locations and temperature described in Part IV, section 21(b)(2).

~~(C)~~(iii) Maintain a gas temperature of 190 degrees Celsius ± 11 degrees Celsius immediately before the heated filter and HFID. Determine these gas temperatures by a temperature sensor located immediately upstream of each component.

~~(vi)~~(F) The continuous hydrocarbon sampling probe:

~~(A)~~(i) Is defined as the first 25.4 to 76.2 cm of the continuous hydrocarbon sampling system.

~~(B)~~(ii) Has a 0.483 cm minimum inside diameter.

~~(C)~~(iii) Is installed in the dilution system at a point where the dilution air and exhaust are well mixed and provide a homogenous mixture.

~~(D)~~(iv) Is sufficiently distant (radially) from other probes and the system wall so as to be free from the influence of any wakes or eddies.

~~(E)~~(v) For a continuous HFID sample probe, the probe must increase the gas stream temperature to 190 degrees Celsius ± 11 degrees Celsius at the exit of the probe. Demonstrate the ability of the probe to accomplish this using the insertion thermocouple technique at initial installation and after any major maintenance. Demonstrate compliance with the temperature specification by continuously recording during each test the temperature of either the gas stream or the wall of the sample probe at its terminus.

~~(vii)~~(G) The response time of the continuous measurement system must be taken into account when logging test data.

(3) Sample mixing.

~~(i)~~(A) Configure the dilution system to ensure a well mixed, homogeneous sample before the sampling probe(s).

~~(ii)~~(B) Make the temperature of the diluted exhaust stream inside the dilution system sufficient to prevent water condensation.

~~(iii)~~(C) Direct the engine exhaust downstream at the point where it is introduced into the dilution system.

(4) Continuously integrated NO_x, CO, and CO_2 measurement systems.

~~(i)~~(A) Sample probe requirements:

~~(A)~~(i) The sample probe for continuously integrated NO_x, CO, and CO_2 must be in the same plane as the continuous HC probe, but sufficiently distant (radially) from other probes and the tunnel wall so as to be free from the influences of any wakes or eddies.

~~(B)~~(ii) The sample probe for continuously integrated NO_x, CO, and CO_2 must be heated and insulated over the entire length, to prevent water condensation, to a minimum temperature of 55 degrees Celsius. Sample gas temperature immediately before the first filter in the system must be at least 55 degrees Celsius.

~~(ii)~~(B) Conform to the continuous NO_x, CO, or CO_2 sampling and analysis system to the specifications of Part III with the following exceptions and revisions:

~~(A)~~(i) Heat the system components requiring heating only to prevent water condensation, the minimum component temperature is 55 degrees Celsius.

~~(B)~~(ii) Coordinate analysis system response time with CVS flow fluctuations and sampling time/test cycle offsets, if necessary.

~~(C)~~(iii) Use only analytical gases conforming to the specifications of Part III, section 12 for calibration, zero and span checks.

~~(D)~~(iv) Use a calibration curve conforming to Part III, section 21 for CO and CO_2 and Part III, section 18 for NO_x for any range on a linear analyzer below 155 ppm.

~~(iii)~~(C) Convert the chart deflections or voltage output of analyzers with non-linear calibration curves to concentration values by the calibration curve(s) specified in Part III section 21 before flow correction (if used) and subsequent integration takes place.

87. [Reserved].

88. Exhaust Gas Analytical System; CVS Grab Sample.

(a) Schematic drawings. Figure 4 in Appendix A of this Part is a schematic drawing of the exhaust gas analytical system used for analyzing CVS grab "bag" samples from spark-ignition engines. Since various configurations can produce accurate results, exact conformance with the drawing is not required. Additional components such as instruments, valves, solenoids, pumps and switches may be used to provide additional

information and coordinate the functions of the component systems. Other components such as snubbers, which are not needed to maintain accuracy in some systems, may be excluded if their exclusion is based on good engineering judgment.

(b) Major component description. The analytical system, Figure 4 in Appendix A of this Part, consists of a flame ionization detector (FID) or a heated flame ionization detector (HFID) for the measurement of hydrocarbons, nondispersive infrared analyzers (NDIR) for the measurement of carbon monoxide and carbon dioxide, and a chemiluminescence detector (CLD) (or heated CLD (HCLD)) for the measurement of oxides of nitrogen. The exhaust gas analytical system shall conform to the following requirements:

(1) The CLD (or HCLD) requires that the nitrogen dioxide present in the sample be converted to nitric oxide before analysis. Other types of analyzers may be used if shown to yield equivalent results and if approved in advance by the Executive Officer.

(2) If CO instruments are used which are essentially free of CO_2 and water vapor interference, the use of the conditioning column may be deleted. (See Part III, sections 17 and 20.)

(3) A CO instrument will be considered to be essentially free of CO_2 and water vapor interference if its response to a mixture of three percent CO_2 in N_2, which has been bubbled through water at room temperature, produces an equivalent CO response, as measured on the most sensitive CO range, which is less than one percent of full scale CO concentration on ranges above 300 ppm full scale or less than 3 ppm on ranges below 300 ppm full scale. (See Part III, section 17.)

(c) Alternate analytical systems. Analysis systems meeting the specifications and requirements of this Part for dilute sampling may be used upon approval of the Executive Officer.

(d) Other analyzers and equipment. Other types of analyzers and equipment may be used if shown to yield equivalent results and if approved in advance by the Executive Officer.

89. Dilute Sampling Procedure – CVS Calibration.

(a) The CVS is calibrated using an accurate flowmeter and restrictor valve.

(1) The flowmeter calibration shall be traceable to the National Institute for Standards and Testing (NIST), and will serve as the reference value (NIST "true" value) for the CVS calibration. (Note: In no case should an upstream screen or other restriction which can affect the flow be used ahead of the flowmeter unless calibrated throughout the flow range with such a device.)

(2) The CVS calibration procedures are designed for use of a "metering venturi" type flowmeter. Large radius or American Society of Mechanical Engineers (ASME) flow nozzles are considered equivalent if traceable to NIST measurements. Other measurement systems may be used if shown to be equivalent under the test conditions in this section and traceable to NIST measurements.

(3) Measurements of the various flowmeter parameters are recorded and related to flow through the CVS.

(4) Procedures used by ARB for both PDP-CVS and CFV-CVS are outlined below. Other procedures yielding equivalent results may be used if approved in advance by the Executive Officer.

(b) After the calibration curve has been obtained, verification of the entire system may be performed by injecting a known mass of gas into the system and comparing the mass indicated by the system to the true mass injected. An indicated error does not necessarily mean that the calibration is wrong, since other factors can influence the accuracy of the system (e.g., analyzer calibration, leaks, or HC hangup). A verification procedure is found in paragraph (e) of this section.

(c) PDP-CVS calibration.

(1) The following calibration procedure outlines the equipment, the test configuration, and the various parameters which must be measured to establish the flow rate of the CVS pump.

~~(i)~~(A) All the parameters related to the pump are simultaneously measured with the parameters related to a flowmeter which is connected in series with the pump.

~~(ii)~~(B) The calculated flow rate, in cm^3/s, (at pump inlet absolute pressure and temperature) can then be plotted versus a correlation function which is the value of a specific combination of pump parameters.

~~(iii)~~(C) The linear equation which relates the pump flow and the correlation function is then determined.

~~(iv)~~(D) In the event that a CVS has a multiple speed drive, a calibration for each range used must be performed.

(2) This calibration procedure is based on the measurement of the absolute values of the pump and flowmeter parameters that relate the flow rate at each point. Two conditions must be maintained to assure the accuracy and integrity of the calibration curve:

~~(i)~~(A) The temperature stability must be maintained during calibration. (Flowmeters are sensitive to inlet temperature oscillations; this can cause the data points to be scattered. Gradual changes in temperature are acceptable as long as they occur over a period of several minutes.)

~~(ii)~~(B) All connections and ducting between the flowmeter and the CVS pump must be absolutely void of leakage.

(3)During an exhaust emission test the measurement of these same pump parameters enables the user to calculate the flow rate from the calibration equation.

(4) Connect a system as shown in Figure 5 in Appendix A of this Part. Although particular types of equipment are shown, other configurations that yield equivalent results may be used if approved in advance by the Executive Officer. For the system indicated, the following measurements and accuracies are required:

Parameter	Symbol	Units	Sensor-readout tolerances
Barometric pressure (corrected)	P_B	kPa	± 0.34 kPa
Ambient temperature	T_{EI}	°C	± 0.28 °C
Air temperature into metering venturi	T_{EI}	°C	± 1.11 °C
Pressure drop between inlet & throat of venturi	P_{ED}	kPa	± 0.012 kPa
Air flow	Q_S	M^3/min.	± 0.5 % of NIST value
Air temperature at CVS pump inlet	P_{TI}	°C	± 1.11 °C
Pressure depression at CVS pump inlet	P_{PI}	kPa	± 0.055 kPa
Pressure head at CVS pump outlet	P_{PO}	kPa	± 0.055 kPa
Air temperature at CVS pump outlet (optional)	P_{YO}	°C	± 1.11 °C
Pump revolutions during test period	N	Revs	± 1 Rev.
Elapsed time for test period	t	seconds	± 0.5 seconds

(5) After the system has been connected as shown in Figure 5 of Appendix A of this Part, set the variable restrictor in the wide open position and run the CVS pump for 20 minutes. Record the calibration data.

(6) Reset the restrictor valve to a more restricted condition in an increment of pump inlet depression that will yield a minimum of six data points for the total

calibration. Allow the system to stabilize for 3 minutes and repeat the data acquisition.

(7) Data analysis:

~~(i)~~(A) The air flow rate, Qs, at each test point is calculated in standard cubic feet per minute 20 degrees Celsius, 101.3 kilopascals from the flowmeter data using the manufacturer's prescribed method.

~~(ii)~~(B) The air flow rate is then converted to pump flow, V_O, in cubic meter per revolution at absolute pump inlet temperature and pressure:

$$V_O = \frac{Q_S}{n} x \frac{T_p}{293} x \frac{101.3kPa}{P_p}$$

Where:

V_O	=	Pump flow, m^3/rev at T_P, P_P.
Q_S	=	Meter air flow rate in standard cubic meters per minute, standard conditions are 20° Celsius, 101.3 kPa.
n	=	Pump speed in revolutions per minute.
T_P	=	Pump inlet temperature in Kelvin, = P_{TI}+273° K.
P_P	=	Absolute pump inlet pressure, kPa = Pp-P_{PI}.

Where:

P_P	=	barometric pressure, kPa.
P_{PI}	=	Pump inlet depression, kPa.

~~(iii)~~(C) The correlation function at each test point is then calculated from the calibration data:

$$X_O = \frac{1}{n}\sqrt{\left(\frac{\Delta P}{P_E}\right)}$$

Where:

X_O	=	correlation function.

ΔP = The pressure differential from pump inlet to pump outlet = P_E-P_P, kPa.

P_E = Absolute pump outlet pressure = P_B+P_{PO}, kPa.

Where:

P_{PO} = Pressure head at pump outlet, kPa, (inches fluid).

~~(iv)~~(D) A linear least squares fit is performed to generate the calibration equation which has the form:

$$V_O = D_O - M(X_O)$$

D_O and M are the intercept and slope constants, respectively, describing the regression line.

(8) A CVS system that has multiple speeds should be calibrated on each speed used. The calibration curves generated for the ranges will be approximately parallel and the intercept values, D_O, will increase as the pump flow range decreases.

(9) If the calibration has been performed carefully, the calculated values from the equation will be within ± 0.50 percent of the measured value of V_O. Values of M will vary from one pump to another, but values of D_O for pumps of the same make, model and range should agree within ± three percent of each other. Calibrations should be performed at pump start-up and after major maintenance to assure the stability of the pump slip rate. Analysis of mass injection data will also reflect pump slip stability.

(d) CFV-CVS calibration.

(1) Calibration of the CFV is based upon the flow equation for a critical venturi.

~~(i)~~(A) Gas flow is a function of inlet pressure and temperature:

$$Q_S = \frac{K_V P}{\sqrt{T_K}}$$

Where:

Q_S = flow rate [m^3/min].

K_V = calibration coefficient.

P = absolute pressure [kilopascals].

T_K = absolute temperature [degrees Kelvin].

~~(ii)~~(B) The calibration procedure described in paragraph (d)(3) of this section establishes the value of the calibration coefficient at measured values of pressure, temperature and air flow.

(2) The manufacturer's recommended procedure shall be followed for calibrating electronic portions of the CFV.

(3) Measurements necessary for flow calibration are as follows:

Parameter	Symbol	Units	Tolerances
Barometric pressure (corrected)	P_B	kPa	± 0.34 kPa
Air temperature into flowmeter	T_{EI}	°C	± 0.28 °C
Pressure drop between inlet & outlet of venturi	P_{ED}	kPa	± 0.012 kPa
Air flow	Q_S	m^3/min.	± 0.5 percent of NIST value
CVS inlet depression	P_{PI}	kPa	± 0.055 kPa
Pressure head at CVS pump outlet	P_{PO}	kPa	± 0.055 kPa
Temperature at venturi inlet	T_V	°C	± 2.22 °C

(4) Set up equipment as shown in Figure 6 of Appendix A of this Part and eliminate leaks. (Leaks between the flow measuring devices and the critical flow venturi will seriously affect the accuracy of the calibration.)

(5) Set the variable flow restrictor to the open position, start the blower, and allow the system to stabilize. Record data from all instruments.

(6) Vary the flow restrictor and make at least eight readings across the critical flow range of the venturi.

(7) Data analysis. The data recorded during the calibration are to be used in the following calculations:

~~(i)~~(A) The air flow rate (designated as Qs) at each test point is calculated in standard cubic feet per minute from the flow meter data using the manufacturer's prescribed method.

~~(ii)~~(B) Calculate values of the calibration coefficient for each test point:

$$K_V = \frac{Q_S \sqrt{T_V}}{P_V}$$

Q_S = Flow rate in standard cubic meter per minute, at the standard conditions of 20° C, 101.3 kPa.

T_V = Temperature at venturi inlet, degrees Kelvin.

P_V = Pressure at venturi inlet = $P_B - P_{PI}$, kPa

Where:

P_{PI} = Venturi inlet pressure depression, kPa.

~~(iii)~~(C) Plot K_V as a function of venturi inlet pressure. For choked flow, K_V will have a relatively constant value. As pressure decreases (vacuum increases), the venturi becomes unchoked and K_V decreases. (See Figure 7 in Appendix A of this Part.)

~~(iv)~~(D) For a minimum of eight points in the critical region calculate an average K_V and the standard deviation.

~~(v)~~(E) If the standard deviation exceeds 0.3 percent of the average K_V, take corrective action.

(e) CVS system verification. The following "gravimetric" technique can be used to verify that the CVS and analytical instruments can accurately measure a mass of gas that has been injected into the system. (Verification can also be accomplished by constant flow metering using critical flow orifice devices.)

(1) Obtain a small cylinder that has been charged with 99.5 percent or greater propane or carbon monoxide gas.

(2) Determine a reference cylinder weight to the nearest 0.01 grams.

(3) Operate the CVS in the normal manner and release a quantity of pure propane into the system during the sampling period (approximately five minutes).

(4) The calculations are performed in the normal way except in the case of propane. The density of propane (0.6109 kg/m^3) carbon atom is used in place of the density of exhaust hydrocarbons.

(5) The gravimetric mass is subtracted from the CVS measured mass and then divided by the gravimetric mass to determine the percent accuracy of the system.

(6) Good engineering practice requires that the cause for any discrepancy greater than ± two percent must be found and corrected.

90. CVS Calibration Frequency.

Calibrate the CVS positive displacement pump or critical flow venturi following initial installation, major maintenance or as necessary when indicated by the CVS system verification (described in Part IV, section 24(e)).

91. Dilute Emission Sampling Calculations.

(a) The final reported emission test results must be computed by use of the following formula:

$$A_{wm} = \frac{\sum (W_i \, x \, WF_i)}{\sum (P_i \, x \, WF_i)} \, x \, K_{Hi}$$

Where:

A_{wm} = Weighted mass emission level (HC, CO, CO_2, or NO_x) for a test [g/kW-hr].

W_i = Average mass flow rate of an emission from a test engine during mode i [g/hr].

WF_i = Weighting factor for each mode i as defined in Part IV, section 10(a).

P_i = Gross average power generated during mode i [kW] calculated from the following equation (power for the idle mode shall always be zero for this calculation):

$$P_i = \frac{2\pi}{60{,}000} \, x \, speed \, x \, torque$$

speed = average engine speed measured during mode i [rev./minute]

torque = average engine torque measured during mode i [N-m]

K_{Hi} = Humidity correction factor for mode i. This correction factor only affects calculations for NO_x and is equal to one for all other emissions. K_{Hi} is also equal to one for all two-stroke engines.

(b) The mass flow rate (Wi) of an emission for mode i is determined from the following equation:

$$W_i = Q_i \, x \, D \, x \left(C_{Di} - C_{Bi} \, x \left(1 - \frac{1}{DF_i} \right) \right)$$

Where:

Q_i	=	Volumetric flow rate of the dilute exhaust through the CVS at standard conditions [m^3/hr at STP].
D	=	Density of a specific emission (D_{HC}, D_{CO}, D_{CO2}, D_{NOx}) in the exhaust [g/m^3].
DF_i	=	Dilution factor of the dilute exhaust during mode i.
C_{Di}	=	Concentration of the emission (HC, CO, NO_x) in the dilute exhaust extracted from the CVS during mode i [ppm].
C_{Bi}	=	Concentration of the emission (HC, CO, NO_x) in the background sample during mode i [ppm].
STP	=	Standard temperature and pressure. All volumetric calculations made for the equations in this section are to be corrected to a standard temperature of 20 degrees Celsius and 101.3 kilopascals.

(c) Densities for emissions that are to be measured for this test procedure are:

D_{HC}	=	576.8 g/m^3
D_{NOx}	=	1912 g/m^3
D_{CO}	=	1164 g/m^3
D_{CO2}	=	1829 g/m^3

(1) The value of D_{HC} above is calculated based on the assumption that the fuel used has a carbon to hydrogen ratio of 1:1.85. For other fuels, D_{HC} can be calculated from the following formula:

$$D_{HC} = \frac{M_{HC}}{R_{STP}}$$

Where:

M_{HC} = Molecular weight of the hydrocarbon molecule divided by the number of carbon atoms in the molecule [g/mole].

R_{STP} = Ideal gas constant for a gas at STP = 0.024065 [m^3-mole].

(2) The idealized molecular weight of the exhaust hydrocarbons, i.e., the molecular weight of the hydrocarbon molecule divided by the number of carbon atoms in the molecule, M_{HC} can be calculated from the following formula:

$$M_{HC} = M_C + \alpha M_H + \beta M_O$$

Where:

M_C = Molecular weight of carbon = 12.01 [g/mole].

M_H = Molecular weight of hydrogen = 1.008 [g/mole].

α = Hydrogen to carbon ratio of the test fuel.

(3) The value of D_{NOx} above assumes that NO_x in entirely in the form of NO_2.

(d) The dilution factor (DF) is the ratio of the volumetric flow rate of the background air to that of the raw engine exhaust. The following formula is used to determine DF:

$$DF = \frac{13.4}{C_{D_{HC}} + C_{D_{CO}} + C_{D_{CO_2}}}$$

Where:

C_{DHC} = Concentration of HC in the dilute sample [ppm].

C_{DCO} = Concentration of CO in the dilute sample [ppm].

C_{DCO2} = Concentration of CO_2 in the dilute sample [ppm].

(e) The humidity correction factor K_H is an adjustment made to the measured NO_x. This corrects for the sensitivity that a spark-ignition engine has to the humidity of its combustion air. The following formula is used to determine K_H for NO_x calculations:

$$K_H = \frac{1}{1 - 0.0329(H - 10.71)}$$

Where:

H = Absolute humidity of the engine intake air [grams of water per kilogram of dry air].

(f) The absolute humidity of the engine intake air H is calculated using the following formula:

$$H = \frac{6.211\, P_{dew}}{P_B - \left(\frac{P_{dew}}{100}\right)}$$

Where:

P_{dew} = Saturated vapor pressure at the dew point temperature [kilopascals].

P_B = Barometric pressure [kilopascals].

(g) The fuel mass flow rate F_i can be either measured or calculated using the following formula:

$$F_i = \frac{M_f}{T}$$

Where:

M_f = Mass of fuel consumed by the engine during the mode [g].

T = Duration of the sampling period [hr].

(h) The mass of fuel consumed during the mode sampling period, M_{FUEL} can be calculated from the following equation:

$$M_f = \frac{G_S}{R_2 \, x \, 273.15}$$

Where:

G_S = Mass of carbon measured during the mode sampling period [g].

R_2 = The fuel carbon weight fraction, which is the mass of carbon in fuel per mass of fuel [g/g].

(i) The grams of carbon measured during the mode G_S can be calculated from the following equation:

$$G_S = \frac{12.011\,x\,HC_{mass}}{12.011+1.008\alpha} + 0.429\,CO_{mass} + 0.273\,CO_{2\ mass}$$

Where:

HC_{mass} = mass of hydrocarbon emissions for the mode sampling period [g].

CO_{mass} = mass of carbon monoxide emissions for the mode sampling period [g].

CO_2 mass = mass of carbon dioxide emissions for the mode sampling period [g].

α = The atomic hydrogen to carbon ratio of the fuel.

92. Catalyst Thermal Stress Resistance Evaluation.

(a) (1) The purpose of the evaluation procedure specified in this section is to determine the effect of thermal stress on catalyst conversion efficiency. The thermal stress is imposed on the test catalyst by exposing it to quiescent heated air in an oven. The evaluation of the effect of such stress on catalyst performance is based on the resultant degradation of the efficiency with which the conversions of specific pollutants are promoted. The application of this evaluation procedure involves the several steps that are described in the following paragraphs.

(2) The engine manufacturer need not submit catalyst conversion efficiency data for pollutants that the catalyst being tested was not designed to reduce/oxidize. The engine manufacturer must specify the pollutants that the catalyst will be converting and submit catalyst conversion efficiency data on only those pollutants.

(b) Determination of initial conversion efficiency.

(1) A synthetic exhaust gas mixture having the composition specified in section 29 is heated to a temperature of 450 degrees Celsius ± 5 degrees Celsius and

passed through the new test catalyst or, optionally, a test catalyst that has been exposed to temperatures less than or equal to 500 degrees Celsius for less than or equal to two hours, under flow conditions that are representative of anticipated in-use conditions.

(2) The concentration of each pollutant of interest, that is, hydrocarbons, carbon monoxide, or oxides of nitrogen, in the effluent of the catalyst is determined by means of the instrumentation that is specified for exhaust gas analysis in Part III.

(3) The conversion efficiency for each pollutant is determined by:

~~(i)~~(A) Subtracting the effluent concentration from the initial concentration,

~~(ii)~~(B) Dividing this result by the initial concentration,

~~(iii)~~(C) Multiplying this result by 100 percent.

(c) Imposition of thermal stress.

(1) The catalyst is placed in an oven that has been pre-heated to 1000 degrees Celsius and the temperature of the air in the oven is maintained at 1000 degrees Celsius ± 10 degrees Celsius for six hours. Optionally, the catalyst may instead be placed in an oven having a 90% nitrogen/10% water vapor environment that has been pre-heated to at least 850 degrees Celsius and the temperature of the nitrogen/water vapor environment in the oven is maintained at 850 degrees Celsius ± 10 degrees Celsius for six hours.

(2) The catalyst is removed from the oven and allowed to cool to room temperature.

(d) Determination of final conversion efficiency. The steps listed in paragraph (b) of this section are repeated.

(e) Determination of conversion efficiency degradation.

(1) The final conversion efficiency determined in paragraph (c) of this section is subtracted from the initial conversion efficiency determined in paragraph (b) of this section.

(2) This result is divided by the initial conversion efficiency.

(3) This result is multiplied by 100 percent.

(f) Determination of compliance with degradation limit. The percent degradation determined in paragraph (e) of this section must not be greater than 20 percent.

Appendix A to Part IV – Figures.

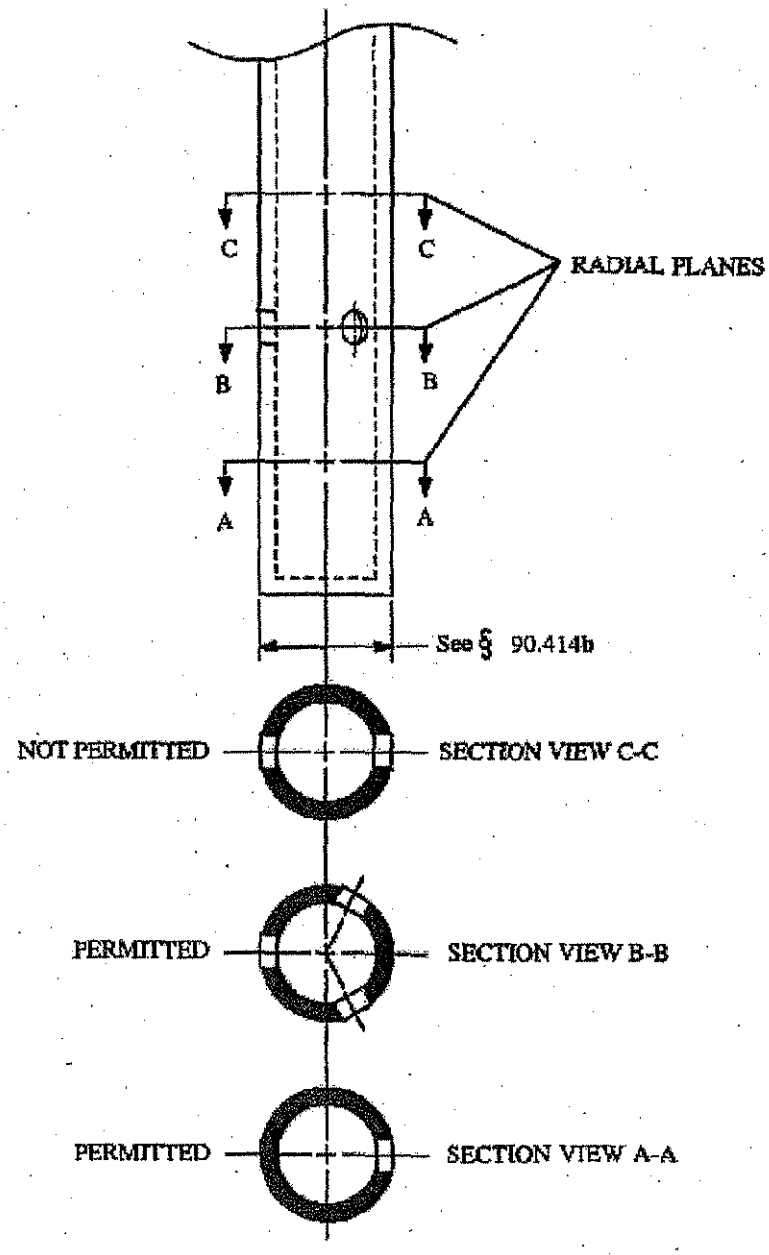

Figure 1.—Sample Probe and Typical Hole Spacings

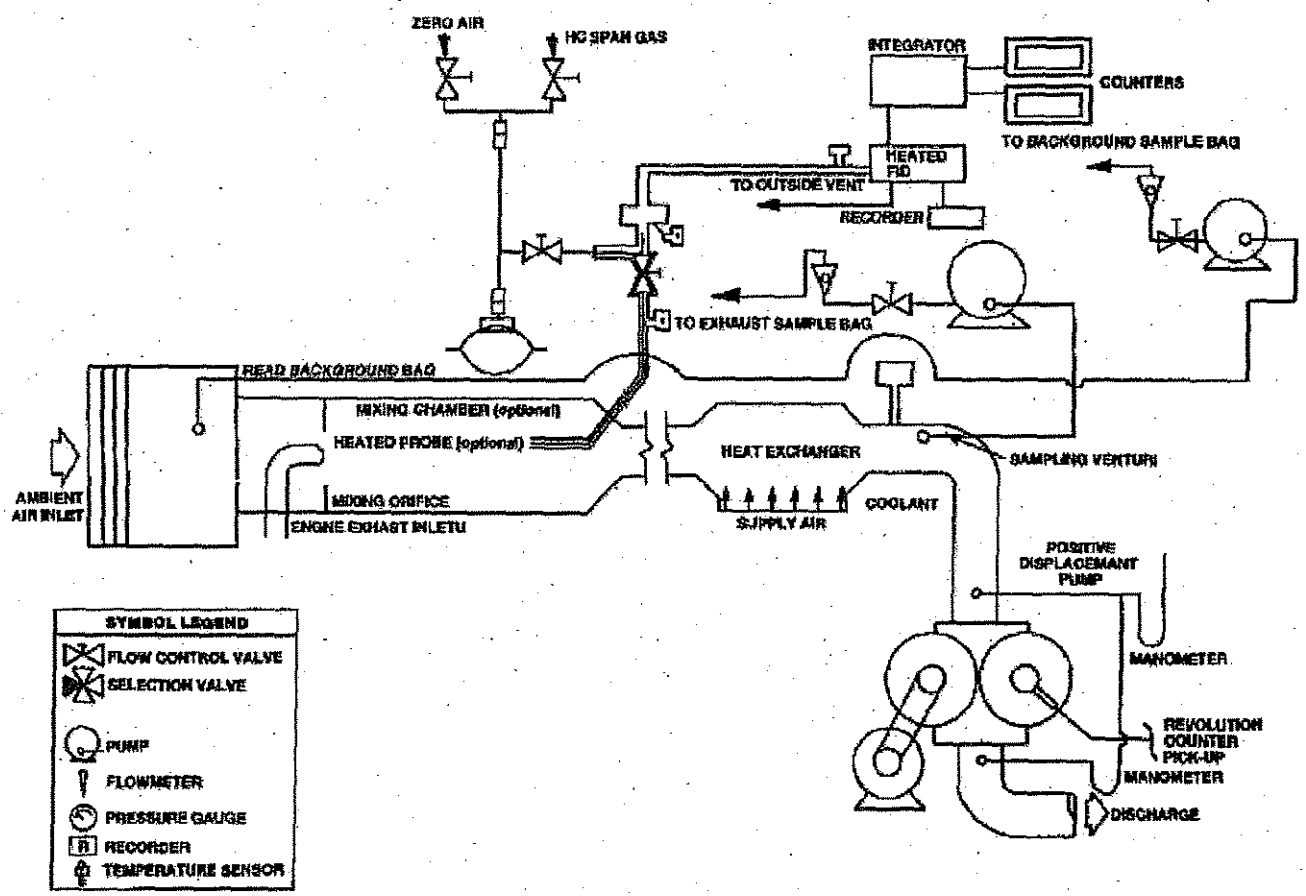

Figure 2 — Gaseous Emissions Sampling System (PDP-CVS)
Showing both grab bag sampling and continous sampling

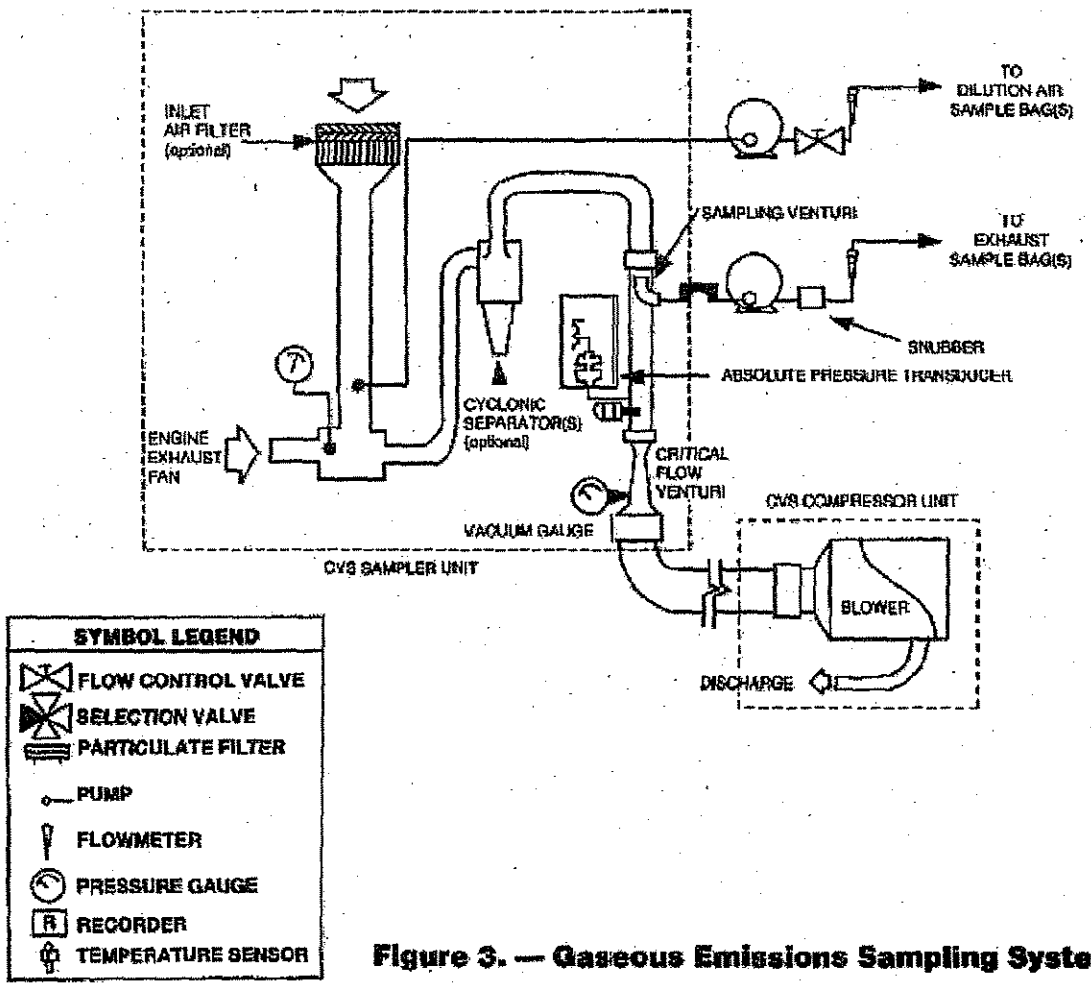

Figure 3. — Gaseous Emissions Sampling System (CVF-CVS)

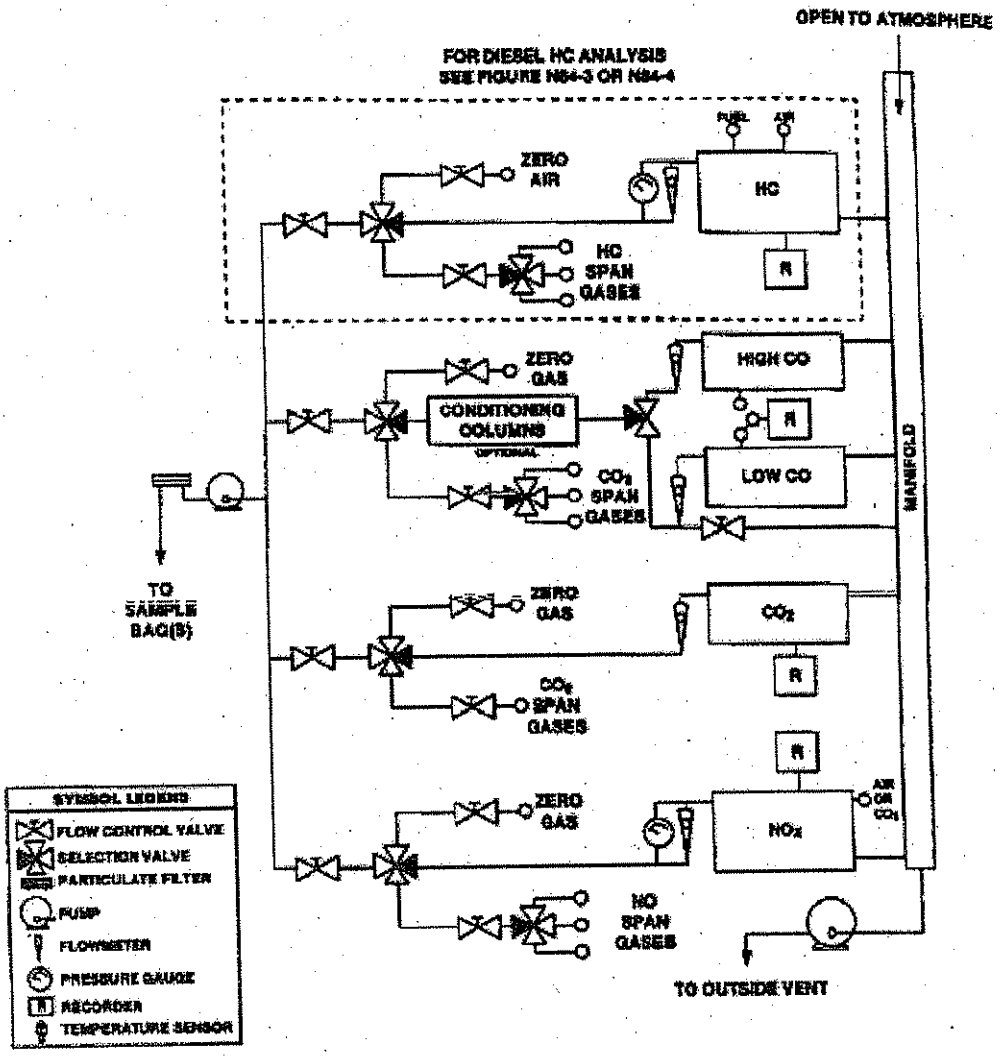

Figure 4. — Exhaust Gas Analytical System

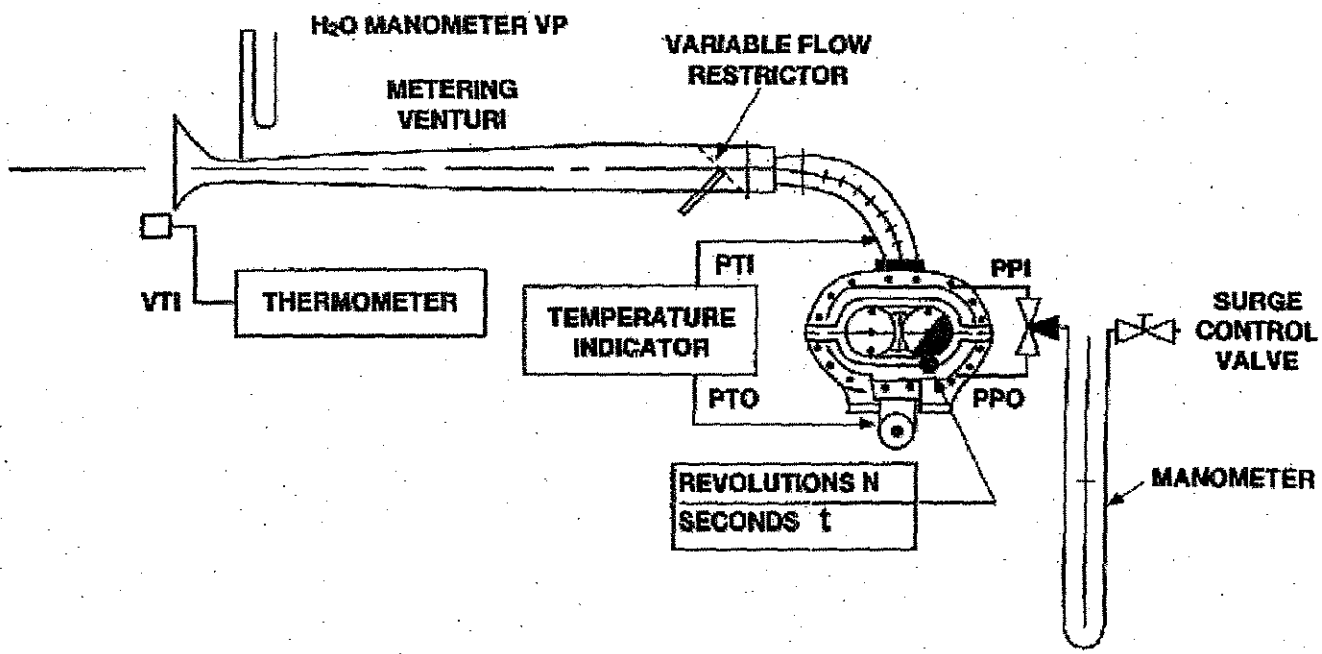

Figure 5. — PDP-CVS Calibration Configuration

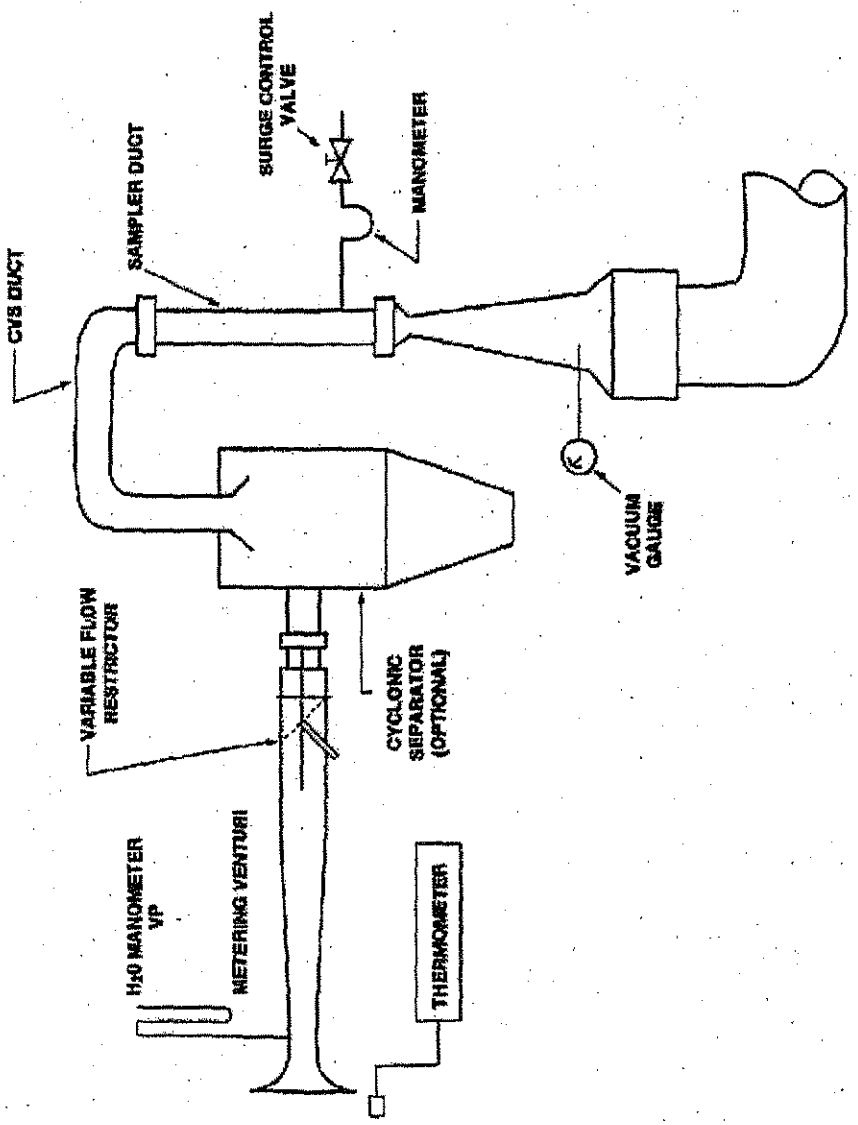

Figure 6. — CFV-CVS Calibration Configuration

PART 17

FINAL REGULATION ORDER TEST PROCEDURES

Recreational Marine Spark-Ignition Engines

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FINAL REGULATION TEST PROCEDURE ORDER

Note: This appendix shows the entirety of regulatory amendments to the test procedures titled below, which were approved by the Air Resources Board on December 16, 2011, and refined via subsequent conforming modifications authorized under Resolution 11-41. These amendments are formatted in a style to indicate changes from the existing test procedures. All existing language is indicated by plain type. All additions to the existing language are indicated by underlined type. All deletions to the existing language are indicated by ~~strikeout~~. Only those sections containing the modifications from the existing language are included. All other portions remain unchanged and are indicated by the notation [* * * * *] for reference. If there is any conflict between the provisions of this document and the California Health and Safety Code, Division 26, or Title 13 of the California Code of Regulations (CCR), the Health and Safety Code and Title 13 apply.

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State of California

AIR RESOURCES BOARD

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 2001 AND LATER SPARK-IGNITION MARINE ENGINES

Adopted: October 21, 1999

Amended: June 5, 2002

Amended: September 22, 2006

Amended: June 5, 2009

Last Amended: October 25, 2012

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES
FOR 2001 AND LATER SPARK-IGNITION MARINE ENGINES

* * * * *

Part III. Emission Test Equipment Provisions.

* * * * *

44. Lubricating Oil and Test Fuel.

* * * * *

(b) Test fuels – certification.

(1) Petroleum-based fuels.

(A) The manufacturer must use gasoline having the specifications or substantially equivalent specifications approved by the Executive Officer, as specified in Table 8-1 below for exhaust emission testing of gasoline fueled engines. As an alternative, the manufacturer may use the fuel specifications as outlined in the California Code of Regulations, Title 13, section 1960.1, and the latest amendment of the "California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles", incorporated herein by reference. The test fuel specification in either case should remain consistent from batch to batch. The specification range of the fuel to be used under this paragraph must be reported in accordance with Part I, section 14(b)(2)~~(F)~~(G).

* * * * *

(B) Additionally for the 2013-2019 model-year spark-ignition marine engines, the manufacturer has the option to use the fuel specified in (b)(1)(C) below.

(C) For 2020 and later model-year spark-ignition marine engines: The certification test fuel for exhaust emission testing must be consistent with the fuel specifications as outlined in title 13, section 1961.2 and the "California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," adopted <insert adopted date>, and incorporated by reference herein. The test fuel specifications should remain consistent from batch to batch. The specification range of the fuel to be used under this paragraph must be reported in accordance with Part I, section 14(b)(2)G. Optionally, manufacturers may use other renewable fuel blends under this paragraph that have been certified by ARB as yielding test results equivalent,

or more stringent than, those resulting from the fuel specified by 13 CCR 1961.2, and which are appropriate for the certification of spark-ignition marine engines.

* * * * *

State of California

AIR RESOURCES BOARD

PROCEDURES FOR EXEMPTION OF ADD-ON AND MODIFIED PARTS FOR OFF-ROAD CATEGORIES

Adopted: July 14, 2000
Amended: June 5, 2009

FINAL REGULATION ORDER TEST PROCEDURES

Note: This document is printed in a style to indicate changes from the existing provisions. All existing language is indicated by plain type. All additions to language are indicated by underlined text. All deletions to language are indicated by ~~strikeout~~. Only those portions containing the suggested modifications from the existing provisions are included. All other portions remain unchanged and are indicated by the symbol "* * * * *" for reference.

AIR RESOURCES BOARD

PROCEDURES FOR
EXEMPTION OF ADD-ON AND MODIFIED PARTS
FOR OFF-ROAD VEHICLES/ENGINES/EQUIPMENT

I. APPLICABILITY

* * * * *

V. OFF-ROAD CATEGORIES

* * * * *

D. Spark-Ignition Marine Engines

The spark-ignition marine engine category includes 2001 and subsequent model year outboard and personal watercraft engines used to propel marine watercraft, ~~but not including~~ 2003 and subsequent model year sterndrive/~~or~~ inboard engines less than or equal to 373 kw, and 2009 and subsequent model year sterndrive/inboard engines greater than 373 kw.

* * * * *

VI. TEST PROCEDURES AND STANDARDS

A. Test Procedures

* * * * *

4) Test Procedures for Spark-Ignition Marine Engines

"California Exhaust Emission Standards and Test Procedures for 2001 Model Year and Later Spark-Ignition Marine Engines" adopted October 21, 1999, as incorporated by reference in Section 2447 ~~which is incorporated by reference herein. (These procedures are also incorporated by reference by Title 13, CCR Section 2442)~~.

* * * * *

State of California
AIR RESOURCES BOARD

CALIFORNIA EXHAUST EMISSIONS STANDARDS AND TEST PROCEDURES FOR 1997 AND LATER OFF-HIGHWAY RECREATIONAL VEHICLES AND ENGINES

Adopted: May 26, 1995
Amended: October 22, 1999
Amended: ~~Insert date of amendment here~~ August 15, 2007

bmc
7-16-07

NOTE: This document incorporates by reference, with noted modifications, sections of Subparts E and F, Part 86, Title 40, Code of Federal Regulations, and sections of Subparts A, B, C, F, and I, Part 1051, Title 40, Code of Federal Regulations. California provisions which replace specific federal provisions are denoted by the words "DELETE" for the federal language and "REPLACE WITH" or "ADD" for the new California language. The symbols "*****" and "..." mean that the federal text that immediately follows the symbols is unchanged and incorporated by reference into the California Standards and Test Procedures. Sections of the federal regulations which are not listed are not part of the California Standards and Test Procedures.

This Document is printed in a style to indicate changes from the existing provisions. All existing language is indicated by plain type. All additions to language are indicated by underline. All deletions to language are indicated by ~~strikeout~~.

CALIFORNIA EXHAUST EMISSIONS STANDARDS AND TEST PROCEDURES
FOR 1997 AND LATER OFF-HIGHWAY RECREATIONAL VEHICLES AND ENGINES

The following provisions of Subpart E and F, Part 86, Title 40, Code of Federal Regulations, as adopted or amended by the U. S. Environmental Protection Agency on the date listed are adopted and incorporated herein by this reference as the California Exhaust Emission Standards and Test Procedures for 1997 and Later Off-Highway recreational vehicles and engines, except as altered or replaced by the provisions set forth below.

PART 86, CONTROL OF EMISSIONS FROM NEW AND IN-USE HIGHWAY VEHICLES AND ENGINES

Subpart E, General Provisions for Emission Regulations for 1978 and Later New Motorcycles

SOURCE: 42 FR 1126, Jan. 5, 1977, unless otherwise noted.

86.401-78 General Applicability. 42 FR 1126, Jan. 5, 1977.

DELETE

86.401-90 General Applicability. 54 FR 14539, Apr. 11, 1989.

(a) DELETE,
REPLACE WITH:
(a) This subpart applies to all 1997 and later model year off-road motorcycles, all-terrain vehicles, golf carts, and engines used in such vehicles produced on or after January 1, 1997 and all 2007 and later model year off-road sport vehicles, off-road utility vehicles, sand cars, and engines used in such vehicles produced on or after January 1, 2007.

(b) DELETE

(c) DELETE

86.401-2006 General Applicability. 69 FR 2435, Jan. 15, 2004

DELETE

86.401-97 General Applicability. 59 FR 48512, Sept. 21, 1994

DELETE

86.402-78 Definitions. 49 FR 48138, Dec. 10, 1984

* * * *

"Administrator" DELETE,
REPLACE WITH:
"Administrator" means the Executive Officer of the Air Resources Board, or their designee.

* * * *

"All-Terrain Vehicle (ATV)" means any ~~motorized~~ off-highway motor vehicle 50 inches (1270 mm) or less in overall width, ~~with an unladen dry weight of 606 pounds (275 kg) or less,~~ that has all of the following features and characteristics: designed to travel on four or more low pressure tires, having a single seat designed to be straddled by the operator ~~and~~ or a single seat designed to be straddled by the operator and a seat for no more than one passenger, having handlebars for steering control, ~~and intended for use by a single operator and no passengers. The vehicle is designed to carry not more than 350 pounds (160 kg) payload, excluding the operator,~~ and is powered by an internal combustion engine. Width ~~and unladen weight~~ shall be exclusive of accessories and optional equipment. A golf cart, off-road sport vehicle, off-road utility vehicle, or sand car is not, for purposes of this regulation, to be classified as an all-terrain vehicle.

"Certificate of Conformity" means an Executive Order.

"Certification" means certification as defined in Section 39018 of the Health and Safety Code.

* * * *

"EPA Enforcement Officer" DELETE,
REPLACE WITH:
"EPA Enforcement Officer" means an "ARB Enforcement Officer" which means any employee of the Air Resources Board so designated in writing by the Executive Officer of the Air Resources Board or by the Executive Officer's designee.

* * * *

"Executive Order" means an order issued by the Executive Officer of the Air Resources Board certifying engines for sale in California.

"Exhaust Emissions" DELETE,
REPLACE WITH:
"Exhaust Emissions" means substances emitted to the atmosphere from any opening downstream from the exhaust port of an off-highway recreational vehicle.

* * * *

ADD:

"Golf Cart" means a vehicle used to convey equipment and no more than two persons, including the driver, to play the game of golf in an area designated as a golf course. Golf carts are designed to have an unladen weight of less than 1,300 pounds and carry not more than 100 pounds, excluding passengers, accessories and optional equipment. A golf cart is not used for grounds keeping or maintenance purposes.

* * * *

"Motorcycle" DELETE,
REPLACE WITH:
"Motorcycle," for purposes of these test procedures, means Off-Road Motorcycle, All-Terrain Vehicle, Off-Road Sport Vehicle, Off-Road Utility Vehicle, Sand Car and Engines used in such vehicles.

* * * *

ADD:
"Off-Highway Recreational Vehicle Engines" or "Engines" are identified as: two-stroke or four-stroke, air-cooled, liquid-cooled, gasoline, diesel, or alternate-fuel powered engines or electric motors that are designed for powering off-road recreational vehicles and engines included in~~, but not limited to use in,~~ the following: off-road motorcycles, all-terrain vehicles, off-road sport vehicles, off-road utility vehicles, sand cars, and golf carts. 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 not included within this category.

"Off-Road Equipment and Vehicle" means any non-stationary device, powered by an internal combustion engine or electric motor, used primarily off the highways, to propel, move, or draw persons or property including any device propelled, moved, or drawn exclusively by human power, and used in, but not limited to the following applications: Marine Vessels, Construction/Farm Equipment, Locomotives, Utility engines and Lawn and Garden Equipment, Off-Road Motorcycles, and Off-Highway Vehicles.

"Off-Road Motorcycle" means any two or three wheeled vehicle equipped with an internal combustion engine and weighing less than 1,499 pounds. An off-road motorcycle is primarily designed for use off highways. These vehicles are mainly used for recreational riding on dirt trails but are not limited to this purpose.

"Off-Road Sport Vehicle" means any off-highway motor vehicle that has all of the following features and characteristics: designed to travel on four wheels, having bench or bucket seating for one or more persons, having a steering wheel for steering control,

designed for operation over rough terrain, having a rear payload not exceeding 600 pounds, having an internal combustion engine with a displacement less than or equal to one liter, and is capable of speeds 25 miles per hour or more. Vehicles otherwise meeting the definition for sand cars but powered by an engine with a displacement less than or equal to one liter are considered off-road sport vehicles.

"Off-Road Utility Vehicle" means any off-highway motor vehicle that has all of the following features and characteristics: designed to travel on four or more wheels, having bench or bucket seating for two or more persons, having a steering wheel for steering control, designed for operation over rough terrain, having an internal combustion engine with a displacement less than or equal to one liter, having a maximum brake power less than or equal to 30 kilowatts, capable of speeds 25 miles per hour or more, and having either 1) a rear payload of 350 pounds or more, or 2) seating for six or more passengers.

* * * *

"Sand Car" means any off-highway motor vehicle that has all of the following features and characteristics: designed to travel on four wheels, having bench or bucket seating for one or more persons, having a steering wheel for steering control, designed primarily for operation over sand dunes, and is powered by an internal combustion engine with a displacement greater than one liter. Vehicles otherwise meeting the criteria in the previous sentence that are powered by an engine with a displacement less than or equal to one liter are considered off-road sport vehicles.

* * * *

"Total Test Distance" DELETE,
REPLACE WITH:
"Total Test Distance" is defined as the appropriate distance the vehicle should be driven to stabilize the emission characteristics of the engine. The manufacturer shall determine the appropriate distance.

ADD:
"Ultimate Purchaser" means the first person who in good faith purchases or leases a new engine, vehicle, or piece of equipment for purposes other than resale.

* * * *

"Useful life" DELETE,
REPLACE WITH:
"Useful life" is defined as follows:

ENGINE DISPLACEMENT (in cubic centimeters)	USEFUL LIFE (in years and Kilometers)
0 to less than 170	5 years or 10,000 km
170 to less than 280	5 years or 10,000 km
280 or greater	5 years or 10,000 km

* * * *

ADD:
"Vehicle Identification Number (VIN)" means an alpha numeric code which has been permanently assigned by the manufacturer to a vehicle. The VIN is unique to each vehicle and may contain information deemed necessary by governing agencies. Unless otherwise noted, the VIN will follow formats specified in the Code of Federal Regulations 49, Chapter V, Parts 565, 566, and 571, section 571.115 – Vehicle Identification Number – Content Requirements.

86.402-98 Definitions. 69 FR 2435, Jan. 15, 2004

DELETE

86.403-78 Abbreviations.

ARB- California Air Resources Board.
* * * *
Bhp- Brake-horsepower.
Bhp-hr- Brake horsepower-hour.
* * * *
Hp- Horsepower.
* * * *
PM- Particulate Matter
* * * *

86.404-78 Section Numbering

* * * *

86.405-78 Measurement system.

* * * *

86.406-78 Introduction, structure of subpart, further information.

DELETE

86.407-78 Certificate of conformity required.

DELETE,
REPLACE WITH:
Every new off-road motorcycle, all-terrain vehicle, off-road sport vehicle, off-road utility vehicle, sand car, golf cart, and engines used in such vehicles produced for sale, lease, or use, or introduced into commerce in California which is subject to any of the standards prescribed in this subpart is required to be covered by an executive order issued pursuant to this subpart.

86.408-78 General Standards; Increase in Emissions; Unsafe Conditions.

(a) DELETE, "Any system installed on or incorporated in a new motorcycle to enable such vehicle to conform to standards imposed by this subpart:"

REPLACE WITH:
"Any system installed on or incorporated in a new off-road motorcycle, all-terrain vehicle, off-road sport vehicle, off-road utility vehicle, sand car, golf cart or engines used in such vehicles to enable such vehicles to conform to standards imposed by this subpart:"

(b) DELETE,
REPLACE WITH:
(b) Every manufacturer of new off-road motorcycles, all-terrain vehicles, off-road sport vehicles, off-road utility vehicles, sand cars, and engines used in such vehicles, which subject to any of the standards imposed by this subpart shall test or cause to be tested off-road motorcycles, all-terrain vehicles, off-road sport vehicles, off-road utility vehicles, sand cars, and engines used in such vehicles, in accordance with good engineering practice to ascertain that such test vehicles will meet the requirements of this section for the useful life of the vehicle.

86.409-78 Defeat Devices, Prohibition.

(a) motorcycle DELETE,
REPLACE WITH:
"off-road motorcycle, all-terrain vehicle, golf cart, off-road sport vehicle, off-road utility vehicle, sand car, and engines used in such vehicles..."

* * * *

86.410-80 Emission standards for 1980 and later model year motorcycles. 49 FR 48138, Dec. 10, 1984

DELETE

86.410-90 Emission standards for 1990 and later model year motorcycles. 54 FR 14539, Apr. 11, 1989

(a) DELETE,
REPLACE WITH:

(a)(1) Exhaust emissions from 1997 and later off-road motorcycles and all-terrain vehicles with engines greater than 90 cc must not exceed:

(~~i~~i) Hydrocarbons. 1.2 grams per vehicle kilometer. Compliance is based on a manufacturer's corporate average basis, as provided in (b) below.
(ii) Carbon Monoxide. 15.0 grams per vehicle kilometer.

(2) Exhaust emissions from 1999 and later off-road motorcycles and all-terrain vehicles with engines 90 cc or less must not exceed:

(~~i~~i) Hydrocarbons. 1.2 grams per vehicle kilometer. Compliance is based on a manufacturer's corporate average basis, as provided in (b) below.
(ii) Carbon Monoxide. 15.0 grams per vehicle kilometer.

(3) Exhaust emissions from 2007 and later off-road sport vehicles, off-road utility vehicles, and sand cars must not exceed:
(i) Hydrocarbons. 1.2 grams per vehicle kilometer. Compliance is based on a manufacturers corporate average basis, as provided in (b) below.
(ii) Carbon Monoxide. 15.0 grams per vehicle kilometer.

(3~~4~~) The standards set forth in paragraphs (a)(1), (a)(2), and (a)(3) of this section refer to the exhaust emitted over driving schedules as set forth in subpart F and measured and calculated in accordance with those procedures.

(b) DELETE,
REPLACE WITH:

(b) Compliance with a standards to be applied as a "corporate average" shall be determined as follows:

$$\frac{\sum_{j=1}^{n}(PROD)_{jx}(STD)_{jx}}{\sum_{j=1}^{n}(PROD)_{jx}} = STD_{ca}$$

n = ~~Off-road motorcycle and all-terrain vehicle~~ Off-highway recreational vehicle engine families.

$PROD_{jx}$= Number of units in engine family j produced for sale in California in model year x.

STD_{jx} = The manufacturer designated HC exhaust emission standard for engine family j in model year x, which shall be determined by the manufacturer subject to the following conditions: (1) no individual engine family exhaust emission standard shall exceed 2.5 g/km, and (2) no engine family designation or engine family exhaust emission standard shall be amended in a model year after the engine family is certified for the model year, and (3) prior to sale or offering for sale in California, each engine family shall be certified in accordance with these test procedures, and shall be required to meet the manufacturer's designated HC exhaust emission standard as a condition of the certification Executive Order. Prior to certification the manufacturer shall also submit estimated production volumes for each engine family to be offered for sale in California.

STD_{ca} = A manufacturer's corporate average HC exhaust emissions from those California off-road motorcycles and all-terrain vehicles subject to the California corporate average HC exhaust emissions standard, as established by an Executive Order certifying the California production for the model year. This order must be obtained prior to the issuance of certification Executive Orders for individual engine families for the model year and shall include but not be limited to the following requirements:

(1) During the manufacturer's production year, for each vehicle produced for sale in California, the manufacturer must provide the following information to the Executive Officer within 30 days after the last day in each calendar quarter:

(~~I~~i) vehicle identification numbers and an explanation of the identification code if applicable;

(ii) model number and engine size of vehicle;

(iii) the total number of vehicles marketed and produced for sale in California

and their applicable designated emissions standards;

(2) The manufacturer's average HC exhaust emissions shall meet the corporate average standard at the end of the manufacturer's production for the model year.

(3) Production and sale of vehicles which result in noncompliance with the California standard for the model year shall cause a manufacturer to be subject to civil penalties, according to applicable provisions of the Health and Safety Code. All excess emissions resulting from non-compliance with the California standard shall be made up in the following model year.

(4) For a period of up to one year following the end of the model year, for each model the manufacturer shall submit California sales and registration data as it becomes available.

ADD:

(c) As an option to the standards set forth in section (a)(1) above, exhaust emissions from 1997 and later all-terrain vehicle engines and 2007 and later off-road sport vehicles, off-road utility vehicles, and sand cars must not exceed the ~~equivalent to the off-road motorcycle and all-terrain vehicle~~ applicable $HC+NO_x$ standard in Section 2412(b), CCR, Title 13, using the test procedures set forth in "California Exhaust Emission Standards and Test Procedures for 1995 ~~and Later~~-2004 Small Off-Road Engines", adopted March 20, 1992, and last amended ~~March 26, 1998~~July 26, 2004, which is hereby incorporated by reference herein. Compliance with the optional $HC+NO_x$ standard is based on a manufacturer's corporate average basis, as provided in ~~(b) above~~ Section 2412(d), CCR, Title 13.

(d)(1) Emissions from 1997 and later model year golf carts operating in federal ozone non-attainment areas of California must not exceed zero grams hydrocarbon, carbon monoxide, oxides of nitrogen, and particulate matter.

(2) These vehicles must be certified by the Executive Officer pursuant to all applicable regulations set forth in CCR, Title 13, Chapter 9. Emission test procedures are not applicable to these vehicles.

(3) On or after January 1, 1997, manufacturers must not produce for sale in federal ozone non-attainment areas of California new nonzero emission engines for use in golf carts.

(e)(1) As an option to the standards set forth in section (a) above, off-road motorcycles and ATVs, and engines used in such vehicles, that do not meet the emissions standards in section (a) may operate only during certain periods at certain off-highway vehicle (OHV) riding areas. CCR, Title 13, Chapter 9, Article 3, Section 2415 lists these California OHV riding areas and their associated riding seasons for off-highway recreational vehicles that are subject to use restrictions.

(2) These vehicles must be certified by the Executive Officer pursuant to all applicable regulations set forth in CCR, Title 13, Chapter 9. Emission testing is not applicable to these vehicles.

(f) No crankcase emissions shall be discharged into the ambient atmosphere from the following vehicles, or from engines used in such vehicles:
(1) 1997 and later off-road motorcycles, all-terrain vehicles, and golf carts;
(2) 2007 and later off-road sport vehicles, off-road utility vehicles, and sand cars.

(g) The Executive Officer may find that any off-road motorcycles, all-terrain vehicles, off-road sport vehicles, off-road utility vehicles, sand cars or engines used in such vehicles certified to comply with California emission standards and test procedures for on-road or other off-road applications are in compliance with these regulations.

86.410-2006 Emission standards for 2006 and later model year motorcycles. 69 FR 2435, Jan. 15, 2004

DELETE

86.411 - 78 Maintenance instructions, vehicle purchaser.

(a) "motorcycle" DELETE,
REPLACE WITH:
"off-road motorcycle, all-terrain vehicle, golf cart, off-road sport vehicle, off-road utility vehicle, sand car, and engines used in such vehicles..."

* * * *

86.412 - 78 Maintenance instructions, submission to Administrator.

* * * *

(a)(1) DELETE,
REPLACE WITH:
(a)(1) The manufacturer must provide 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), a copy of the maintenance instructions which the manufacturer proposes to supply to the ultimate purchaser. The instructions must include the periodic and anticipated maintenance contained in the applications for certification or contained in the manufacturers' records. Such instructions must be reasonable and necessary to assure the proper functioning of the vehicle's emission control systems.

* * * *

b) "motorcycle" DELETE,
REPLACE WITH:
"off-road motorcycle, all-terrain vehicle, golf cart, off-road sport vehicle, off-road utility vehicle, sand car, and engines used in such vehicles..."

* * * *

86.413 - 78 Labeling. 42 FR 56737, Oct. 28, 1977

(a) DELETE,
REPLACE WITH:
(a) All 1997 and later model year off-road motorcycles, all-terrain vehicles, and engines used in such vehicles, except those certified according to 86.410-90(e), and 2007 and later model year off-road sport vehicles, off-road utility vehicles, sand cars, and engines used in such vehicles, have California labeling requirements which shall be consistent with (a) these test procedures, and (b) Title 13, California Code of Regulations, Chapter 9, Section 2413 ~~and the incorporated "California Motor Vehicle Emission Control and Smog Index Label Specifications", adopted March 1, 1978, as last amended June 24, 1996 (as corrected September 20, 1996), which are incorporated herein by reference~~.

(b) DELETE

86.414 - 78 Submission of vehicle identification number.

(a) DELETE,
REPLACE WITH:

(a) Upon the request by the Executive Officer, the manufacturer of any off-road motorcycle, ~~or~~ all-terrain vehicle, off-road sport vehicle, off-road utility vehicle, or sand car shall, within 30 days, identify by vehicle identification number, the vehicle(s) covered by the executive order.

(b) DELETE,
REPLACE WITH:
(b)(1) The manufacturer of any off-road motorcycle, ~~or~~ all-terrain vehicle, off-road sport vehicle, off-road utility vehicle, or sand car certified under an Executive Order shall furnish to the Executive Officer, at the beginning of each model year, its vehicle identification number (VIN) coding system description which identifies such vehicle(s) as covered by the Executive Order.

(b)(2) The (VIN) shall be consistent with the Code of Federal Regulations 49, Chapter V, Parts 565, 566, and 571, section 571.115 – Vehicle Identification Number – Content Requirements, which are incorporated herein by reference, except as noted below.

(b)(3) Manufacturers shall identify all California certified off-road motorcycles ~~and~~, all-terrain vehicles, off-road sport vehicles, off-road utility vehicles, and sand cars meeting the emission standards in 86.410-90(a) by using any letter or digit other than the letter "C" or the digit "3" in the eighth character of the VIN.

(b)(4) Manufacturers shall exclusively reserve all letters and digits other than the letter "C" or the digit "3" for use in the eighth character of the VIN of California certified off-road motorcycles ~~and~~, all-terrain vehicles, off-road sport vehicles, off-road utility vehicles, and sand cars meeting the emission standards in 86.410-90(a).

(b)(5) Manufacturers shall use either the letter "C" or the digit "3" for use in the eighth character of the VIN of California off-road motorcycles and all-terrain vehicles meeting the requirements in 86.410-90(e).

(b)(6)In lieu of (b)(3) and (b)(4) above, manufacturers may, at their option, agree to identify off-road motorcycles and all-terrain vehicles that do not meet the emission standards in 86.410-90(a), and do not meet the requirements in 86.410-90(e), and are offered for sale in California, by using the letter "C" or the digit "3" in the eighth character of the VIN.

86.415 - 78 Production vehicles. 49 FR 48138, Dec. 10, 1984.

* * * *

86.416 - 80 Application for certification. 49 FR 48138, Dec. 10, 1984.

(a) DELETE, "New motorcycles produced by a manufacturer whose projected sales in the United States is 10,000 or more units (for the model year in which certification if sought) are covered by the following:"

REPLACE WITH:

"New off-road motorcycles, all-terrain vehicles, off-road sport vehicles, off-road utility vehicles, sand cars, and engines used in such vehicles are covered by the following:"

* * * *

(iii) DELETE,

REPLACE WITH:

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

* * * *

(b) DELETE,

REPLACE WITH:

(b) For new 1997 and subsequent model golf carts and off-road motorcycles and all-terrain vehicles meeting the requirements of 86.410-90(e) ["the vehicle(s)"], the certification application shall include the following, as applicable:

(1) Identification and description of the vehicle(s) covered by the application.

(2) Identification of the curb weight and gross vehicle weight rating of the vehicle.

(3) Identification and description of the propulsion system for the vehicle (golf carts only).

(4) Projected number of vehicles produced and delivered for sale or use in California, and projected California sales.

(5) All information necessary for proper and safe operation and maintenance of the vehicle, including recharging information (golf carts only), and other relevant information as determined by the Executive Officer.

(6) A copy of the owner's manual must be submitted during certification for approval by the Executive Officer. The manual must include the information as required by subsections (1), (2), (3), and (5) above.

(c) DELETE,

REPLACE WITH:

(c)(1) Manufacturers of off-road motorcycles, all-terrain vehicles, <u>off-road sport vehicles, off-road utility vehicles, sand cars,</u> and engines used in such vehicles must submit to the Executive Officer the number of vehicles, and engines used in such vehicles, marketed and produced for sale in California.

(2) Such data must be submitted on a quarterly basis for all such vehicles and engines identified in the preceding paragraph that have been produced for sale in California on or after January 1, 1997. In addition to the data required under paragraph (c)(1), manufacturers must also provide the model number and VIN of each vehicle or engine sold for use in California and the number sold for use in California for each model. These data must be provided to the Executive Officer within 30 days after the last day in each calendar quarter.

* * * *

86.417 - 78 Approval of application for certification.

* * * *

86.418 - 78 Test fleet selection.

(a) DELETE,
REPLACE WITH:
Test fleet selection and requirements on test vehicles are found in 86.419 to 86.423.

86.419 - 78 Engine displacement, motorcycle classes.

* * * *

(b)(1) DELETE,
REPLACE WITH:
(b)(1) Class I - 0 to 169 cc displacement (0 to 10.4 cu. in.).

* * * *

86.419-2006 Engine Displacement, motorcycle classes. 69 FR 2437, Jan. 15, 2004

DELETE

86.420 - 78 Engine families. 44 FR 48205, Aug. 17, 1979.

* * * *

86.421 - 78 Test fleet.

* * * *

(b) DELETE

* * * *

86.422 - 78 Administrator's fleet.

* * * *

86.423 - 78 Test vehicles. 49 FR 48138, Dec. 10, 1984.

(a)(1) DELETE,
REPLACE WITH:
(a)(1) The manufacturer may perform a zero-kilometer exhaust emission test.

* * * *

(a)(3) DELETE

* * * *

86.425 - 78 Test procedures.

(a) DELETE,
REPLACE WITH:

(a) Off-road motorcycle, ~~and~~ all-terrain vehicle, off-road sport vehicle, off-road utility vehicle, and sand car emission test procedures are found in Subpart F. All-terrain vehicles, off-road sport vehicles, off-road utility vehicles and sand cars shall be tested on the Class I cycle, regardless of the engine displacement. With prior approval by the Executive Officer, manufacturers of all-terrain vehicles, off-road sport vehicles, off-road utility vehicles, and sand cars may use the emission test procedures incorporated in California Code of Regulations, Title 13, Sections 2403 to certify their vehicles. The Executive Officer shall grant approval to those manufacturers who provide information and test results showing the appropriate emission standards on the small off-road engine test cycle that are equivalent to the all-terrain vehicle emission standards set forth in 86.410-90(a)(1). The Executive Officer shall consider data submitted by the manufacturer from engines similar to the engine to be certified. This data will include, but not be limited to, the engine size, performance, operating characteristics, and technology used. The data should be statistically valid in order to set the complying emissions standard applicable for the engine family to be certified on the small off-road engine test cycle.

* * * *

86.426 - 78 Service accumulation. 42 FR 56737, Oct. 28, 1977.

DELETE,
REPLACE WITH:
Manufacturers shall determine the appropriate service accumulation for their vehicles.

86.427 - 78 Emission tests. 49 FR 48139, Dec. 10, 1984.

(a)(1) DELETE,
REPLACE WITH:
(a)(1) Each test vehicle shall be driven with all emission control systems installed and operating for a period of time as deemed appropriate by the manufacturer to stabilize the emission characteristics of the engine.

* * * *

(b) DELETE,
REPLACE WITH:

(b) All vehicles shall undergo at least two emission tests at intervals specified by the manufacturer. Additional tests may be performed at the manufacturer's option.

(c) DELETE

(d) DELETE

(e) DELETE

* * * *

86.428 - 80 Maintenance, scheduled; test vehicles.

DELETE,
REPLACE WITH:
Periodic maintenance on the engine, emission control system, and fuel system of test vehicles shall be scheduled for the same intervals that will be specified in the manufacturer's maintenance instructions furnished to the ultimate purchaser.

86.429 - 78 Maintenance, unscheduled; test vehicles.

* * * *

86.430-78 Vehicle failure. 49 FR 48139, Dec. 10, 1984.

* * * *

86.431 - 78 Data submission. 49 FR 48139, Dec. 10, 1984.

(a) DELETE,
REPLACE WITH:
(a) Data from all tests (including voided tests) performed by a manufacturer shall be included in the applications.

* * * *

86.432 - 78 Deterioration factor. 49 FR 48139, Dec. 10, 1984.

(a) DELETE,
REPLACE WITH:
(a) The manufacturer shall determine the appropriate deterioration factors.

* * * *

(c) DELETE,

REPLACE WITH:
(c) Manufacturers shall determine the appropriate deterioration factor for the designated useful life.

(d) DELETE

* * * *

(f) DELETE

86.434 - 78 Testing by the Administrator. 49 FR 48139, Dec. 10, 1984.

(a) DELETE,
REPLACE WITH:
(a) At the conclusion of certification testing by manufacturers, the ARB may require confirmatory testing. The ARB will designate where such testing shall be performed.

* * * *

86.435 - 78 Extrapolated emission values. 49 FR 48139, Dec. 10, 1984.

DELETE

86.436 - 78 Additional service accumulation. 49 FR 48139, Dec. 10, 1984.

DELETE

86.437 - 78 Certification. 47 FR 49807, Nov. 2, 1982.

(a) DELETE, "New motorcycles produced by a manufacturer whose projected sales in the United States is 10,000 or more units (for the model year in which certification is sought) are covered by the following:"

REPLACE WITH:
"Manufacturers of new off-road motorcycles and all-terrain vehicles produced on or after January 1, 1997, and manufacturers of off-road sport vehicles, off-road utility vehicles, and sand cars produced on or after January 1, 2007, shall submit to the Executive Officer a statement that the test vehicles, for which data are submitted, have been tested, and conform to the requirements of the regulations to their designated useful life."

* * * *

(b) DELETE

86.438 - 78 Amendments to the application.

* * * *

86.439 - 78 Alternative procedure for notification of additions and changes. 49 FR 48139, Dec. 10, 1984.

* * * *

86.440 - 78 Maintenance of records. 49 FR 48140, Dec. 10, 1984.

* * * *

86.441 - 78 Right of entry.

* * * *

86.442 - 78 Denial, revocation, or suspension of certification. 42 FR 56738, Oct. 28, 1977.

* * * *

86.443 - 78 Request for hearing.

* * * *

86.444 - 78 Hearings on certification.

* * * *

86.445-2006 What temporary provisions address hardship due to unusual circumstances? 69 FR 2437, Jan. 15, 2004

DELETE

86.446-2006 What are the provisions for extending compliance deadlines for small-volume manufacturers under hardship? 69 FR 2437, Jan. 15, 2004

DELETE

86.447-2006 What are the provisions for exempting motorcycles under 50 cc from the requirements of this part if they use engines certified under other programs? 69 FR 2438, Jan. 15, 2004

DELETE

86.448-2006 What are the provisions for producing motorcycles under 50 cc with

engines already certified under other programs?
69 FR 2438, Jan. 15, 2004

DELETE

86.449 Averaging Provisions. 69 FR 2439, Jan. 15, 2004

DELETE

Subpart F -- Emission Regulations for 1978 and Later New Motorcycles; Test Procedures

SOURCE: 42 FR 1137, Jan. 5, 1977, unless otherwise noted.

86.501 - 78 Applicability.

* * * *

86.502 - 78 Definitions.

* * * *

86.503 - 78 Abbreviations.
DELETE,
REPLACE WITH:
The abbreviations in 86.403-78 apply to this subpart, with the following additions:

ARB-	California Air Resources Board.
Bhp-	Brake-horsepower.
Bhp-hr-	Brake horsepower-hour.
Hp-	Horsepower.
PM-	Particulate Matter.

86.504 - 78 Section numbering.

* * * *

86.505 - 78 Introduction; structure of subpart.

* * * *

86.505 - 2004 Introduction; structure of subpart. 69 FR 2440, Jan. 15, 2004

DELETE

86.508 - 78 Dynamometer. 42 FR 56738, Oct. 28, 1977.

* * * *

86.509 - 90 Exhaust gas sampling system. 54 FR 14539, Apr. 11, 1989.

* * * *

86.511 - 90 Exhaust gas analytical system. 54 FR 14539, Apr. 11, 1989.

* * * *

86.513 - 87 Fuel and engine lubricant specifications. 52 FR 47869, Dec. 16, 1987.

DELETE

86.513 - 90 Fuel and engine lubricant specifications. 54 FR 14544, Apr. 11, 1989.

* * * *

86.513 - 94 Fuel and engine lubricant specifications. 60 FR 34354, June 30, 1995.

DELETE

86.513 - 2004 Fuel and engine lubricant specifications. 69 FR 2441, Jan. 15, 2004

DELETE

86.514 - 78 Analytical gases.

* * * *

86.515 - 78 EPA Urban Dynamometer Driving Schedule.

* * * *

86.516 - 90 Calibrations, frequency and overview. 54 FR 14546, Apr. 11, 1989.

* * * *

86.518 - 78 Dynamometer calibration.

* * * *

86.519 - 90 Constant volume sampler calibration. 54 FR 14546, Apr. 11, 1989.

* * * *

86.521 - 90 Hydrocarbon analyzer calibration. 54 FR 14546, Apr. 11, 1989.

* * * *

86.522 - 78 Carbon monoxide analyzer calibration.

* * * *

86.523 - 78 Oxides of nitrogen analyzer calibration. 52 FR 47870, Dec. 16, 1987.

* * * *

86.524 - 78 Carbon dioxide analyzer calibration.

* * * *

86.526 - 90 Calibration of other equipment. 54 FR 14551, Apr. 11, 1989.

* * * *

86.527 - 90 Test procedures, overview. 54 FR 14551, Apr. 11, 1989.

* * * *

86.528 - 78 Transmissions.

* * * *

86.529 - 78 Road load force and inertia weight determination.

* * * *

<u>86.529 - 98 Road load force and inertia weight determination. 63 FR 11849, Mar. 11, 1998</u>

<u>DELETE</u>

86.530 - 78 Test sequence, general requirements.

* * * *

86.531 - 78 Vehicle preparation.

* * * *

86.532 - 78 Vehicle preconditioning.

* * * *

86.535 - 90 Dynamometer procedure. 54 FR 14551, Apr. 11, 1989.

* * * *

86.536 - 78 Engine starting and restarting.

* * * *

86.537 - 90 Dynamometer test runs. 54 FR 14551, Apr. 11, 1989.

* * * *

86.540 - 90 Exhaust sample analysis. 54 FR 14551, Apr. 11, 1989.

* * * *

86.542 - 90 Records required. 54 FR 14551, Apr. 11, 1989.

* * * *

86.544 - 90 Calculations; exhaust emissions. 54 FR 14553, Apr. 11, 1989.

The following provisions of Subparts A, B, C, F, and I, Part 1051, Title 40, Code of Federal Regulations, as adopted or amended by the U. S. Environmental Protection Agency on the date listed are adopted and incorporated herein by this reference as the California Exhaust Emission Standards and Test Procedures for 1997 and Later Off-Highway Recreational Vehicles and Engines. The following modifications generally substitute California references for federal references, but do not change any standard, implementation, or test procedure related to the evaporative control requirements found in the incorporated subparts of the federal regulation.

PART 1051, CONTROL OF EMISSIONS FROM RECREATIONAL ENGINES AND VEHICLES

Subpart A, Determining How to Follow This Part

1051.5 Which engines are excluded or exempted from this part's requirements?

DELETE
REPLACE WITH:
You may exclude vehicles with compression-ignition engines.

Subpart B, Emission Standards and Related Requirements

SOURCE: 70 FR 40487, July 13, 2005, unless otherwise noted.

1051.101 What emission standards and other requirements must my vehicles meet?
DELETE.

1051.103 What are the exhaust emission standards for snowmobiles?
DELETE.

1051.105 What are the exhaust emission standards for off-highway motorcycles?
DELETE.

1051.107 What are the exhaust emission standards for all-terrain vehicles (ATVs) and offroad utility vehicles?
DELETE.

1051.110 What evaporative emission standards must my vehicles meet?

DELETE Introductory Text,
REPLACE WITH:
Your new vehicles must meet the emission standards of this section over their full useful life. Note that section 1051.245 of these test procedures allows you to use design-based certification instead of generating new emission data.

(a) DELETE
REPLACE WITH:
(a) Beginning with the 2008 model year, permeation emissions from your vehicle's fuel tank(s) may not exceed 1.5 grams per square-meter per day when measured with the test procedures for tank permeation in subpart F of this part of these test procedures. You may generate or use emission credits under the averaging, banking, and trading (ABT) program, as described in Subpart H, Part 1051, Title 40, Code of Federal Regulations, provided the credits and debits are from vehicles produced for sale in California.

* * * *

1051.115 What other requirements must my vehicles meet?
DELETE.

1051.120 What emission-related warranty requirements apply to me?
DELETE.

1051.125 What maintenance instructions must I give to buyers?
DELETE.

1051.130 What installation instructions must I give to vehicle manufacturers?
DELETE.

1051.135 How must I label and identify the vehicles I produce?
DELETE.

1051.137 What are the consumer labeling requirements?
DELETE.

1051.145 What provisions apply only for a limited time?
DELETE subparagraphs (a) through (f) and retain subparagraphs (g) and (h).

Subpart C, Certifying Engine Families

SOURCE: 70 FR 40492, July 13, 2005, unless otherwise noted.

1051.201 What are the general requirements for obtaining a certificate of conformity?
DELETE.

1051.205 What must I include in my application?
DELETE.

1051.210 May I get preliminary approval before I complete my application?
DELETE.

1051.220 How do I amend the maintenance instructions in my application?
DELETE.

1051.225 How do I amend my application for certification to include new or modified vehicles or to change an FEL?
DELETE.

1051.230 How do I select engine families?
DELETE.

1051.235 What emission testing must I perform for my application for a certificate of conformity?
DELETE.

1051.240 How do I demonstrate that my engine family complies with exhaust emission standards?
DELETE.

1051.243 How do I determine deterioration factors from exhaust durability testing?
DELETE:

1051.245 How do I demonstrate that my engine family complies with evaporative emission standards?

(a) DELETE,
REPLACE WITH:
(a) For purposes of certification, your engine family is considered in compliance with the evaporative emission standards in subpart B of these test procedures and 2412(b), Title 13, California Code of Regulations (CCR), if you do either of the following:

(a)(1) DELETE,
REPLACE WITH:
(a)(1) You have test results showing permeation emission levels from the fuel tanks and fuel lines in the family are at or below the evaporative standards in section 1051.110 of these test procedures and section 2412(b), Title 13, CCR, throughout the useful life.

* * * *

(c) DELETE,
REPLACE WITH:
(c) To compare emission levels with the emission standards, apply deterioration factors to the measured emission levels. For permeation emissions, use the following procedures to establish an additive deterioration factor. An additive deterioration factor for a pollutant is the difference between emissions at the end of the useful life and emissions at the low-

hour test point. In these cases, adjust the official emission results for each tested vehicle or engine at the selected test point by adding the factor to the measured emissions. If the factor is less than zero, use zero. Additive deterioration factors must be specified to one more decimal place than the applicable standard:

(1) Section 1051.515 of these test procedures specifies how to test your fuel tanks to develop deterioration factors. Small-volume manufacturers may use assigned deterioration factors that we establish. Apply the deterioration factors as follows:

(i) Calculate the deterioration factor from emission tests performed before and after the durability tests as described in sections 1051.515(c) and (d) of these test procedures, using good engineering judgment. The durability tests described in section 1051.515(d) of these test procedures represent the minimum requirements for determining a deterioration factor. You may not use a deterioration factor that is less than the difference between evaporative emissions before and after the durability tests as described in sections 1051.515(c) and (d) of these test procedures.

(ii) Do not apply the deterioration factor to test results for tanks that have already undergone these durability tests.

(2) Determine the deterioration factor for fuel lines using good engineering judgment.

* * * *

(e)(1) DELETE.
REPLACE WITH:
(e)(1) For certification to the evaporative standards specified in section 1051.110(a) of these test procedures and section 2412(b), Title 13, CCR, with the control technologies shown in the following table:

* * * *

(e)(2) DELETE.
REPLACE WITH:
(e)(2) For certification to the standards specified in section 1051.110(b) of these test procedures and section 2412(b), Title 13, CCR, with the control technologies shown in the following table:

* * * *

1051.250 What records must I keep and make available to EPA?
DELETE.

1051.255 What decisions may EPA make regarding my certificate of conformity?
DELETE.

Subpart F, Test Procedures

SOURCE: 70 FR 40499, July 13, 2005, unless otherwise noted.

1051.501 What procedures must I use to test my vehicles or engines?

DELETE Introductory Test
(a) DELETE

(b) DELETE

(c) DELETE
REPLACE WITH:
(c) *Permeation testing.* (1) Use the equipment and procedures specified in section 1051.515 of these test procedures to measure fuel tank permeation emissions.

(2) DELETE
REPLACE WITH:
(2) Prior to permeation testing of fuel hose, the hose must be preconditioned by filling the hose with the fuel specified in paragraph (d)(3) of this section, sealing the openings, and soaking the hose for 4 weeks at 23 ±5 °C. To measure fuel-line permeation emissions, use the equipment and procedures specified in SAE J30 (incorporated by reference in section 1051.810 of these test procedures). The measurements must be performed at 23 ±2 °C using the fuel specified in paragraph (d)(3) of this section.

* * * *

(d)(1) DELETE

(d)(2) DELETE
REPLACE WITH:
(d)(2) *Fuel Tank Permeation.* (i) For the preconditioning soak described in section 1051.515(a)(1) of these test procedures and fuel slosh durability test described in section 1051.515(d)(3) of these test procedures, use the fuel specified in Table 1 of section 1065.710, Title 40, Code of Federal Regulations, blended with 10 percent ethanol by volume. As an alternative, you may use Fuel CE10, which is Fuel C as specified in ASTM D 471–98 (incorporated by reference in section 1051.810 of these test procedures) blended with 10 percent ethanol by volume.

(ii) For the permeation measurement test in section 1051.515(b) of these test procedures, use the fuel specified in Table 1 of section 1065.710, Title 40, Code of Federal Regulations. As an alternative, you may use the fuel specified in paragraph (d)(2)(i) of this section.

(d)(3) DELETE
REPLACE WITH:
(d)(3) *Fuel Hose Permeation.* Use the fuel specified in Table 1 of section 1065.710, Title 40, Code of Federal Regulations, blended with 10 percent ethanol by volume for permeation testing of fuel lines. As an alternative, you may use Fuel CE10, which is Fuel C as specified in ASTM D 471–98 (incorporated by reference in section 1051.810 of these test procedures) blended with 10 percent ethanol by volume.

(e) DELETE

* * * *

1051.505 What special provisions apply for testing snowmobiles?
DELETE.

1051.510 What special provisions apply for testing ATV engines? [Reserved]
DELETE.

1051.515 How do I test my fuel tank for permeation emissions?

* * * *

(a)(1) DELETE.
REPLACE WITH:
(a) *Preconditioning fuel soak.* To precondition your fuel tank, follow these five steps:
(1) Fill the tank with the fuel specified in section 1051.501(d)(2)(i) of these test procedures, seal it, and allow it to soak at 28 ±5 °C for 20 weeks. Alternatively, the tank may be soaked for a shorter period of time at a higher temperature if you can show that the hydrocarbon permeation rate has stabilized.

* * * *

(a)(3) DELETE.
REPLACE WITH:
(a)(3) Fill the fuel tank with the test fuel specified in section 1051.501(d)(2)(ii) of these test procedures to its nominal capacity. If you fill the tank inside the temperature-controlled room or enclosure, do not spill any fuel.

* * * *

(b)(7) DELETE.
REPLACE WITH:
(b)(7) At the end of the soak period, weigh the sealed fuel tank and record the weight to the nearest 0.1 grams. You may use less precise weights as long as the difference in mass from the start of the test to the end of the test has at least three significant figures. Unless

the same fuel is used in the preconditioning fuel soak and the permeation test run, record weight measurements on five separate days per week of testing. The test is void if a linear plot of tank weight vs. test days for the full soak period for permeation testing specified in paragraph (b)(5) of this section yields a coefficient of determination (r^2) below 0.8. The coefficient of determination (r^2) is calculated per the following equation:

$$r_y^2 = 1 - \frac{\sum_{i=1}^{N}\left[y_i - a_{0y} - \left(a_{1y} \cdot y_{refi}\right)\right]^2}{\sum_{i=1}^{N}\left[y_i - \bar{y}\right]^2}$$

In this equation, "N" denotes sample size, "i" denotes an index, "y" denotes a generic measured quantity, the superscript over-bar "$\bar{}$" denotes an arithmetic mean, and the subscript "$_{ref}$" denotes the reference quantity being measured.

* * * *

(c) DELETE.
REPLACE WITH:
(c) *Determination of final test result.* To determine the final test result, apply a deterioration factor to the measured emission level. The deterioration factor is the difference between permeation emissions measured before and after the durability testing described in paragraph (d) of this section. Adjust the baseline test results for each tested fuel tank by adding the deterioration factor to the measured emissions. The deterioration factor determination must be based on good engineering judgment. Therefore, during the durability testing, the test tank may not exceed the fuel tank permeation standard described in section 2412(b), Title 13, CCR, (this is known as "line-crossing"). If the deterioration factor is less than zero, use zero.

* * * *

(d)(3) DELETE.
REPLACE WITH:
(d)(3) *Slosh testing.* Perform a slosh test by filling the tank to 40 percent of its capacity with the fuel specified in section 1051.501(d)(2)(i) of these test procedures and rocking it at a rate of 15 cycles per minute until you reach one million total cycles. Use an angle deviation of +15° to −15° from level. This test must be performed at a temperature of 28 °C ±5 °C.

* * * *

1051.520 How do I perform exhaust durability testing?
DELETE.

Subpart I, Definitions and Other Reference Information

SOURCE: 70 FR 40507, July 13, 2005, unless otherwise noted.

1051.801 What definitions apply to this part?

DELETE ALL DEFINITIONS:

ADD:
The definitions in the California Health and Safety Code and in Title 13, CCR, § 2421, shall apply.

ADD:
The definitions in Part 86.402-78 of these test procedures shall apply and shall take precedent in the event of conflict.

ADD:
Act means California Health and Safety Code, Division 26, and corresponding regulations, except where the context indicates otherwise.

ADD:
Clean Air Act means California Health and Safety Code, Division 26, and corresponding regulations, except where the context indicates otherwise.

ADD:
Designated Compliance Officer means the Executive Officer of the Air Resources Board (or the Executive Officer's designee).

ADD:
Designated Enforcement Officer means the Executive Officer of the Air Resources Board (or the Executive Officer's designee).

ADD:
EPA or U.S. EPA means Air Resources Board.

ADD:
We (us, our) means the Executive Officer of the California Air Resources Board and any authorized representatives.

ADD:
You means, within the context of its usage, the target entity to which the regulatory provision applies. This is typically the engine manufacturer, but may occasionally refer to

the equipment manufacturer or other entity as specified.

1051.805 What symbols, acronyms, and abbreviations does this part use?
DELETE.

1051.810 What materials does this part reference?

DELETE Introductory Text

* * * *

Table 2 Row 2 "SAE J1930, Electrical/Electronic Systems 1051.135 Diagnostic Terms, Definitions, Abbreviations, and Acronyms, May 1998....."
DELETE.

1051.815 What provisions apply to confidential information?
DELETE.

1051.820 How do I request a hearing?
DELETE.

PART 15

INCORPORATED TEST PROCEDURE

New Off-Highway Recreational Vehicles and Engines

Note: This appendix shows the entirety of regulatory amendments to the test procedures titled below, which were approved by the Air Resources Board on December 16, 2011, and refined via subsequent conforming modifications authorized under Resolution 11-41. These amendments are formatted in a style to indicate changes from the existing test procedures. All existing language is indicated by plain type. All additions to the existing language are indicated by underlined type. All deletions to the existing language are indicated by ~~strikeout~~. Only those sections containing the modifications from the existing language are included. All other portions remain unchanged and are indicated by the notation [* * * * *] for reference. If there is any conflict between the provisions of this document and the California Health and Safety Code, Division 26, or Title 13 of the California Code of Regulations (CCR), the Health and Safety Code and Title 13 apply.

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State of California

AIR RESOURCES BOARD
CALIFORNIA EXHAUST EMISSIONS STANDARDS AND TEST PROCEDURES FOR 1997 AND LATER OFF-HIGHWAY RECREATIONAL VEHICLES AND ENGINES

Adopted: ~~May 26, 1995~~ November 22, 1994

Amended: October 22, 1999

Amended: June 1, 2007

Amended: October 25, 2012

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CALIFORNIA EXHAUST EMISSIONS STANDARDS AND TEST PROCEDURES FOR 1997 AND LATER OFF-HIGHWAY RECREATIONAL VEHICLES AND ENGINES

The following provisions of Subpart E and F, Part 86, Title 40, Code of Federal Regulations, as adopted or amended by the U. S. Environmental Protection Agency on the date listed are adopted and incorporated herein by this reference as the California Exhaust Emission Standards and Test Procedures for 1997 and Later Off-Highway recreational vehicles and engines, except as altered or replaced by the provisions set forth below.

PART 86, CONTROL OF EMISSIONS FROM NEW AND IN-USE HIGHWAY VEHICLES AND ENGINES
Subpart E, General Provisions for Emission Regulations for 1978 and Later New Motorcycles
SOURCE: 42 FR 1126, Jan. 5, 1977, unless otherwise noted.

* * * * *

Subpart F -- Emission Regulations for 1978 and Later New Motorcycles; Test Procedures

* * * * *

86.513 - 90 Fuel and engine lubricant specifications. 54 FR 14544, Apr. 11, 1989.
(a) DELETE
REPLACE WITH:
(a)(1) Gasoline having the following specifications will be used by the Administrator in exhaust emission testing. Gasoline having the following specifications or substantially equivalent specifications approved by the Administrator, shall be used by the manufacturer for emission testing except that the octane specifications do not apply.

(a)(1)(A) Additionally for the 2013-2019 model-year off-highway recreational vehicles, the manufacturer has the option to use the fuel specified in (a)(2) below.

(a)(1)(B) For 2020 and later model-year off-highway recreational vehicles: The certification test fuel for exhaust emission testing must be consistent with the fuel specifications as outlined in title 13, section 1961.2 and the “California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles,” adopted <insert date of adoption>, and incorporated by reference herein. The test fuel specifications should remain consistent from batch to batch. Optionally, manufacturers may use other renewable fuel blends under this paragraph that have been certified by ARB as yielding test results equivalent, or more stringent than, those resulting from the fuel specified by 13 CCR 1961.2, and which are appropriate for the certification of off-highway recreational vehicles.

* * * * *

TP-933

Test Procedure for Determining Evaporative Emissions from Off-Highway Recreational Vehicles

Adopted: November 5, 2014

California Air Resources Board

Monitoring and Laboratory Division

Note: This is a newly adopted test procedure shown without underline as permitted by California Code of Regulations.

TP-933
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TP-933

Test Procedure for Determining Evaporative Emissions from Off-Highway Recreational Vehicles (OHRVs)

1 APPLICABILITY

Test Procedure 933 (TP-933) is used by the Air Resources Board (ARB) to determine OHRV evaporative emissions. This test procedure is proposed pursuant to section 43824 of the California Health and Safety Code (CH&SC).

1.1 Terms and Definitions

In addition to the following definitions, the definitions set forth in the incorporated "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles" as last amended December 6, 2012, and title 13, California Code of Regulations (CCR), section 2417, apply:

1.1.1 For the purpose of this procedure, when the term "Administrator" is used in any federal regulations referenced within this document, it shall mean the ARB Executive Officer or his or her authorized representative or designate.

1.1.2 For the purpose of this procedure, the term "ARB" refers to the California Air Resources Board.

1.1.3 For the purpose of this procedure, the term “Deterioration factor” means the ratio of emissions after and before durability testing or the value of any positive increase in emissions from before or after durability testing.

1.1.4 For the purpose of this procedure, the term "Executive Officer" refers to the ARB Executive Officer or his or her authorized representative or designate.

1.1.5 For the purpose of this procedure, the term "horizontal plane" shall mean:

1.1.5.1 For vehicles with two wheels, the plane which contains the line defined by the points where the vehicle’s front and rear tires are in contact with the testing surface when positioned in normal upright riding position on the level testing surface and which is parallel to the axis of the wheel axles.

1.1.5.2 For vehicles with three or more wheels, the plane defined by the points where the vehicle’s tires contact the testing surface while the vehicle is positioned in normal upright riding position on the level testing surface with the tires inflated to normal manufacturer recommendations.

1.1.6 For the purpose of this procedure, when the term "methanol" is used in any federal regulations referenced within this document, it shall mean methanol and/or ethanol, except as otherwise indicated in this test procedure.

1.1.7 For the purpose of this procedure, the term "travel axis" shall mean the axis defined by the direction the vehicle travels while in normal use and located in the horizontal plane that the vehicle sits.

1.1.8 For the purpose of this procedure, the term "upright axis" shall mean a line passing through the travel axis which is perpendicular to the horizontal plane. Under normal use conditions, this is the same as the vertical axis.

1.2 Test Data Availability

The manufacturer shall provide the specific information that supports its assurance of the system's performance with the requirements within this procedure within 30 days of a written request by the Executive Officer.

1.3 Safety

This test procedure involves the use of flammable materials and should only be used by, or under the supervision of, those familiar and experienced in the use of such operations and materials. Appropriate safety precautions should be observed at all times while performing this test procedure.

1.4 Test Fuel Specification

The test fuel used for all parts of this procedure, unless otherwise specified, shall be California certification gasoline as specified in "California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" section II.A.100.3.1.2, adopted March 22, 2012, as last amended December 6, 2012, which is incorporated by reference herein.

1.5 Alternative Test Procedures

With prior approval alternative test procedures can be used. It must be demonstrated that the alternative method is equivalent to or more stringent than the method set forth in this test procedure.

2 PRINCIPLE AND SUMMARY OF TEST PROCEDURES

This test procedure measures evaporative emissions from a complete vehicle or piece of equipment with complete evaporative emission control systems as defined in 13 CCR 2752 (a)(8) by subjecting them to durability tests, preconditioning, and a diurnal evaporative test as described in section 6 of this procedure. The engine with a complete evaporative emission control system must be tested as a complete vehicle except where a test rig is explicitly allowed. Where not otherwise specified, the vehicle shall be in an approximately level position during all phases of the test sequence.

Prior to evaporative emissions testing, the vehicle's evaporative emissions control system must undergo durability testing to ensure that the emissions control devices continue to function as designed for the useful life of the vehicle. Real world end of useful life emissions are simulated during vehicle preconditioning.

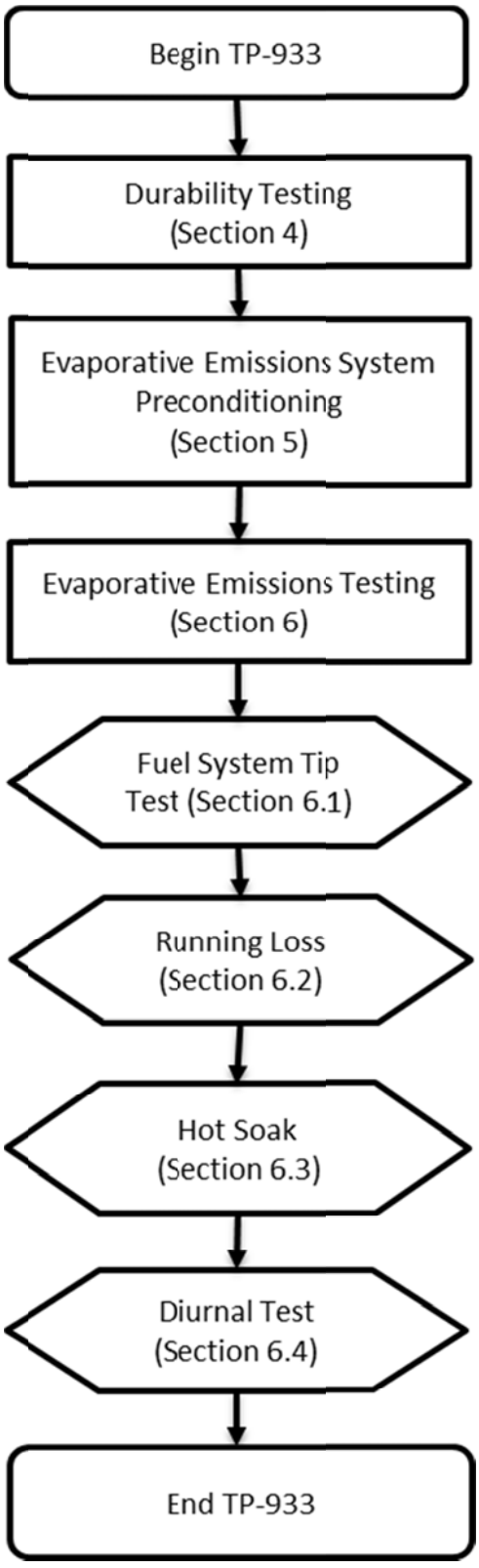
Evaporative emissions are quantified by direct measurement or by a combination of direct measurement and calculation. Evaporative emissions are directly measured with a hydrocarbon analyzer in a sealed testing enclosure following a defined temperature profile and maintaining atmospheric pressure. The volume of the enclosure must be accurately determined whenever hydrocarbons are being measured. The total mass of hydrocarbons emitted from a test vehicle over the test period is calculated based on measured concentration, known molecular weight, and volume of the testing enclosure.

The vehicle shall demonstrate adequate control of diurnal emissions through one of the following test sequences:

Vehicle may undergo a 72-hour diurnal evaporative emissions test with variable temperature as defined in section 6.4.1.

Alternatively, a steady state diurnal test may be used to show compliance. The vehicle's evaporative emissions control system is demonstrated to be adequately designed and constructed by performing a 24-hour diurnal test in conjunction with the vented emissions requirements as described in section 6.4.2. The steady state diurnal test must be conducted with the testing enclosure maintained at a constant temperature of 86°± 3°F, with a vent connecting the evaporative vent of the vehicle to the atmosphere outside the testing enclosure. The purpose of the steady state diurnal test is to evaluate fuel permeation and verify the construction of the evaporative emissions control system. Compliance is shown with the vented emissions requirement using the Calculation Method as described in Appendix A or by using a pressure relief valve that opens at 2 pounds per square inch (psi) or greater, or which does not release vapor from the tank during the second of two consecutive 24-hour diurnal temperature cycles from 72° to 96°F. A flowchart summarizing the procedure is shown in Figure 1.

Figure 1: TP-933 Summary Flowchart



3 INSTRUMENTATION

Equipment used during this testing shall, at a minimum, meet the requirements set forth in this section. This document incorporates by reference Title 40, Code of Federal Regulations (CFR), Part 86 – Control of Emissions from New and In-Use Highway Vehicles and Engines, subpart 107-96, 108-79, 108-00, and 508-78 (2012).

3.1 Vehicle Test Enclosure

This test procedure incorporates by reference "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles" as last amended December 6, 2012, Parts III.A and III.B, for evaporative emission measurement enclosure requirements and calibrations with the following exceptions:

3.1.1 The fuel tank temperature is not controlled in this procedure for the diurnal evaporative tests and the tip tests. Fuel tank temperature is only controlled for the pressure relief option in section 6.4.2. Therefore, disregard all sections pertaining to fuel tank temperature monitoring and fuel tank temperature management systems except as required.

3.1.1.1 If showing compliance with a pressurized fuel tank, revise subparagraph 40 CFR section 86.107-96(e), (Temperature Recording System) to read: In addition to the specifications in this section, the vapor temperature in the fuel tank must be measured. When the fuel or vapor temperature sensors cannot be located in the fuel tank to measure the temperature of the prescribed test fuel or vapor at the approximate mid-volume (e.g. saddle tank), sensors shall be located at the approximate mid-volume of each fuel or vapor containing cavity. The average of the readings from these sensors shall constitute the fuel or vapor temperature. The Executive Officer may approve alternate sensor locations where the specifications above cannot be met or where tank symmetry provides redundant measurements.

3.2 Dynamometer

3.2.1 The chassis dynamometer shall meet the requirements of 40 CFR section 86.508-78, 40 CFR section 86.108-00, or 40 CFR section 86.108-79 (2012) as long as it is capable of accurately simulating the test weight of the vehicle.

3.2.2 The chassis dynamometer shall be calibrated according to the requirements used in 3.2.1 above. The calibration shall be conducted at a temperature of 86°F ± 3°F.

3.3 Fuel Vapor and Alcohol Hydrocarbon Analyzer

The fuel vapor and alcohol hydrocarbon analyzer shall meet the requirements specified in 40 CFR section 86.107-96(b). As described in section 7, ethanol measurements may be omitted if the calculated mass of hydrocarbon emissions is multiplied by an adjustment factor that accounts for alcohol vapor.

3.4 Test Data Recording System

An on-line computer system or strip-chart recorder shall be used to record the following parameters during the test sequence:

a) Cell/enclosure ambient temperature
b) If applicable, temperatures of vehicle fuel tank liquid (T_{liq}) and vapor space (T_{vap})
c) If applicable, vehicle fuel tank headspace pressure
d) If applicable, dynamometer roll speed
e) Flame Ionization Detector (FID) output voltage recording the following parameters for each sample analysis:
    1) zero gas and span gas adjustments
    2) zero gas reading
    3) If applicable, dilute sample bag reading
    4) If applicable, dilution air sample bag reading
    5) zero gas and span gas readings
f) Ethanol sampling data including the:
    1) volumes of deionized water introduced into each impinger
    2) rate and time of sample collection
    3) volumes of each sample introduced into the gas chromatograph
    4) flow rate of carrier gas through the column
    5) column temperature
    6) chromatogram of the analyzed sample

3.5 Carbon Canister Bench Aging Equipment

Carbon canister bench aging equipment shall meet the requirements specified in section 4.1 of this procedure.

3.6 Carbon Canister Test Bench

The carbon canister test bench or associated combination of testing equipment shall meet the requirements specified in section 5.2 of this procedure.

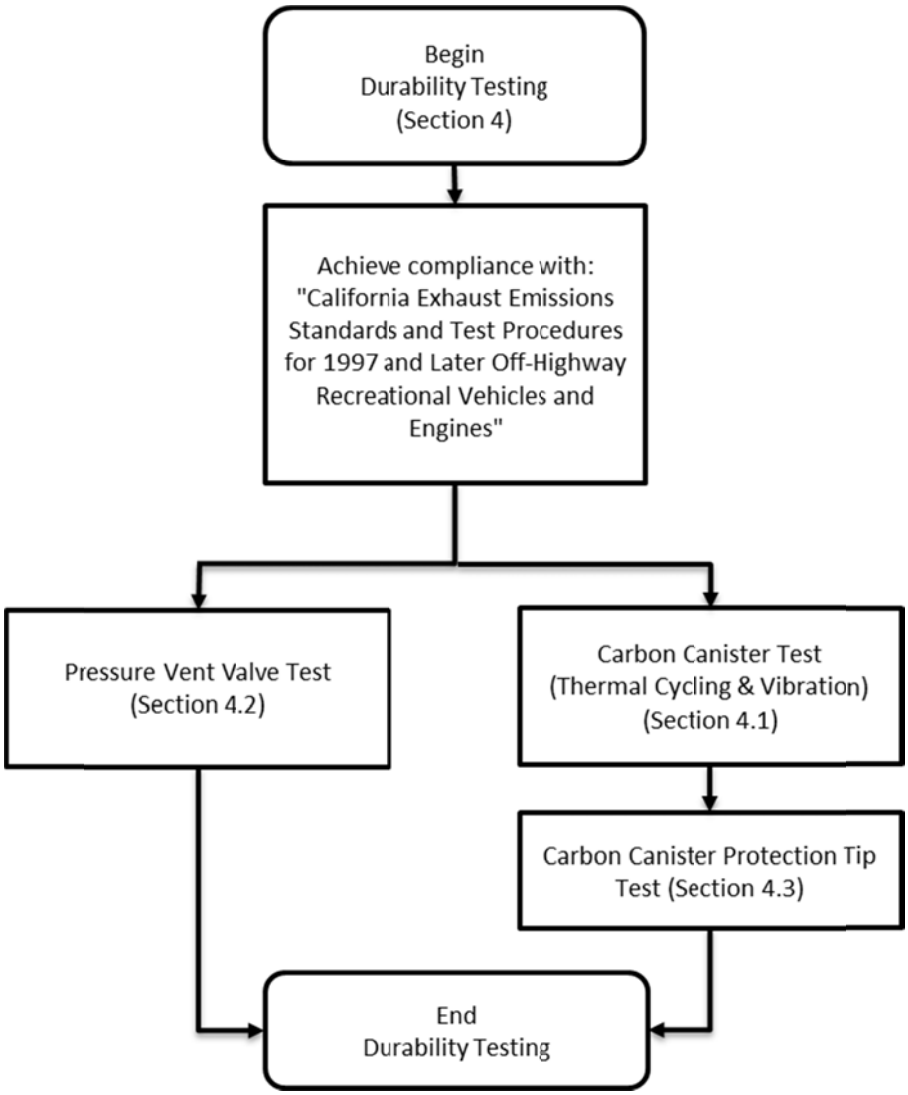
4 DURABILITY TESTING

Certification of an OHRV evaporative emission control system requires a manufacturer to first demonstrate the durability of each evaporative emission control system family. This is required prior to performing the evaporative emissions test described in section 6 to ensure the vehicle will meet evaporative emissions standards over the useful life of the vehicle. The evaporative emission control system must satisfy durability requirements as prescribed in "TP-901 – Test Procedure for Determining Permeation Emissions from Small Off-Road Engines and Equipment Fuel Tanks," as adopted July 26, 2004, and incorporated by reference herein. This must be done before proceeding to the durability testing section of this procedure, unless each evaporative emissions-related part has undergone durability testing for exhaust in another model of the same vehicle as specified in *California Exhaust Emissions Standards And Test Procedures For 1997 And Later Off-Highway Recreational Vehicles And Engines*, California Environmental Protection Agency, Air Resources Board, El Monte, CA, October 25, 2012 which is incorporated by reference herein.

In addition, OHRV manufacturers must comply with the durability requirements in sections 4.1 through 4.3 of this test procedure or get approval from ARB for an alternative durability

procedure. Carry-over and carry-across of deterioration factors may be allowed for systems using components that have successfully completed durability testing. Applicants shall be allowed to proceed to section 5 of this test procedure if their products remain free of defects after the durability tests prescribed below. An applicant may propose modifications to the durability tests in this section if they can clearly demonstrate that the alternative durability test procedures are representative of end of useful life. Durability testing shall include the steps outlined in Figure 2.

Figure 2: Durability Flow Chart



4.1 Carbon Canister Test

For systems that utilize a carbon canister, the durability test procedures shall include thermal cycling and vibration exposure of the canister.

4.1.1 For thermal cycling, the test must subject the canister to 100 cycles of the following temperature profile:

4.1.1.1 Heat and hold at 140ºF ±4ºF for 30 minutes. (Up to 10 minutes is allowed for the temperature to rise and stabilize)

4.1.1.2 Cool and hold at 32ºF ±4ºF for 30 minutes. (Up to 20 minutes is allowed for the temperature to reach 32ºF during the cooling period)

4.1.2 For the vibration test, the canister must be subject to a peak horizontal acceleration of 4.5 x gravitational acceleration (g – 9.8 meters per second squared) at 60 Hertz (Hz) with a total of 10,000,000 cycles. The orientation of the canister, while being subject to vibration, must be the same as when mounted on the vehicle during normal use. If the canister is mounted on the vehicle using a vibration isolation system, the canister may be mounted in a test rig using the same vibration isolation system for conducting the test.

4.2 Pressure Vent Valve

If the fuel system employs a fuel vapor pressure vent valve, prior to the time of submission of a certification application, the applicant is required to submit and obtain approval of an evaporative emission durability test procedure for the pressure vent valve. The procedure shall have provisions to demonstrate durability after exposure to ultraviolet (UV) light, ozone, vibration and dust. Once approved, the pressure vent valve durability procedure may be used by any applicant using a similar pressure vent valve.

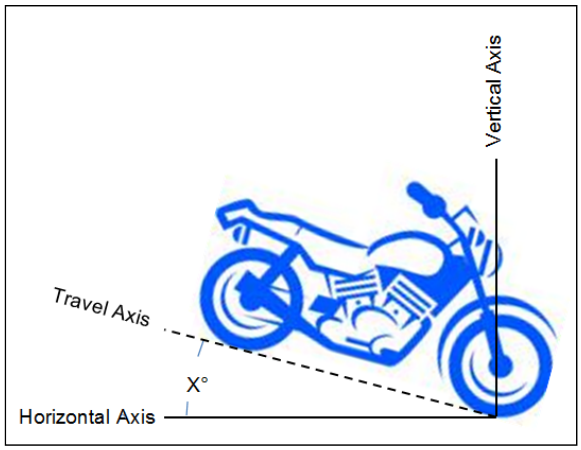
4.3 Carbon Canister Protection - Tip Test

The carbon canister protection tip test can be conducted with a vehicle or with a test rig that represents the actual position and orientation of the fuel system components. The fuel tank must be filled to 100 percent of nominal capacity with test fuel.

4.3.1 In less than 2 seconds, orient the vehicle such that the travel axis is tilted X degrees above and below the horizontal plane. See Figure 3 for a schematic. Hold the vehicle for 60 to 70 seconds, or such longer period of time as a manufacturer may choose, in both the positive and the negative position. X shall be as defined as follows:

a) 30° ± 2° for off-road motorcycles.
b) 30° ± 2° for all other OHRVs.

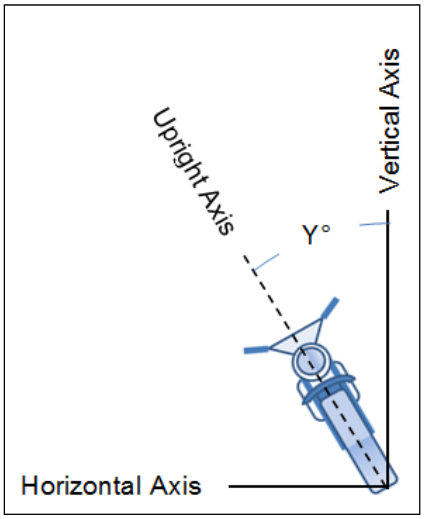
Figure 3: Horizontal Tilt



4.3.2 In less than 2 seconds, orient the vehicle such that the upright axis is tilted Y degrees from the vertical axis with rotation being about the travel axis. See Figure 4 for a schematic. Hold this position in both the positive and the negative position for 60 to 70 seconds, or such longer period of time as a manufacturer may choose. Y shall be as defined as follows:

a) Unsupported position on either side for off-road motorcycles (i.e., vehicle lying on its side).
b) 15° ± 2° for all other OHRVs.

Figure 4: Vertical Tilt



The weight of the vehicle's carbon canister must be measured before and after the tests specified in this section to determine weight gain. If the weight gain is 10 percent of the butane working capacity or more, the vehicle fails the test.

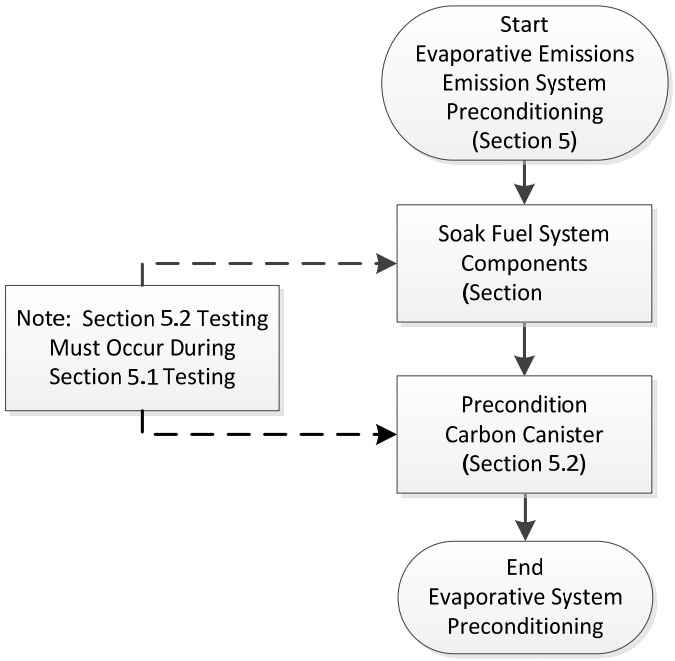
Alternative carbon canister protection tip tests may be submitted for approval. All proposed alternatives to the carbon canister protection tip test must show that the carbon canister functions as it should at the end of useful life, while subjecting it to the potential for liquid gasoline contamination consistent with vehicle usage. As a guideline, all

alternative carbon canister tip tests should include real world liquid fuel exposure (e.g. volumes, rates, and total events), real world purges (e.g., rates and bed volumes), and use of a damaged canister during testing as described in this procedure.

5 EVAPORATIVE EMISSIONS SYSTEM PRECONDITIONING

The purpose of the preconditioning period is to introduce test fuel into the fuel system and condition all fuel system components to in-use conditions. Evaporative system preconditioning can be done in conjunction with mileage accumulation for exhaust testing as long as the fuel system has continuously held evaporative test fuel E10 (commercial pump fuel containing 10 percent ethanol) for a total of 140 days. E10 pump fuel may only be used for the portion of the soaking period; however, fuel must be switched to E10 test fuel for a minimum of 30 days prior to testing. The preconditioning procedure shall include the steps outlined in Figure 5.

Figure 5: Preconditioning Flowchart



5.1 Soak Fuel System Components

Precondition the tank and other fuel delivery system components by filling the tank to its nominal capacity with fresh test fuel. Cap the tank within one minute of filling. After filling the tank, start the vehicle engine and allow it to idle for approximately fifteen minutes. Soak the tank and other components continuously for a total of 3,360 hours while maintaining an ambient temperature between 68ºF and 86ºF. Alternatively, components may be preconditioned using a fuel system test rig. The test rig must include all the components of the fuel and evaporative emissions control system connected and oriented as they would be installed in the vehicle. The tank and fuel lines must be filled with test fuel at the beginning of the test. A fuel system may be soaked for less than 3,360 hours if data is provided using one of the following two documents incorporated by reference: “TP-901 - Test Procedure for Determining Permeation Emissions from Small Off-Road Engines and Equipment Fuel Tanks” adopted July 26, 2004 or 40 CFR section1060.520 (2012) that

shows steady state permeation has been reached. If slosh testing is required, the slosh time may be considered part of the preconditioning period, provided all fuel system components tested remain filled with fuel, and are never empty for more than one hour over the entire preconditioning period.

If the fuel system is allowed to sit more than 6 weeks at 68°F to 86°F, a 1-week presoak must be conducted with fresh fuel before testing begins. The fresh fuel presoak can be counted as part of the 3,360-hour soak, so long as the fuel system is empty less than one hour.

Prior to beginning any test sequence to measure running loss, hot soak, or diurnal emissions, a vehicle may, at the manufacturer's option, be preconditioned to minimize non-fuel emissions by being soaked at an elevated temperature prior to testing. To ensure steady state permeation rates, the vehicle must be soaked for at least 7 days at a temperature no higher than 95°F immediately prior to emissions testing.

5.2 Precondition Carbon Canister

For systems that utilize carbon canisters, subsections 5.2.2 through 5.2.4 of the preconditioning sequence must be completed no sooner than 96 hours preceding the beginning of the evaporative emission test procedure described in section 6 at 86° ± 3°F.

For vehicles with multiple canisters in a series configuration, the set of canisters must be preconditioned as a unit. For vehicles with multiple canisters in a parallel configuration, each canister must be preconditioned separately. If production evaporative canisters are equipped with a functional service port designed for vapor load or purge steps, the service port shall be used to precondition the canister.

The following steps shall be performed in preconditioning the carbon canister:

5.2.1 Determine the canister's nominal working capacity based on the average capacity of no less than five canisters. These five canisters shall be the same as the canister on the vehicle undergoing testing. A manufacturer may use the butane working capacity provided by the canister vendor; if the vendor certifies that the working capacity has been determined using the following procedures:

a) Each canister must be loaded no less than 10 times and no more than 100 times, to 2 gram breakthrough with a 50/50 mixture by volume of butane and nitrogen, at a rate of 15 ± 2 grams butane per hour per liter of canister volume. Each canister loading step must be preceded by canister purging with 300 canister bed volume exchanges at 0.8 cubic feet per minute (cfm) per liter of canister volume.

b) Each canister must first be purged with 300 canister bed volume exchanges at 0.8 cfm per liter of canister volume. The working capacity of each canister shall be established by determining the mass of butane required to load the canister from the purged state so that it emits 2 grams of hydrocarbon vapor; the canister must be loaded with a 50/50 mixture by volume of butane and nitrogen, at a rate of 15 ± 2 grams butane per hour per liter of canister volume.

5.2.2 Prepare the vehicle's evaporative emission canister for the canister purging and loading operation. The canister shall not be removed from the vehicle, unless access to the canister in its normal location is so restricted that purging and loading can only reasonably be accomplished by removing the canister from the vehicle. Special care shall be taken during this step to avoid damage to the components and the integrity of

the fuel system. A replacement canister may be temporarily installed during the soak period while the canister from the test vehicle is preconditioned.

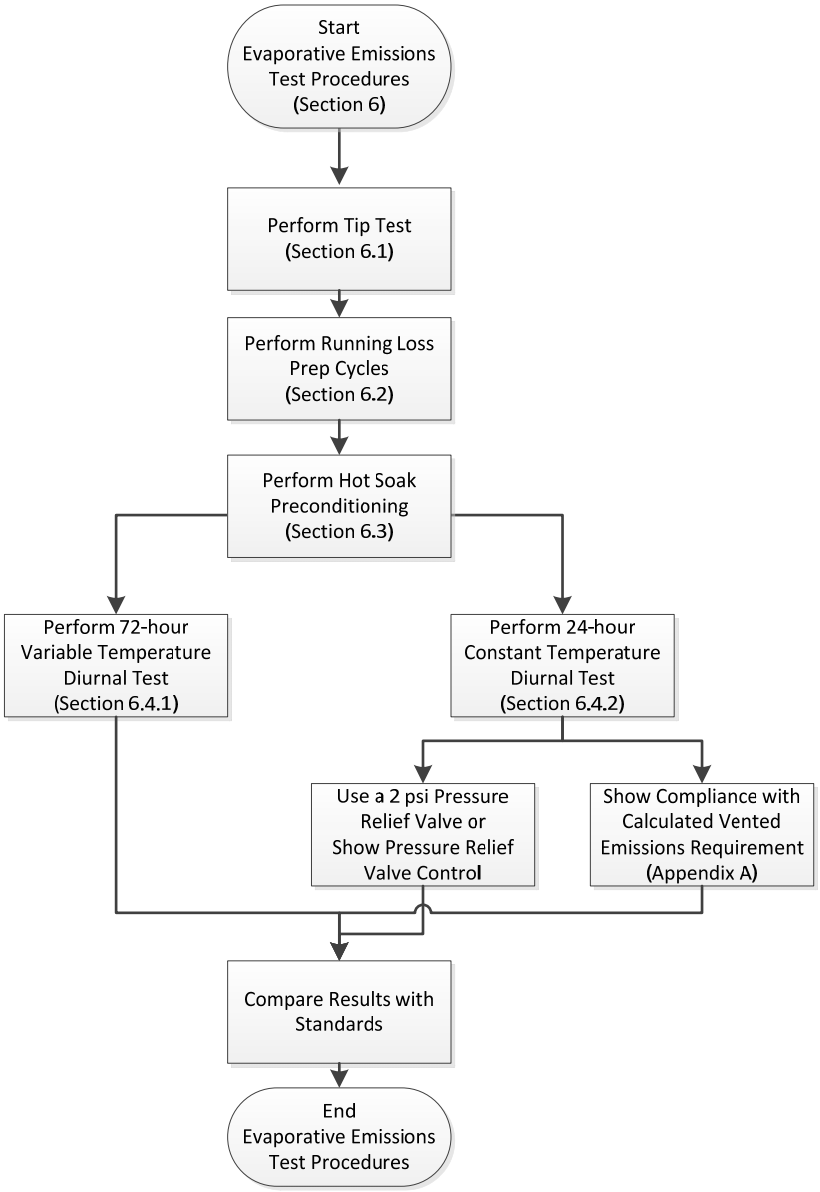
5.2.3 The canister purge shall be performed with ambient air of humidity controlled to 50 ± 25 grains per pound of dry air. This may be accomplished by purging the canister in a room that is conditioned to this level of absolute humidity. The flow rate of the purge air shall be maintained at a nominal flow rate of 0.8 cfm per liter of canister volume and the duration shall be determined to provide a total purge volume flow through the canister equivalent to 300 canister bed volume exchanges. The bed volume is based on the volume of adsorbing material in the canister.

5.2.4 The evaporative emission canister shall then be loaded by sending to the canister an amount of commercial grade butane vapors equivalent to 1.5 times its nominal working capacity. The canister shall be loaded with a mixture composed of 50 percent butane and 50 percent nitrogen by volume at a rate of 15 ± 2 grams butane per hour per liter of canister volume. If the canister loading at that rate takes longer than 12 hours, a manufacturer may determine a new rate, based on completing the canister loading in no less than 12 hours. The new rate may be used for all subsequent canister loading within this preconditioning. The time of initiation and completion of the canister loading shall be recorded.

6 EVAPORATIVE EMISSIONS TEST PROCEDURES

The Evaporative Emissions Test Procedures shall include the steps outlined in Figure 6.

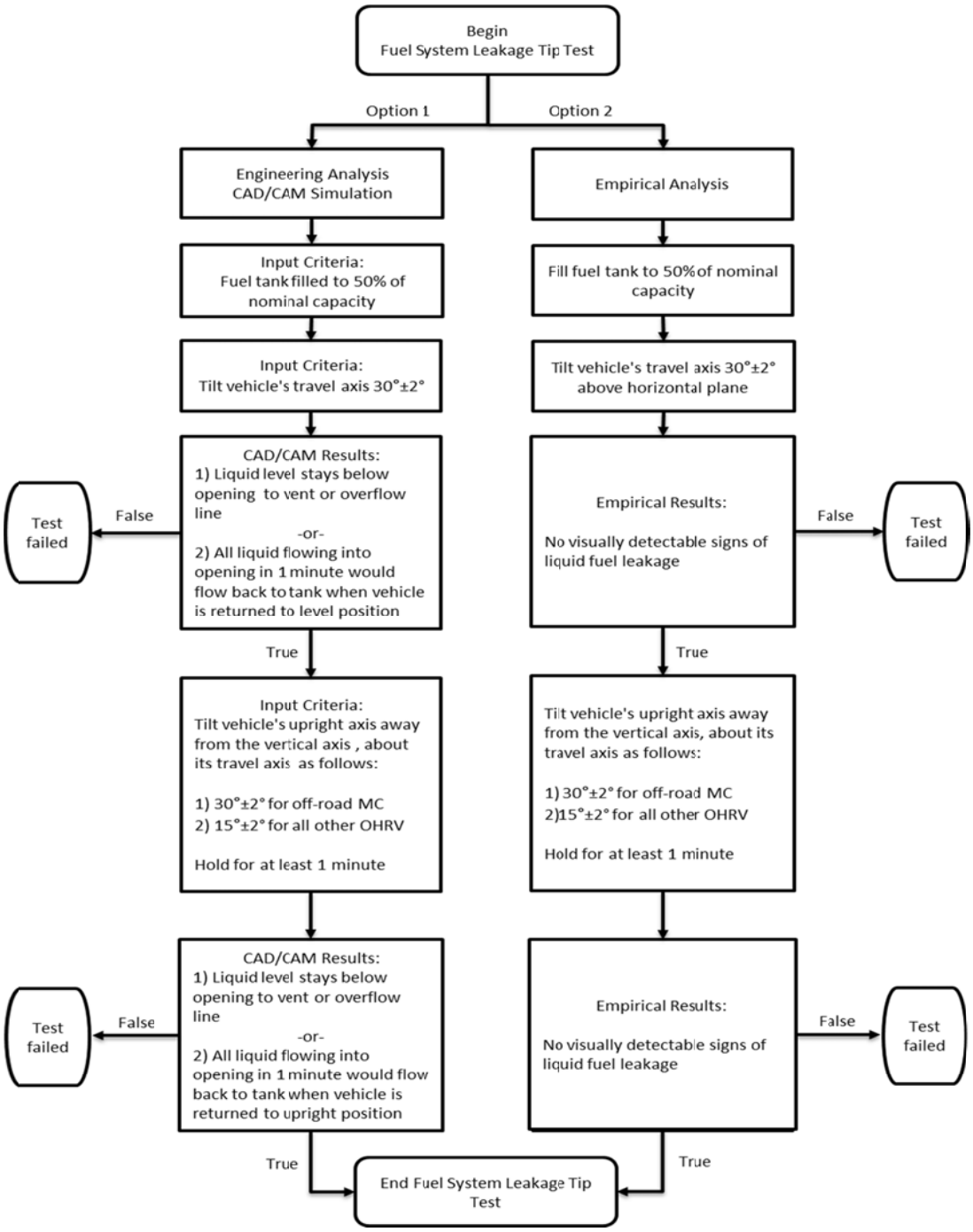
Figure 6: Evaporative Emissions Testing Flowchart



6.1 Fuel System Leakage Tip Test

The fuel system leakage tip test shall be performed during the soak specified in subsection 6.2.1.5. The fuel tank must be filled to 50 percent with test fuel. During the test the vehicle is tipped to inspect for visible signs of liquid leakage. If any test fuel leakage is observed, then the vehicle fails the test. See Figure 7 for a summary of the steps in the fuel system leakage tip test.

Figure 7: Fuel System Leakage Tip Test Flow Chart



An engineering analysis may be performed as an alternative to the tests described in this section. The analysis must demonstrate that zero liquid leakage will occur within one minute when the vehicle, with the gasoline tank filled to 50 percent of rated capacity, is tipped as specified in subsection 6.1.

To perform the analysis, a Computer-Aided Design/Computer-Aided Manufacturing (CAD/CAM) design program may be used to determine the level of fuel in the system that

would occur when the tank is filled to 50 percent of its nominal capacity. To demonstrate compliance, the height of the fuel surface when the vehicle is tilted must be below the height of any opening to a vent or overflow line or it must be demonstrated that the total volume of fuel flowing into the opening in one minute would flow back into the fuel tank when the vehicle is returned to a level surface.

All tip measurements shall be made to an accuracy of ± 1° of arc.

The tip test shall be conducted with the vehicle on a level surface as described below:

6.1.1 In less than 2 seconds, orient the vehicle such that the travel axis is tilted X degrees above and below the horizontal plane. See Figure 3 for a schematic. Hold the vehicle for 60 to 70 seconds, or such longer period of time as a manufacturer may choose, in both the positive and the negative position. Note any visible signs of fuel leakage. X shall be as defined as follows:

a) 30° ± 2° for off-road motorcycles.
b) 30° ± 2° for all other OHRVs.

6.1.2 In less than 2 seconds, orient the vehicle such that the upright axis is tilted Y degrees from the vertical axis with rotation being about the travel axis. See Figure 4 for a schematic. Hold this position in both the positive and the negative position for 60 to 70 seconds, or such longer period of time as a manufacturer may choose. Y shall be as defined as follows:

a) Unsupported position on either side for off-road motorcycles (i.e., vehicle lying on its side).
b) 15° ± 2° for all other OHRVs.

6.2 Running Loss Conditioning

The running loss test is designed to simulate vehicle operation and canister purging during operation. Follow the dynamometer schedules in 40 CFR section 86.515-78 (2012), which is hereby incorporated by reference. For the purpose of this running loss conditioning, all soak and test temperatures are 86° ± 3°F.

6.2.1 The following steps shall be performed before beginning the running loss test:

6.2.1.1 The fuel tank of the vehicle to be tested shall be drained and refilled to 50 percent with test fuel.

6.2.1.2 Soak for at least 6 hours after being refueled. Following this soak period, conduct a refueling cycle by running the test vehicle through one Urban Dynamometer Driving Schedule (UDDS) driving cycle. The drain and fill and 6-hour soak may be omitted on subsequent tests of the vehicle if the vehicle remains under laboratory temperatures between tests. The later test preconditioning will begin with subsection 6.2.1.5.

6.2.1.3 Install fuel temperature sensors as needed.

6.2.1.4 Drain and refill the fuel tank of the vehicle to 50 percent with test fuel.

6.2.1.5 Soak the vehicle with the key off for 12 to 36 hours between the end of the refueling and the start of the cold start preconditioning cycle.

6.2.1.6 During the soak period, perform the tip test specified in subsection 6.1 and purge and load the evaporative control system canister using the procedures defined in sections 5.2.2, 5.2.3, and 5.2.4. The evaporative control system canister is not required to be installed while performing the tip test specified in subsection 6.1.

6.2.1.7 The location and speed of a fan used to cool the vehicle must comply with the requirements described in Appendix B.

6.2.1.8 The speed profile is the U.S. Environmental Protection Agency (U.S. EPA) UDDS as specified in 40 CFR section 86.515-78 (2012). The same cycle (Class I or Class II) must be used as is required for exhaust emissions certification. The steady state engine test for All-Terrain Vehicles (ATV) is not allowed for this test procedure.

6.2.1.9 Perform a cold start UDDS preconditioning cycle on the dynamometer.

6.2.1.10 Perform a hot start UDDS preconditioning cycle on the dynamometer.

Following the completion of the running loss preconditioning, a hot soak preconditioning must be conducted as specified in subsection 6.3.

6.3 Hot Soak Preconditioning

The hot soak evaporative emission preconditioning is designed to soak the OHRV after operation. The test temperature for the hot soak is 86° ± 3°F.

6.3.1 The hot soak must be performed within 7 minutes of the completion of the UDDS hot start cycle, performed in subsection 6.2.

6.3.2 Turn off all engine cooling fans when the engine is turned off.

6.3.3 During the time between the end of the UDDS hot start cycle and the beginning of the hot soak preconditioning, the engine is allowed to be shut off for no more than 4 minutes immediately preceding the start of the hot soak preconditioning.

6.3.4 Soak the OHRV at 86° ± 3°F for 90 ± 0.5 minutes.

6.3.5 If the Calculation Method is to be used for the diurnal test, the carbon canister must be removed immediately following the hot soak test and the butane working capacity must be determined by loading the canister to 2 grams breakthrough with a 50/50 mixture by volume of butane and nitrogen, at a rate of 15 ± 2 grams butane per hour per liter of canister volume.

6.3.6 Upon completion of the hot soak test, proceed to the diurnal test in subsection 6.4.

6.4 Diurnal Test

Upon completion of the hot soak, the diurnal test shall begin. The diurnal test can be conducted by direct measurement of three consecutive 24-hour diurnal tests (72-hour diurnal test) or by measuring emissions for a single 24-hour diurnal test and showing vented emissions compliance (steady state diurnal test) as described in sections 6.4.1 and 6.4.2, respectively.

6.4.1 72-Hour Diurnal Test - Begin the 3-day diurnal test by lowering the temperature of the enclosure in which the diurnal test will be performed to 72° ± 3°F within 60 minutes of completing the hot soak test. Diurnal soak period is 6 to 36 hours at 72° ± 3°F. Perform the diurnal test procedure described in 40 CFR section 86.133-96 (2012), which is hereby incorporated by reference with the following exceptions.

6.4.1.1 When the word "methanol" or the term C_{CH3OH} (methanol concentration) is used, it shall be replaced by ethanol or the term C_{C2H5OH} (ethanol concentration).

6.4.1.2 All references to the hot soak test performed in 40 CFR section 86.138-96 (2012) shall mean the hot soak conditioning previously described in section 6.3 of this procedure.

6.4.1.3 All references to the calculations performed in 40 CFR section 86.143 (2012) shall be replaced with the calculations performed in section 7 of this procedure.

6.4.1.4 Omit the following language from section (a)(1), "The diurnal emission test may be conducted as part of either the three-diurnal test sequence or the supplemental two-diurnal test sequence, as described in 40 CFR section 86.130-96 (2012)."

6.4.1.5 Omit section (a)(3), and all of sections (j), (o) and (p).

6.4.1.6 Omit the following language from section (e), "…and the test vehicle windows and luggage compartment(s) opened…"

6.4.1.7 Revise section (i)(5) as follows, "Within 10 minutes of closing and sealing the test enclosure doors, analyze enclosure atmosphere for hydrocarbons and record. This is the initial (time=0 minutes) hydrocarbon concentration, CHC_i, required in section 7 of this procedure. The final hydrocarbon measurement shall be conducted no more than 60 seconds from the end of the test."

6.4.1.8 Omit the following language from section (n), "…the test vehicle windows and luggage compartments may be closed …".

6.4.2 Steady State Diurnal Test

The purpose of the steady state diurnal test is to demonstrate control of permeation emissions and to verify proper evaporative emissions system construction.

6.4.2.1 Perform the diurnal test as defined in subsection 6.4.1 except:

6.4.2.2 Attach vent line(s) to air-port(s) of carbon canister(s), if so equipped, that will direct any air/vapor exiting the canister to the exterior of the test enclosure. This air/vapor need not be measured.

6.4.2.3 The test shall be conducted at a constant temperature of 86° ± 3°F.

6.4.2.4 A single steady state 24-hour diurnal is required.

6.4.2.5 Compliance is shown if the emissions measured in this section are lower than the standard and one of the following can be shown:

a) Calculate maximum gasoline vapor loading and show that the carbon canister is operating in the range where it is at least 99.5 percent effective (0.5 percent bleed emissions) based on best modeling practices. The best modeling practices method must be accepted by ARB staff prior to certification or follow the requirements in Appendix A of this test procedure.

b) The OHRV uses a pressure relief valve which does not release vapor from the tank up to 2 pounds per square inch gauge (psig).

c) The OHRV uses a pressure relief valve which does not release vapor from the tank during the second of two consecutive 24-hour diurnal temperature cycles from 72°F to 96°F. The fuel temperature must be below the boiling point for test fuel and the pressure relief valve must not open during both the running loss and hot soak conditioning or it has to vent to the intake.

7 CALCULATIONS: EVAPORATIVE EMISSIONS

Total mass emissions from subsection 6.4.1 must be calculated using the measurements of initial and final concentrations to determine the mass of hydrocarbons and ethanol emitted pursuant to "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles" as last amended December 6, 2012, Parts III.D.11. Alternatively, ethanol measurements may be omitted if the calculated mass of hydrocarbon emissions is multiplied by a percentage adjustment factor equal to:

E10 adjustment factor = (100% - 0.5 x % fuel alcohol content) x (1 + (%ethanol x 3))

(e.g., for E10 adjustment factor = (100% - 0.5 x 10%) x 1.3= 124%)
For OHRVs, the vehicle volume is assumed to be 5 cubic feet (1.42 cubic meters) unless the manufacturer provides a measured OHRV volume.

8 LIST OF TERMS

ARB	California Air Resources Board
ATV	All-Terrain Vehicle
CAD/CAM	Computer-Aided Design/Computer-Aided Manufacturing
C_{C2H5OH}	Ethanol concentration
C_{CH3OH}	Methanol concentration
CCR	California Code of Regulations
CFM	Cubic Feet per Minute
CFR	Code of Federal Regulations
CH&SC	California Health and Safety Code
^oC	Degrees Celsius
^oF	Degrees Fahrenheit
E10	Commercial Pump Fuel containing 10 percent ethanol
HC	Hydrocarbon
HZ	Hertz
KM/H	Kilometers per Hour
MC	Motorcycle
MPH	Miles Per Hour
OHRV	Off-Highway Recreational Vehicle
PSIG	Pounds per Square Inch – Gauge
T_{liq}	Fuel tank liquid temperature
T_{vap}	Fuel tank vapor space temperature
TP	Test Procedure
TP-933	Test Procedure for determining evaporative emissions from off-highway recreational vehicles
UV	Ultraviolet
UDDS	U.S. EPA Urban Dynamometer Driving Schedule

9 DOCUMENTS INCORPORATED BY REFERENCE

California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles, California Environmental Protection Agency, Air Resources Board, El Monte, CA, adopted March 22, 2012, as last amended December 6, 2012.

California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles, California Environmental Protection Agency, Air Resources Board, El Monte, CA, adopted August 5, 1999, as last amended December 6, 2012.

California Exhaust Emissions Standards And Test Procedures For 1997 And Later Off-Highway Recreational Vehicles And Engines, California Environmental Protection Agency, Air Resources Board, El Monte, CA, adopted November 22, 1994, as last amended October 25, 2012.

Control of Emissions from New and In-Use Highway Vehicles and Engines, Title 40, Code of Federal Regulations, Part 86. United States Environmental Protection Agency, 40 CFR section 86.107-96 (2012), 40 CFR section 86.108-79 (2012), 40 CFR section 86.108-00 (2012), 40 CFR section 86.130-96 (2012), 40 CFR section 86.133-96 (2012), 40 CFR section 86.138-96 (2012), 40 CFR section 86.143-96 (2012), 40 CFR section 86.508-78 (2012), and 515-78 (2012).

Control of Evaporative Emissions from New and In-Use Nonroad and Stationary Equipment, Title 40, Code of Federal Regulations, Part 1060. United States Environmental Protection Agency, 40 CFR section 1060.520 (2012).

Reddy, S. Raguma. Prediction of Fuel Vapor Generation From a Vehicle Fuel Tank as a Function of Fuel RVP and Temperature. SAE Technical Paper 892089, September, 1989. Copyrighted.

Test Procedure for Determining Permeation Emissions from Small Off-Road Engine Equipment Fuel Tanks, TP-901, California Environmental Protection Agency, Air Resources Board, Sacramento, CA, as adopted July 26, 2004.

10 APPENDICES

10.1 Appendix A - Calculation Method for Demonstrating the Adequacies of the Vented Evaporative Emissions System

The calculations in this section are based on the ideal gas law, and equations generated in *SAE 892089- Prediction of Fuel Vapor Generation from a Vehicle Fuel Tank as a Function of Fuel RVP and Temperature published* September, 1989 and incorporated here by reference. All final results should be calculated to two significant figures.

Figure A-1: Calculations Flow Chart

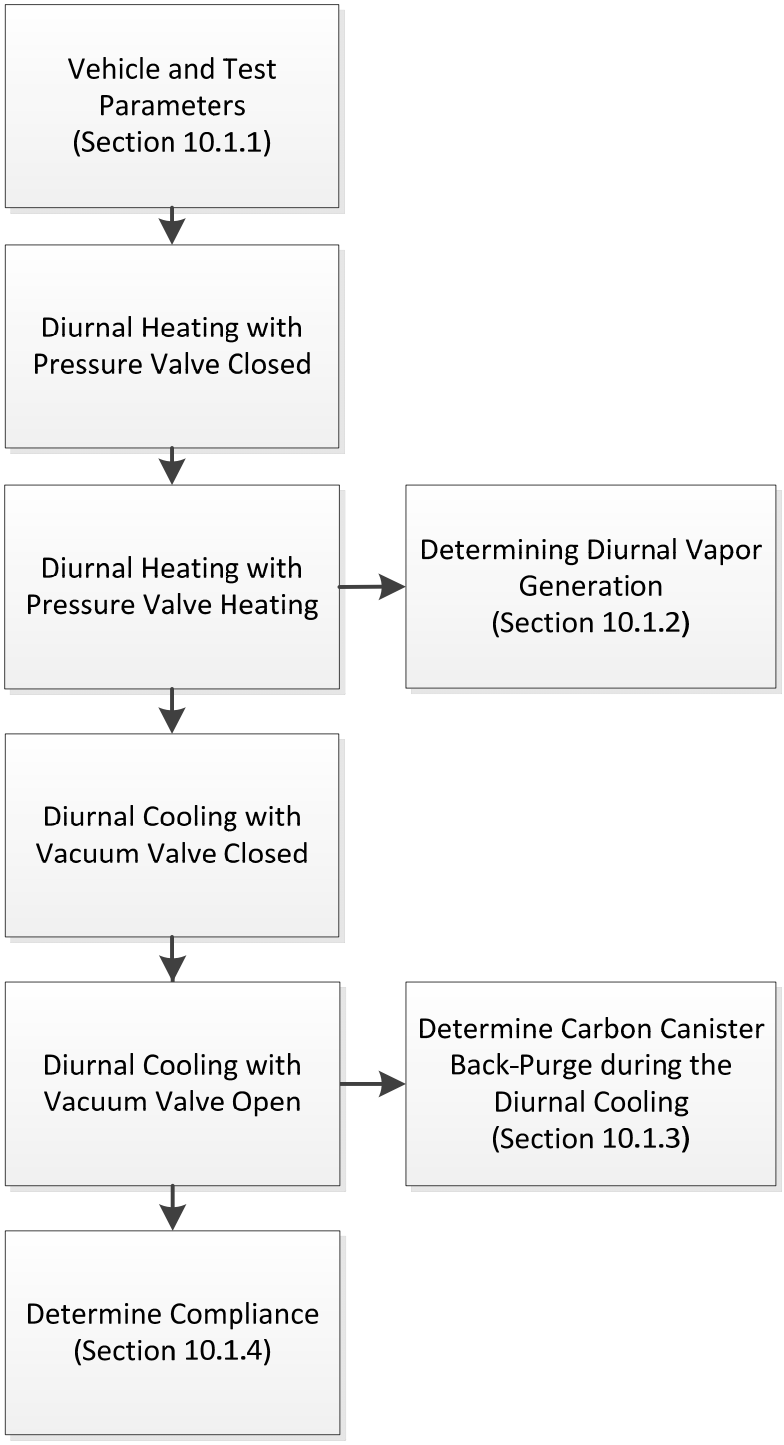
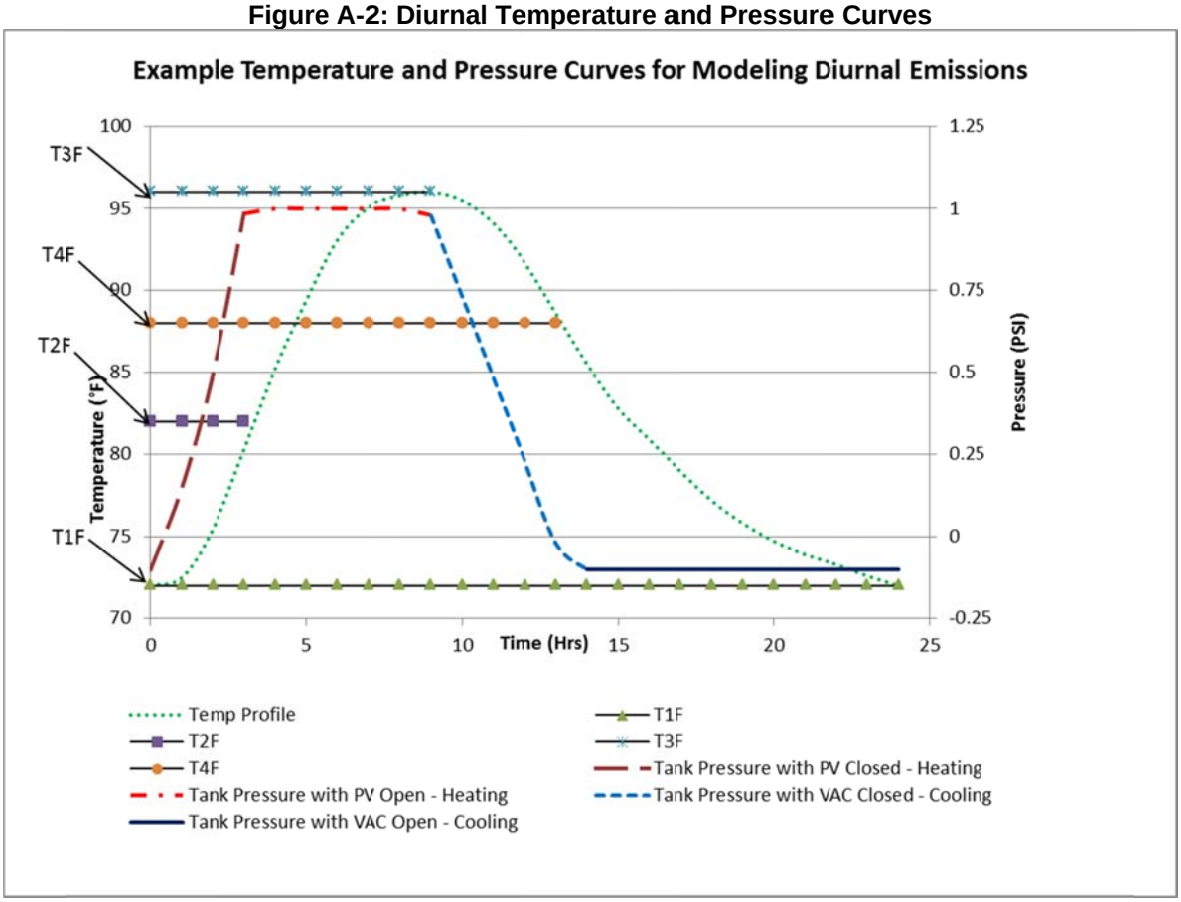


Figure A-2: Diurnal Temperature and Pressure Curves



10.1.1 Vehicle and Test Parameters

a. Fuel Volume Information

_____	(gal)	V_t	Total Volume of Fuel Tank
_____	(gal)	V_u	Usable Volume of Fuel Tank
_____	(gal)	V_i	Initial Fill Volume of Fuel Tank
_____	(gal)	V_{FP}	Fuel Used During Prep
_____	(gal)	V_{FR}	Fuel Used During Run Loss

EXAMPLE:

2.1	*(gal)*	V_t	*Total Volume of Fuel Tank*
2	*(gal)*	V_u	*Usable Volume of Fuel Tank*
1	*(gal)*	V_i	*Initial Fill Volume of Fuel Tank*
0.1	*(gal)*	V_{FP}	*Fuel Used During Prep*
0.1	*(gal)*	V_{FR}	*Fuel Used During Run Loss*

b. List of Temperatures

T1K = Initial/Final Diurnal Temperature (°K)
T2K = Temperature where Pressure Relief Valve Opens (°K)

T3K = Highest Diurnal Temperature (°K)
T4K = Temperature at which vacuum valve opens (°K)

c. Pressure Control Settings

_____	(psig)	P_{VO}	Opening Pressure
_____	(psig)	VAC_{VO}	Vacuum Opening Pressure

EXAMPLE:

1	*(psig)*	*P_{VO}*	*Opening Pressure*
0.1	*(psig)*	*VAC_{VO}*	*Vacuum Opening Pressure*

d. Fuel Reid Vapor Pressure (RVP)

_____	(psi)	RVP

EXAMPLE:

7	*(psi)*	*RVP*

e. Preconditioned Carbon Canister Specifications
The carbon canister must be preconditioned as specified in subsection 5.2. Butane working capacity of a carbon canister must be established at 2 grams breakthrough using “California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles" as amended December 6, 2012, with the flow rates and temperatures specified in subsection 5.2.

_____	(cc)	BV	Carbon Bed Volume
_____	(g/canister)	TBWC	Total Equilibrated Butane Working Capacity
_____	(g/100cc)	BWC	Butane Working Capacity of Carbon
_____	(g/100cc)	GWC	Gasoline Capacity per Volume of Carbon

EXAMPLE:

122	*(cc)*	*BV*	*Carbon Bed Volume*
9.5	*(g/canister)*	*TBWC*	*Total Equilibrated Butane Working Capacity*
7.8	*(g/100cc)*	*BWC*	*Butane Working Capacity of Carbon*
8.2	*(g/100cc)*	*GWC*	*Gasoline Capacity per Volume of Carbon*

f. Determine the Total Gasoline Working Capacity (TGWC) of Canister

The TGWC is the total mass of gasoline vapor that a purged canister can expect to hold. TGWC is determined by direct measurement similar to TBWC but using an aged canister vapor from gasoline at 96°F instead of butane, or by calculating TGWC using canister bed volume, BWC and GWC.

TGWC of Canister

TGWC= TBWC * GWC / BWC = _____*_____/_____

Where,
GWC, TBWC, BWC = (From section 10.1.1.e)

EXAMPLE:
*TGWC= 9.5*8.2/7.8 = 10g/canister*

g. Determine Vapor Space Volume of Fuel Tank at end of all Prep Cycles (V_p)

$V_p = V_t - V_i + V_{FP} + V_{FR}$

V_p = _____ – _____ + _____ + _____

Where,
V_t, V_i, V_{FP}, V_{FR} = (From section 10.1.1.a)

EXAMPLE:

V_p=2.1-1+0.1+0.1=1.3

h. Determine Carbon Canister Gasoline Vapor Capacity at Beginning of Diurnal Test ($TGWC_{di}$)

The carbon canister gasoline vapor capacity at the beginning of the diurnal test is the total mass of gasoline vapor that the canister can expect to hold at the beginning of the diurnal test. $TGWC_{di}$ is determined by direct measurement similar to BWC (section 6.3.5) but using vapor from gasoline at 96°F instead of butane, or calculate using canister bed volume and measured butane capacity at the beginning of the diurnal test ($TBWC_{di}$).

$TGWC_{di}$ = measured gasoline vapor capacity at beginning of diurnal test
$TGWC_{di} = (GWC/BWC)*TBWC_{di}$ = _____/_____*_____

$TGWC_{di}$ = _____

EXAMPLE:
$TGWC_{di}$ *Measured to be = 7g*

10.1.2 Determining Diurnal Vapor Generation

Vapor generation occurs as a result of temperature increase of the fuel in the fuel tank. Vapor emissions occur when the generated vapor is able to exit the fuel tank. If the system does not use a pressure relief system, vapor emissions will occur during the entire diurnal heating stage from 72°F to 96°F. If the system uses a pressure relief system, the emissions occur only at temperatures where fuel tank pressures exceed the relief pressure. If such a tank system is employed, the temperature at which the relief valve opens must be determined.

a. Calculate gasoline vapor pressure at lowest temperature of diurnal cycle (72°F or 22.2°C)

Vapor pressure

$$P_{tgasoline}(T1K) = A * T1K * RVP * e^{\frac{-B}{T1K}}$$

Where,
T1K = 22.2° C + 273.2 K = 295.4 K
$A = 25.61$
$B = 2789.78$
RVP = (From section 10.1.1.d)

EXAMPLE:

$P_{tgasoline}(72°F) = 25.61 * 295.4 * 7 * e^{\frac{-2789.79}{295.4}} = 4.19\ psi$

b. Determine partial pressure of air in the fuel tank at lowest temperature of diurnal cycle.

$P_{air}(72°F) = P_{atm} – VAC_{VO} – P_{tgasoline}(72°F)$

$P_{air}(72°F) =$ _____ – _____ – _____

Where,
P_{atm} = 14.7 psi
VAC_{vo} = (From section 10.1.1.c)
$P_{tgasoline}$ (72ºF) = (From section 10.1.2.a)

EXAMPLE:
$P_{air}(T1) = 14.7 - 0.1 - 4.19 = 10.4$ psi

Find the temperature (T2) at which the relief valve opens. This will be where the internal tank pressure equals atmospheric pressure plus the pressure relief valve. If no pressure control system is used T2 equals 72°F.

Solve using numerical analysis to find a value for T2K where:

P_{tank}(pres. Open) = $P_{atm} + P_{vo} = P_{tgasoline}(T2K) + P_{air}(T2K)$

Where,

$$P_{tgasoline}(T2K) = A * T2K * RVP * e^{-\frac{B}{T2K}}$$

$$P_{air}(T2K) = \frac{T2K * P_{air}(T1K)}{T1K}$$

RVP = (From section 10.1.1.d)
P_{vo}= (From section 10.1.1.c)

EXAMPLE:
Assume T2F is 82°F (301°K)
$P_{tgasoline}(301K) = 25.61*301*7*e^{(2789.78/301)}=5.1$ psi
$P_{air}(301K) = (301*10.4)/295.4 = 10.6$

$P_{tgasoline}$(301K) + P_{air}(301K) = 10.6 + 5.1 = 15.7psi = 14.7+1
Therefore, T2F=82°F

c. Using the Reddy Vapor Generation equation, determine the vapor generation in grams per gallon for a diurnal cycle from T2, for systems with pressure relief, to T3.

$$\mathrm{VAPOR_{diurnal}} = \mathrm{C} * \mathrm{e}^{\mathrm{D}*\mathrm{RVP}} * (\mathrm{e}^{\mathrm{E}*\mathrm{T3}} - \mathrm{e}^{\mathrm{E}*\mathrm{T2}})$$

Where,
$\mathrm{C} = 0.00817$
$\mathrm{D} = 0.2357$
$\mathrm{E} = 0.0409$
T2 (F) = (From section 10.1.2.c, converted to °F)
T3 (F) = max diurnal (96°F)
V_p = (From section 10.1.1.g)
RVP = (From section 10.1.1.d)

Vapor generation for a non-pressurized system using a 72°F to 96°F temperature profile at sea level with 7 RVP fuel simplifies to:

$VAPOR_{diurnal}$= 1.35 g/gal

<u>EXAMPLE:</u>
*$VAPOR_{diurnal}$ = 0.00817*e^(0.2357*7)*(e^(0.0409*96)-e(0.0409*82)) = 0.94g/gal*

10.1.3 Determine Carbon Canister Back-Purge During the Diurnal Cooling

The weight of hydrocarbon vapor back purged (passively purged) from the canister during diurnal cooling steps is a function of the volume of air drawn into the fuel tank as it cools. The amount of air purging the canister will be the difference between the air volume in the fuel tank at the end of cooling less the amount in the tank when the air first begins to enter the tank. In a system that does not employ a pressure relief/vacuum valve system, the flow of air begins as soon as the cooling starts. In a system that employs pressure control, the air flow begins when the in tank pressure equals atmospheric pressure less the opening pressure of the vacuum relief valve. The following calculations provide a calculation method appropriate for either type of system.

a. Calculate gasoline vapor pressure at the highest temperature of the diurnal cycle (96°F or 36.6°C)

Vapor pressure

$$\mathrm{P_{tgasoline}}(96°\mathrm{F}) = \mathrm{A} * \mathrm{T3K} * \mathrm{RVP} * \mathrm{e}^{\frac{-\mathrm{B}}{\mathrm{T3K}}}$$

Where,
$\mathrm{T3K} = 35.6°\mathrm{C} + 273\mathrm{K} = 308.75\mathrm{K}$
$\mathrm{A} = 25.61$
$\mathrm{B} = 2789.78$

RVP = (From section 10.1.1.d)

EXAMPLE:

$P_{tgasoline}(96°F) = 25.61 * 308.75 * 7 * e^{\frac{-2789.79}{308.75}} = 6.59\ psi$

b. Determine partial pressure of air in the fuel tank at the highest temperature of the diurnal cycle.

$$\mathrm{Pair}(96°\mathrm{F}) = \mathrm{P_{atm}} + \mathrm{P_{vo}} - \mathrm{P_{tgasoline}}\ (96\ \mathrm{F})$$

Where,
$\mathrm{Patm} = 14.7$ psi
P_{vo} = (From section 10.1.1.c)

P_{air} (96°F) = 14.7+_____-6.59 =

EXAMPLE:
P_{air} (96°F) = 14.7 + 1 - 6.59 = 9.11 psi

Find the temperature (T4) at which the vacuum relief valve opens. This will be where the internal tank pressure equals atmospheric pressure less the vacuum valve setting. This temperature may be found using numerical analysis to determine the temperature where the tank pressure plus the relief valve pressure is equal to atmospheric pressure. If no pressure control system is used this temperature will be 96°F.

$$\mathrm{P_{tank}}(\text{vac open}) = \mathrm{P_{atm}} - \mathrm{VAC_{vo}} = \mathrm{P_{tgasoline}}(\mathrm{T4K}) - \mathrm{P_{air}}(\mathrm{T4K})$$

Where,

$$\mathrm{P_{tgasoline}}(\mathrm{T4K}) = \mathrm{A} * \mathrm{T4K} * \mathrm{RVP} * e^{-\frac{\mathrm{B}}{\mathrm{T4K}}}$$

$$\mathrm{P_{air}}(\mathrm{T4K}) = \frac{\mathrm{T4} * \mathrm{P_{air}}(\mathrm{T3K})}{\mathrm{T3K}}$$

Where,
RVP = (From section 10.1.1.d)
P_{air}(T3) = (From section 10.1.3.b)
VAC_{vo} = (From section 10.1.1.c)

Solve for T4K
T4K = _____

EXAMPLE:
Assume T4F is 88°F (304.1°K)
*$P_{tgasoline}$(304.1K) = 25.61*304.1*7*e^(2789.78/304.1)=5.6 psi*
*P_{air}(304.1K) = (304.1*10)/308.56 = 9.0 psi*
$P_{tgasoline}$(304.1K)+P_{air}(304.1K) = 9.0 + 5.6 = 14.6psi = 14.7 - 0.1
Therefore T4F = 88°F

c. Determine the volume of air in the fuel tank in gallons at the temperature when the vacuum valve opens.

$$V_{air}(T4K) = \frac{V_p * P_{air}(T4K)}{(P_{atm} - VAC_{vo})}$$

Where,
$P_{tgasoline}(T4)$ = (From section 10.1.3.c)
VAC_{vo} = (From section 10.1.1.c)
V_p = (From section 10.1.1.g)

EXAMPLE:

$$V_{air}(T4K) = \frac{1.3 \quad * 9.1}{(14.7\text{-}0.1)} = 0.8 \text{ gal}$$

d. Determine the volume of air in the fuel tank in gallons at the minimum temperature of the diurnal cycle (T1=72°F).

$$V_{air}(T1) = \frac{V_p * P_{air}(T1K)}{(P_{atm} - VAC_{vo})}$$

Where,
$P_{air}(T1) = P_{air}(72F)$ (From section 10.1.2.b)
VAC_{vo} = (From section 10.1.1.c)
V_p = (From section 10.1.1.g)

EXAMPLE:

$$V_{air}(T1K) = \frac{1.3 \quad * 10.43}{(14.7 - 0.1)} = 0.92 \; gal$$

e. The volume of air purging the carbon canister in gallons is the difference between these volumes.

$V_{airpurge} = V_{air}(T1) - V_{air}(T4)$

$$V_{airpurge} = \_\_\_\_\_ - \_\_\_\_\_$$

Where,
$V_{airpurge(cc)} = V_{airpurge} * 3785.4cc/gal$
$V_{air}(T4)$ = (From section 10.1.3.e)
$V_{air}(T1)$ = (From section 10.1.3.f)

EXAMPLE:

$V_{airpurge} = V_{air}(T1) - V_{air}(T4) = 0.92 - 0.8 = 0.12$ gal
$V_{airpurge}(cc) = 0.13ga * 3785.4cc/gal = 454.2cc$

f. Calculate the purge in carbon bed volume(s).

$$BV_{purge} = \frac{V_{airpurge}(cc)}{BV}$$

Where,
BV = Total Volume of Carbon in Canister (From section 10.1.1.e)
$V_{airpurge(cc)}$ = (From section 10.1.3.e)

EXAMPLE:
BV_{purge}= 454.2/120 = 3.8 bed volumes

The efficiency of the back purge is a function of canister loading or canister saturation. Empirical data must be generated for the conditions at the beginning of the diurnal test.

EXAMPLE:
A purge efficiency of 0.15% of the total canister TBWC per bed volume purged.

*$VAPOR_{backpurge}$ = 0.0015*TBWC*(GWC/BWC)* BV_{purge}*
*$VAPOR_{backpurge}$ = 0.0015*9.4*(8.2/7.8)*3.8 = 0.056g*

Where,
TBWC = (*From section 10.1.1.e)*
BWC = (*From section 10.1.1.e)*
GWC = (*From section 10.1.1.e)*
BV_{purge}= (from section 10.1.3.g)

10.1.4 Calculating Compliance

a. Total diurnal vapor loading:

$VL_{diurnaltot} = 3*(VAPOR_{diurnal} * V_p) – (2 * VAPOR_{backpurge})$
$VL_{diurnaltot}$ = 3*(_____ * _____) – (2 * _____)

Where,
$VAPOR_{diurnal}$ = (From section 10.1.2.d)
$VAPOR_{backpurge}$ =(From section 10.1.3.g)

EXAMPLE:
$VL_{diurnaltot}$= 3(0.94*1.3)-(2*0.056) = 3.6g*

b. Total Canister Loading is equal to Canister loading prior to diurnal test plus diurnal vapor load:

$VL_{total} = TGWC – TGWC_{di} + VL_{diurnaltot}$

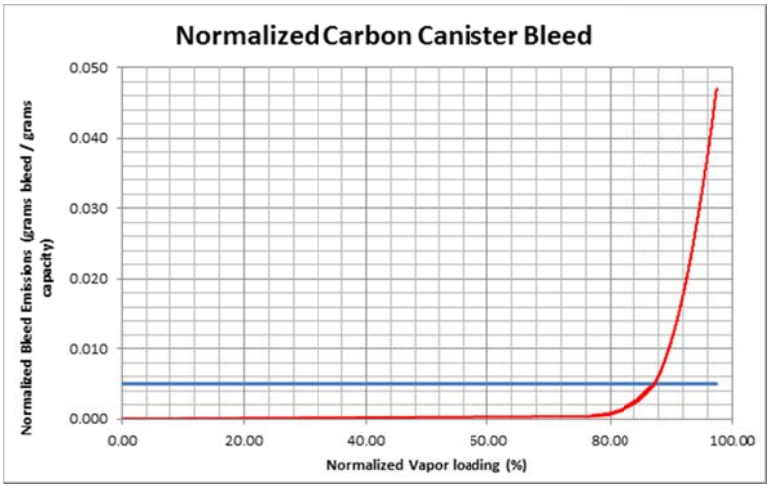
Where,
TGWC = (From section 10.1.1.f)
$TGWC_{di}$ = (From section 10.1.1.h)
$VL_{diurnaltot}$ = (From section 10.1.4.a)

VL_{total} = _____ – _____ + _____ = _____

EXAMPLE:
VL_{total}= 10 – 7 + 3.6 = 6.6g

Criteria for approval of Certification- A graph similar to the one shown below, but appropriate for the carbon canister actually used, must be submitted. The x axis must show the loading of the canister as a percentage of its working capacity. The y axis must show the bleed emissions in grams of bleed per grams of working capacity when the canister is loaded at the rate defined in section 5.2.1 (50/50 mixture by volume of butane and nitrogen at a rate of 15 ± 2 grams butane per hour per liter of canister volume).

Figure A-3: EXAMPLE plot



Acceptable design (sizing) of the canister shall be demonstrated by a calculated total canister loading (VL_{total}) that is the lesser of 75 percent of the Normalized Loading or that Normalized Loading where the efficiency of the canister to control Bleed Emissions exceeds 0.005 grams of bleed emission / gram of total canister capacity (NVL%).

Normalized Load Limit Percentage:
NVL% = _____
Normalized Load:
NVL = NVL% * TGWC

Where,
TGWC = (From section 10.1.1.f)

EXAMPLE:
NVL% = 75
*NVL=0.75*10 = 7.5g*

c. The design is acceptable if:

$NVL \geq VL_{total}$

_____ ≥ _____

EXAMPLE:
7.5g ≥ 6.6g……PASS!

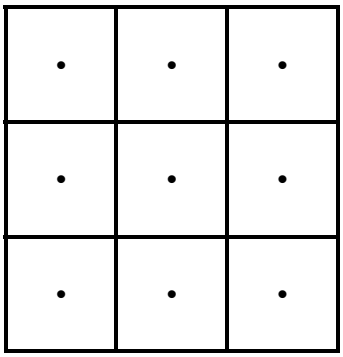
10.2 Appendix B – Variable Speed Cooling Blower

a) Variable speed cooling blower must direct air to the vehicle.
b) Blower outlet must be at least 0.4 square meters (4.31 square feet).
c) Blower outlet must be squarely positioned 0.3 ± 0.05 meters (11.8 ± 1.97 inch) in front of the vehicle.
d) Blower outlet lower edge height must be 0.1 meter (3.94 inch) to 0.2 meter (7.87 inch) above the ground.
e) Cooling air speed produced by the blower must be within the following limits (as a function of dynamometer roll speed):

Actual dynamometer roll speed	Allowable cooling air speed
0 km/h	0 km/h
Above 0 km/h to 5 km/h	0 km/h to roll speed + 2.5 km/h
Above 5 km/h to 25 km/h	Roll speed ± 2.5 km/h
25 km/h to 80 km/h	Roll speed ± 10 percent
Above 80 km/h	At least 72 km/h

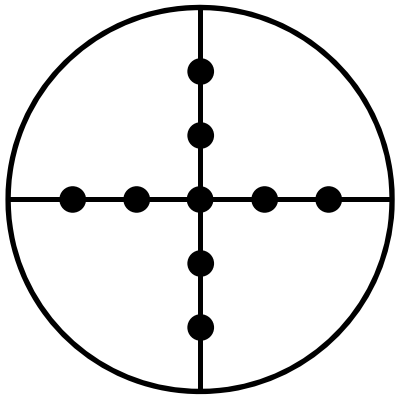
f) The cooling air speed above must be determined as an averaged value of 9 measuring points.
   1) For blowers with rectangular outlets, both horizontal and vertical sides of the blower outlet must be divided into 3 equal parts yielding 9 equal rectangular areas (see the diagram below). The measurement points are located at the center of each rectangular area.

Figure A-4



   2) For blowers with circular outlets, the blower outlet must be divided into 4 equal sectors defined by a vertical line and a horizontal line (see diagram below). The measurement points include the center of the blower outlet and locations on the radial lines (0°, 90°, 180°, and 270°) at radii of 1/3 and 2/3 of the total radius.

Figure A-5



g) In addition to the averaged cooling air speed requirements, each measuring point must be within ± 30 percent of actual roll speeds above 5 km/h.
h) Cooling air speed must be measured linearly at a distance of 0.3 ± 0.05 meter (11.8 ± 1.97 inch) from the blower outlet.
i) Cooling air speed measurements must be made with no vehicle or other obstruction in front of the blower outlet.
j) Instrument used to measure and verify cooling air speed must have an accuracy of 2 percent.