

FINAL REGULATION ORDER

NOTE: This document is written in a style to indicate changes from the existing provisions. All existing language is indicated by plain text. 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 existing provisions are included. All other portions remain unchanged and are indicated by the symbol “* * * * *” for reference.

Amend sections 2111, 2112, Appendix A to Article 2.1, 2139, 2147, 2440, 2441, 2442, 2443.1, 2443.2, 2443.3, 2444.1, 2444.2, 2445.1, 2445.2, 2446, and 2474, and delete section 2448, title 13 California Code of Regulations, to read as follows:

Chapter 2. Enforcement of Vehicle Emission Standards and Surveillance Testing

Article 2.1. Procedures for In-Use Vehicle Voluntary and Influenced Recalls

§ 2111. Applicability.

(a) These procedures shall apply to:

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- (4) California-certified 2008 model year spark-ignition sterndrive/inboard marine engines with maximum rated power less than or equal to 373 kilowatts complying with the Option 2 requirements in Section 2442(b)(1) and all California-certified 2009 and subsequent model-year spark-ignition sterndrive/inboard and marine engines complying with the Option 1 requirements in Section 2442(b)(1) and California-certified 2008 and subsequent model-year spark-ignition inboard and sterndrive marine engines complying with the Option 2 requirements in Section 2442(b)(1).

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Note: Authority cited: Sections 39600, 39601, 43013, 43018 and 43105, Health and Safety Code.

Reference: Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2112. Definitions.

(a) "Capture rate" means ...

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(l) "Useful life" means, for the purposes of this article:

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(20) For 2004 and subsequent model-year heavy heavy-duty diesel engines, 2004 and subsequent model-year heavy-duty diesel urban buses, 2004 and subsequent model-year heavy-duty diesel engines to be used in urban buses, and 2004 and subsequent model year hybrid-electric urban buses for carbon monoxide, particulate, and oxides of nitrogen plus non-methane hydrocarbon emissions standards, a period of use of 10 years or 435,000 miles, or 22,000 hours, whichever first occurs, or any alternative useful life period approved by the Executive Officer, except as provided in paragraphs ~~(19)(i)~~(20)(A) and ~~(19)(ii)~~(20)(B).

~~(i)~~

(A) The useful life limit of 22,000 hours in paragraph (19) of this definition is effective as a limit to the useful life only when an accurate hours meter is provided by the manufacturer with the engine and only when such hours meter can reasonably be expected to operate properly over the useful life of the engine.

~~(ii)~~

(B) For an individual engine, if the useful life hours limit of 22,000 hours is reached before the engine reaches 10 years or 100,000 miles, the useful life shall become 10 years or 100,000 miles, whichever occurs first, as required under Clean Air Act section 202(d) (42 U.S.C. 7521(d)).

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(23) (A) For California-certified 20092008 and subsequent model year spark-ignition ~~sterndrive/inboard and sterndrive~~ marine engines with maximum rated power less than or equal to 373 kilowatts and complying with the Option 4₂ requirements in Section 2442(b)(1), and for California-certified 20082009 and subsequent model-year spark-ignition ~~sterndrive/inboard and sterndrive~~ marine engines complying with the Option 2 requirements in Section 2442(b)(1)with a maximum rated or maximum engine power less than or equal to 485 kilowatts, a period of ten years or 480 hours, whichever first occurs. ~~for engines 485 kilowatts and less.~~

(B) For California-certified 2009 and subsequent model year spark-ignition sterndrive/inboard marine engines greater than 485 kilowatts, a period of one year or 50 hours, whichever first occurs. Manufacturers of spark-ignition sterndrive/inboard marine engines greater than 485 kilowatts may petition the Executive Officer for a approval of a shorter period when appropriate.

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Appendix A to Article 2.1

California In-Use Vehicle Emission-Related Recall Procedures, Enforcement Test Procedures, and Failure Reporting Procedures for 1982 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, Heavy-Duty Vehicles and Engines, Motorcycles, 1997 and Subsequent Model-Year Off-Road Motorcycles and All-Terrain Vehicles, 2000 and Subsequent Model-Year Off-Road Compression-Ignition Engines, and 2008 and Subsequent Model-Year Spark-Ignition ~~Inboard and Sterndrive/Inboard~~ Marine Engines.

Vehicle and Engine Parameters, Components, and Specifications

- I. Passenger Car, Light-Duty Truck, Medium-Duty Vehicle, Motorcycle, and Inboard and Sterndrive Parameters and Specifications.

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F. Engine Cooling System: Thermostat calibration.

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G. Exhaust Emission Control system.

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Note: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43104, 43105 and 43806, Health and Safety Code; and Section 28114, Vehicle Code.

Reference: Sections 39002, 39003, 39500, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43107, 43202, 43204-43205.5, 43206, 43210, 43211, 43212, 43213 and 43806, Health and Safety Code; and Section 28114, Vehicle Code.

Chapter 2. Enforcement of Vehicle Emission Standards and Surveillance Testing

Article 2.3. In-Use Vehicle Enforcement Test Procedures

§ 2139. Testing.

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- (h) For spark-ignition ~~inboard~~ and sterndrive/inboard marine engines, in-use compliance tests shall be performed pursuant to section 2442, Title 13, California Code of Regulations. The in-use compliance testing shall use the same test procedure utilized for the specific engine's original certification testing.

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Note: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43104 and 43105, Health and Safety Code.

Reference: Sections 39002, 39003, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43103, 43104, 43105, 43106, 43107, 43204-43205.5 and 43211-43213, Health and Safety Code.

Chapter 2. Enforcement of Vehicle Emission Standards and Surveillance Testing

Article 2.4. Procedures for Reporting Failures of Emission-Related Components

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§ 2147. Demonstration of Compliance with Emission Standards.

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- (b) A manufacturer may test properly maintained in-use vehicles with the failed emission-related component pursuant to the applicable certification emission tests specified in Title 13, California Code of Regulations, Section 1960.1 or 1961, as applicable, for passenger cars, light-duty trucks and medium-duty vehicles, Section 1956.8 for heavy-duty engines and vehicles, Section 1958 for motorcycles, and Section 2442 for ~~inboard~~ and sterndrive/inboard marine engines. The emissions shall be projected to the end of the vehicle'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:

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Note: Authority cited: Sections 39600, 39601 and 43105, Health and Safety Code.
Reference: Sections 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

Chapter 9. Off-Road Vehicles and Engines Pollution Control Devices

Article 4.7. Spark-Ignition Marine Engines

§ 2440. Applicability.

(a)

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- (3) Spark-ignition ~~inboard and sterndrive~~/inboard marine engines produced by the engine manufacturer to be used solely for competition are exempt from the requirements of this article, except section 2443.1, provided that the marine watercraft in which the engine is installed is designed, built, and used solely for competition. Marine watercraft not registered with a nationally-recognized organization that sanctions professional competitive events or used for amateur or occasional competition do not meet the competition exemption criteria.

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Note: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.
Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

§ 2441. Definitions.

(a)

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(5) "Boat manufacturer," as it applies in Section 2442(b), means any person or business entity engaged in the manufacturing, assembling, or importing of new vessels equipped with ~~inboard or sterndrive~~/inboard engines for sale in California, or engaged in the sale, offer for sale, introduction, delivery or importation of such vessels into California for introduction into commerce. Included are those who act for and are under the control of any such person or business entity in connection with the distribution of such vessels. The term boat manufacturer does not include any person or business entity whose sole activities are the direct sale of said vessels to ultimate purchasers or the servicing of said vessels.

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(21) "Enhanced Evaporative Control System" means an integration of evaporative control hardware including activated carbon canisters, low permeation fuel hoses, and non permeable fuel tanks designed to comply with the diurnal and permeation standards in Table 2.2 of § 2442(b)(2).

(2422) "Exhaust emissions" means matter emitted into the environment from any opening downstream from the exhaust port of a spark-ignition marine engine.

(2223) "Executive Officer" means the Executive Officer of the Air Resources Board or his or her authorized representative.

(2324) "Executive Order" means an order issued by the Executive Officer certifying engines for sale in California.

(2425) "Family Emission Limit" means an emission value assigned by a marine engine manufacturer to an engine family for the purpose of complying with a corporate average exhaust emission standard. The Family Emission Limit (FEL) must not exceed the limit specified in this Article.

(2526) "Fuel system" means all components involved in the transport, metering, and mixture of the fuel from the fuel tank to the combustion chamber(s) including, but not limited to the following: fuel tank, fuel tank cap, fuel pump, fuel lines, oil injection metering system, carburetor or fuel injection components, and all fuel system vents.

(2627) "Fuel trim" refers to feedback adjustments to the base fuel schedule. Short-term fuel trim refers to dynamic or instantaneous adjustments. Long-term fuel trim refers to much more gradual adjustments to the fuel calibration schedule

than short-term trim adjustments. These long-term adjustments compensate for engine differences and gradual changes that occur over time.

~~(27)~~(28) “Functional check” for an output component means verification of proper response to a computer command. For an input component, functional check means verification of the input signal being in the range of normal operation, including evaluation of the signal's rationality in comparison to all available information.

(29) “High Performance Engine” or “High Performance SD/I Engine” means a spark-ignition sterndrive/inboard marine engine with maximum engine power greater than 373 kilowatts.

~~(28) “Inboard Engine” means a four-stroke spark-ignition marine engine not used in a personal watercraft that is designed such that the propeller shaft penetrates the hull of the marine watercraft while the engine and the remainder of the drive unit is internal to the hull of the marine watercraft.~~

~~(29)~~(30) “Inspection criteria” means the pass and fail numbers associated with a particular sampling plan.

(31) “Intermediate Volume Manufacturer” means an engine manufacturer that produces high performance and/or standard performance sterndrive/inboard engines for sale in California in combined quantities greater than 75 units but less than 500 units annually.

(32) “Jet boat” means a vessel that uses an installed internal combustion engine powering a water jet pump as its primary source of propulsion and is designed with open area for carrying passengers.

(33) “Large Volume Manufacturer” means an engine manufacturer that produces high performance and standard performance sterndrive/inboard engines for sale in California in combined quantities equal to or greater than 500 units annually.

~~(30)~~(34) “Low-permeation-fuel line (or supply) hose” means a fuel hose that does not exceed a 15.0 grams per square meter per day permeation rate on CE10 fuel at 23° Celsius, ~~as tested~~ per SAE J1527.

~~(31)~~(35) “Malfunction” means the inability of an emission-related component or system to remain within design specifications. Further, malfunction refers to the deterioration of any of the above components or systems to a degree that would likely cause the emissions of an aged engine with the deteriorated components or systems present at the beginning of the applicable certification emission test to exceed the HC+NO_x emission standard by more than 50 percent, unless otherwise specified, as applicable pursuant to Chapter 1 (commencing with Section 1900), Division 3, title 13, of the California Code of Regulations.

~~(32)~~(36) “Marine engine manufacturer” means any person engaged in the manufacturing or assembling of new spark-ignition marine engines or the importing of such engines for resale, or who acts for and is under the control of any such person in connection with the distribution of such engines. A spark-ignition marine engine manufacturer does not include any dealer with respect to new spark-ignition marine engines received by such person in commerce.

~~(33)~~(37) “Marine warm-up cycle” means sufficient engine operation such that the coolant temperature has risen by at least 40 degrees Fahrenheit from engine starting and reaches a minimum temperature of at least 140 degrees Fahrenheit.

~~(34)~~(38) “Marine watercraft” means every description of boat, ship or other artificial contrivance used, or capable of being operated on water.

(39) “Marinize” means to modify an existing automobile engine to operate reliably in a marine environment. Some typical modifications include upgrading the composition of exhaust components to be more resistive against rust and corrosion, incorporating a water jacket within the exhaust manifolds to reduce temperatures, and providing better insulation for electrical contacts that might otherwise be exposed to corrosive sea water.

(40) “Maximum Engine Power” means the maximum brake power point on the nominal power curve for the engine configuration. 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. This information may also be expressed by a torque curve that relates maximum available engine torque with engine speed. The nominal power curve must be within the range of the actual power curves of production engines considering normal production variability. The power value should be rounded to the nearest whole kilowatt for engines greater than 30 kW and to the nearest 0.1 kW for engines less than or equal to 30 kW. Except as indicated below in paragraphs (A) and (B) of this definition, the maximum engine power for an engine family is the weighted average value of maximum engine power for each engine configuration within the engine family based on the total California production volume of engines produced from the engine family.
Alternately:

(A) For outboard or personal watercraft engines, maximum engine power is the greatest value for maximum engine power from all the different configurations within the engine family to determine the appropriate emission standard under § 2442(a).

(B) For sterndrive/inboard engines, maximum engine power is the smallest value for maximum engine power from all the different configurations within the engine family to determine the standards and other requirements that apply under § 2442(b).

~~(35)~~(41) “Maximum Rated Power” means the maximum brake kilowatt output of an engine at rated speed, as stated in the manufacturer’s application for certification.

(42) “Maximum Test Speed” means:

(A) the engine speed during sustained operation with maximum operator demand when testing other than a two-stroke engine installed in a vessel, or

(B) the same as defined in 40 CFR 1045.501 and 40 CFR 1065.1001 when testing a two-stroke engine installed in a vessel or any engine on an engine dynamometer.

For the purposes of laboratory testing, the declared maximum test speed must be within 500 revolutions per minute of the measured value for maximum test speed specified in the test procedures.

~~(36)~~(43) “Model year” means the engine manufacturer’s annual new model production period which includes January 1 of the calendar year for which the model year is named, ends no later than December 31 of the calendar year, and does not begin earlier than January 2 of the previous calendar year. Where an engine manufacturer has no annual new model production period, model year means the calendar year.

~~(37) “New₁”, for purposes of this Article, means a spark-ignition marine engine or watercraft the equitable or legal title to which has never been transferred to an ultimate purchaser. Where the equitable or legal title to the engine or watercraft is not transferred to an ultimate purchaser until after the engine or watercraft is placed into service, then the engine or watercraft will no longer be new after it is placed into service. A spark-ignition marine engine or watercraft is placed into service when it is used for its functional purposes. With respect to imported spark-ignition marine engines or watercraft, the term “new” means an engine or watercraft that is not covered by an Executive Order issued under this Article at the time of importation, and that is manufactured after the effective date of a section in this Article which is applicable to such engine or watercraft, or which would be applicable to such engine or watercraft had it been manufactured for importation into the United States.~~

(44) “New Propulsion Marine Engine” or “New Engine” or “New,” – for purposes of this Article, means any of the following:

(A) A freshly manufactured propulsion marine 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 (A), the engine is new from the time it is produced until

the ultimate purchaser receives the title or the product is placed into service, whichever comes first.

(B) An engine intended to be used as a propulsion marine engine that was originally manufactured as a motor vehicle engine, a nonroad engine that is not a propulsion marine engine, or a stationary engine. In this case, the engine is no longer a motor-vehicle, nonpropulsion, or stationary engine and becomes a “new propulsion marine engine.” The engine is no longer new when it is placed into marine service.

(C) A propulsion marine engine that has been previously placed into service in an excluded application, where that engine is installed in a vessel subject to the requirements of these regulations. The engine is no longer new when it is placed into marine service covered by these regulations. For example, this would apply to an auxiliary marine engine that becomes a propulsion marine engine.

(D) An engine not covered by paragraphs (A) through (C) of this definition that is intended to be installed in a new vessel. This generally includes installation of used engines in new vessels. The engine is no longer new when the ultimate purchaser receives a title for the vessel or the product is placed into service, whichever comes first.

(E) An imported marine engine determined by federal regulations to be new per the criteria defined in 40 CFR 1045.801 for imported propulsion marine engines.

~~(38)~~(45) “Nonconformity” or “Noncompliance,” for purposes of Title 13, California Code of Regulations, section 2444.1, means that:

(A) a significant number, determined by the Executive Officer, of a class of engines, although properly maintained and used, experience a failure of the same emission-related component(s) within their useful lives which, if uncorrected, results in the engines’ failure to comply with the emission standards prescribed under section 2442 which are applicable to the model year of such engines; or

(B) a class of engines that at any time within their useful lives, although properly maintained and used, on average does not comply with the emission standards prescribed under section 2442 which are applicable to the model year of such engines.

(46) “Nontrailerable boat” means a vessel equal to or greater than 8 meters in length or 2.6 meters or more wide.

~~(39)~~(47) “Operating cycle” consists of engine startup, engine run, and engine shutoff.

~~(40)~~(48) “Original equipment manufacturer” means a manufacturer who purchases engines for installation in its equipment for sale to ultimate purchasers.

~~(41)~~(49) “Outboard engine” means ~~a spark-ignition marine engine that, when properly mounted on a marine watercraft in the position to operate, houses the engine and drive unit external to the hull of the marine watercraft~~ an assembly of a spark-ignition marine engine and drive unit used to propel a vessel from a properly mounted position external to the hull of the vessel. An outboard drive unit is partially submerged during operation and can be tilted out of the water when not in use.

(50) “Personal watercraft” means a vessel less than 4.0 meters (13 feet) in length that uses an installed internal combustion engine powering a water jet pump as its primary source of propulsion and is designed with no open load carrying area that would retain water. The vessel is designed to be operated by a person or persons positioned on, rather than within the confines of the hull. A vessel using an outboard engine as its primary source of propulsion is not a personal watercraft.

~~(42)~~(51) “Personal watercraft engine” means ~~a spark-ignition marine engine that does not meet the definition of outboard engine, inboard engine or sterndrive engine, except that the Executive Officer may, in his or her discretion, classify a personal watercraft engine as an inboard or sterndrive engine if it is comparable in technology and emissions to an inboard or sterndrive engine~~ a spark-ignition engine used to propel a personal watercraft.

~~(43)~~(52) “Production-line tests” are emission tests performed on a sample of production engines produced for sale in California and conducted in accordance with Title 13, California Code of Regulations, section 2446(a).

(53) “Qualified Intermediate Volume Manufacturer” means an intermediate volume manufacturer whose ratio of standard performance sterndrive/inboard engines to high performance sterndrive/inboard engines is 12 to 1 or greater.

(54) “Rebuild” or “Rebuilding” refers to a major overhaul in which the engine's pistons or power assemblies are replaced or other changes that significantly increase the service life of the engine are made. 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 that the Test Procedures allow during the useful life period (such as replacing fuel injectors) or unscheduled maintenance that occurs commonly within the useful life period.

~~(44)~~(55) "Redline engine speed" means the engine manufacturer recommended maximum engine speed as normally displayed on instrument panel tachometers, or the engine speed at which fuel shutoff occurs.

~~(45)~~(56) "Response rate," with regards to oxygen sensors, refers to the delay (measured in milliseconds) between a switch of the sensor from lean to rich or vice versa in response to a change in fuel/air ratio above and below stoichiometric.

~~(46)~~(57) "Sales" or "Eligible sales" means the actual or calculated sales of an engine family in California for the purposes of corporate averaging and production-line testing. Upon Executive Officer approval, an engine manufacturer may calculate its eligible sales through market analysis of actual federal production or sales volumes.

~~(47)~~(58) "Scheduled maintenance" means any adjustment, repair, removal, disassembly, cleaning, or replacement of components or systems required by the engine manufacturer to be performed on a periodic basis to prevent part failure or marine watercraft or engine malfunction, or those actions anticipated as necessary to correct an overt indication of malfunction or failure for which periodic maintenance is not appropriate.

(59) "Small Volume Manufacturer" means an engine manufacturer that produces high performance and/or standard performance sterndrive/inboard engines for sale in California in combined quantities equal to or less than 75 units annually.

(60) "Spark-ignition" means relating to a gasoline-fueled engine or any other type of engine with a spark plug (or other sparking device) and with operating characteristics significantly similar to the theoretical Otto combustion cycle. Spark-ignition engines usually use a throttle to regulate intake air flow to control power during normal operation.

~~(48)~~(61) "Spark-ignition marine engine" or "Spark-ignition propulsion marine engine" means any engine used to propel a marine watercraft, and which utilizes the spark-ignition combustion cycle; including, but not limited to personal watercraft, outboard, inboard and sterndrive/inboard engines.

(62) "Standard Performance Engine" or "Standard Performance SD/I Engine" means a spark-ignition sterndrive/inboard marine engine with maximum engine power less than or equal to 373 kilowatts.

~~(49) "Sterndrive engine" means a four-stroke spark-ignition marine engine not used in a personal watercraft that is designed such that the drive unit is external to the hull of the marine watercraft, while the engine is internal to the hull of the marine watercraft.~~

(63) “Sterndrive/inboard engine” or “sterndrive/inboard marine engine” means a spark-ignition engine that is used to propel a vessel, but is not an outboard engine or a personal watercraft engine. This includes engines on propeller driven vessels, jet boats, air boats, and hovercraft.

~~(50)~~(64) “Test engine” means the engine or group of engines that an engine manufacturer uses during certification, production-line and in-use testing to determine compliance with emission standards.

~~(51)~~(65) “Test Procedures” means the document entitled “California Exhaust Emission Standards and Test Procedures for 2001 Model Year and Later Spark-Ignition Marine Engines,” which includes the standards and test procedures applicable to 2001 and later spark-ignition personal watercraft, outboard, ~~inboard~~ and sterndrive/inboard marine engines, as incorporated by reference in Section 2447, as adopted October 21, 1999, and as last amended September 22, 2006. This document is incorporated by reference herein.

~~(52)~~(66) “Ultimate purchaser” means, with respect to any new spark-ignition marine engine, the first person who in good faith purchases such new spark-ignition marine engine for purposes other than resale.

~~(53)~~(67) “U.S.C.” means United States Code.

~~(54)~~(68) “Used solely for competition” means exhibiting features that are not easily removed and that would render its use other than in competition unsafe, impractical, or highly unlikely.

~~(55)~~(69) “Useful life” for spark-ignition marine engines means nine years for personal watercraft engines and sixteen years for outboard, ~~inboard~~, and sterndrive/inboard engines.

~~(56)~~(70) “Warranty period” means the period of time the engine or part is covered by the warranty provisions.

~~(57)~~(71) “Warranty station” means any dealer, service center or other agent that is authorized by the engine manufacturer to perform diagnostic labor, repairs or replacements of warranted engine components.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

§ 2442. Emission Standards.

- (a) Model year 2001 and later model year spark-ignition personal watercraft and outboard marine engines:
- (1) Exhaust emissions from new spark-ignition marine 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 the hydrocarbon plus oxides of nitrogen (HC+NO_x) exhaust emission standards listed in Table 1.1 nor the carbon monoxide (CO) exhaust emission standards listed in Table 1.2 during its designated useful life:

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 kW¹	P_{tx} ≥ 4.3 kW¹
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

Outboard and Personal Watercraft Carbon Monoxide Standards

<u>ENGINE CATEGORY</u>	<u>MODEL YEAR</u>	<u>POWER CATEGORY^a</u> <i>[kilowatts]</i>	<u>CO STANDARD</u> <i>[grams per kilowatt-hour]</i>
<u>OB/PWC^b</u>	<u>2009 and later</u>	<u>kW ≤ 40</u>	<u>500 - 5 x P^c</u>
		<u>kW > 40</u>	<u>300.0</u>

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 Abbreviation for "Outboard and Personal Water Craft" engines

c P is defined as maximum rated power or maximum engine power (see footnote a) in kilowatts (kW)

where:

P_{tx} is the average power in kilowatts (kW) (sales-weighted) of the total number of spark-ignition marine engines produced for sale in California in model year x. Engine power must be calculated using the Society of Automotive Engineers (SAE) standard J1228, November 1991, incorporated herein by reference. Engine manufacturers must not determine P_{tx} by combining the power outputs of outboard engines with the power outputs of personal watercraft engines.

- (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.

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- (b) Model year 2003 and later model year spark-ignition ~~inboard and sterndrive~~/inboard marine engines:
- (1) Exhaust emissions from all new model year 2003 and later spark-ignition ~~inboard and 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/Stern Drive/Inboard Marine Engine Standards

MODEL YEAR	RATED POWER CATEGORY ¹ [kilowatts]	COMPLIANCE OPTION ^{1,2}	DURABILITY [hours / years]	EXHAUST STANDARDS			SUPPLEMENTAL MEASURE ^{4,5}	
				NMHC ^{2,3} +NO _x [grams per kilowatt-hour]	TYPE ^{3,4}	CO [grams per kilowatt-hour]		
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		Low-Permeation Fuel Line Hoses	
2008	kW ≤ 373	OPT 1	N/A	16.0 (25%)	AVE ⁶		None	
			480 / 10	5.0 (75%)	FIXED		Low-Permeation Fuel Line Hoses	
2009 and later	kW ≤ 373	N/A	480 / 10	5.0 ^{6,7,8}	FIXED		75.0 ^{7,9}	Carryover ^{7,10}
	373 < kW ≤ 485		450 ⁵ / 3	5.0 ⁶	AVE			
	kW > 485		50 ⁵ / 1	5.0 ⁶	AVE			

Notes:

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
12. Once a manufacturer has chosen an option, that option must continue to be used exclusively across product lines
23. 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
34. Corporate averaging (AVE) may be used to demonstrate compliance with the exhaust emission standard, except where a FIXED standard is required
45. Supplemental measures may be different than shown, but must provide equal and verifiable emission reductions to those indicated
5. 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
6. The corporate average calculation may be met with or without power weighting for these years
67. 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 Title 13, California Code of Regulations, § 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
8. 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
9. 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
710. 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 the 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

<u>MODEL YEAR</u>	<u>POWER^a CATEGORY</u> <i>[kilowatts]</i>	<u>DURABILITY</u> <i>[hours / years]</i>	<u>HC^b+NO_x STANDARD</u> <i>[grams per kilowatt-hour]</i>		<u>CO STANDARD</u> <i>[grams per kilowatt-hour]</i>
			<u>Small Volume Manufacturers or Intermediate Volume Manufacturers that are not Qualified Intermediate Volume Manufacturers</u>	<u>Large Volume or Qualified Intermediate Volume Manufacturers</u>	
<u>2009 - 2010</u>	<u>373 < kW ≤ 485</u>	<u>150^c / 3</u>	<u>16.0^d</u>	<u>5.0^e</u>	<u>350.0^d</u>
	<u>kW > 485</u>	<u>50^c / 1</u>	<u>25.0^d</u>		
<u>2011 and later</u>	<u>373 < kW ≤ 485</u>	<u>150^c / 3</u>	<u>16.0^d</u>	<u>5.0^e</u>	<u>350.0^d</u>
	<u>kW > 485</u>	<u>50^c / 1</u>	<u>22.0^d</u>		

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

(C) ~~(A)~~No crankcase emissions shall be discharged into the ambient atmosphere from 2003 and later spark-ignition ~~inboard and sterndrive/inboard~~ marine engines.

(D) ~~(B)~~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; enjoinder 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.

(E) ~~(C)~~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

	<u>PERMEATION STANDARDS¹</u> <i>[grams per square meter per day]</i>	<u>DIURNAL STANDARD²</u> <i>[grams per gallon per day]</i>	<u>TEST TEMPERATURES</u> <i>[degrees Celsius]</i>
<u>Fuel Hoses</u>	<u>15.0</u>	<u>—</u>	<u>23 ± 2</u>
<u>Fuel Tank</u>	<u>1.5</u>	<u>—</u>	<u>28 ± 2</u>
<u>Trailerable Boat</u>	<u>—</u>	<u>0.40</u>	<u>25.6 – 32.2</u>
<u>Nontrailerable Boat</u>	<u>—</u>	<u>0.16</u>	<u>27.6 – 30.2</u>

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:

$$\frac{\sum_{j=1}^n (PROD_{jx})(EL_{jx})}{\sum_{j=1}^n (PROD_{jx})} = \text{Corporate Average}$$

$$\frac{\sum_{j=1}^n (PROD_{jx})(EL_{jx})(P_{jx})}{\sum_{j=1}^n (PROD_{jx})(P_{jx})} = \text{Corporate Average}$$

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.

* * * * *

~~(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.~~

~~(4) (3) 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 NMHC+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+NO_x 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+NO_x 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+NO_x 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 § 2442, and measured according to the methods in Part I, section 20., paragraph (c) of the incorporated 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 § 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 the incorporated Test Procedures; or

Table 2.3
NTE Multipliers for Catalyst-Equipped Engines

<u>Pollutant</u>	<u>Subzone 1</u>	<u>Subzone 2</u>
<u>HC+NO_x</u>	<u>1.50</u>	<u>1.00</u>
<u>CO</u>	<u>N/A</u>	<u>1.00</u>

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 the incorporated Test Procedures; or

Table 2.4
NTE Multipliers for Two-Stroke Engines without Catalysts

<u>Pollutant</u>	<u>All Test Points</u>
<u>HC+NO_x</u>	<u>1.2</u>
<u>CO</u>	<u>1.2</u>

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 the incorporated Test Procedures.

Table 2.5
NTE Multipliers for Four-Stroke Engines without Catalysts

<u>Pollutant</u>	<u>Subzone 1</u>	<u>Subzone 2</u>
<u>HC+NO_x</u>	<u>1.40</u>	<u>1.60</u>
<u>CO</u>	<u>1.50</u>	<u>1.50</u>

- (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 § 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 this article or the test procedures incorporated by reference in § 2447.
- (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 full useful life 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

<u>HC¹+NO_x STANDARD</u> <i>[grams per kilowatt-hour]</i>	<u>CO STANDARD</u> <i>[grams per kilowatt-hour]</i>	<u>PERMEATION STANDARDS</u> <i>[grams per square meter per day]</i>		<u>DIURNAL STANDARD²</u> <i>[grams per gallon per day]</i>
		<u>Hose³</u>	<u>Tank⁴</u>	
<u>2.50</u>	<u>50.0</u>	<u>15.0</u>	<u>1.5</u>	<u>0.4</u>

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) New Replacement Engine Requirements for Engine Manufacturers. 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.”

~~(e)~~(f) The test equipment and test procedures for determining compliance with these standards are set forth in Parts III and IV, respectively, of the “Test Procedures.”

(g) 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).

(3) General Hardship Relief Provision

Manufacturers may petition the Executive Officer at any time to issue temporary relief from any of the requirements of this Article that would result in extreme financial or technical hardship to the manufacturer. The Executive Officer shall consider the following in determining whether or not to grant the manufacturer's request for relief and the extent to which relief is provided:

- (A) The manufacturer could not have reasonably anticipated the situation for which relief is requested and has substantiated that the circumstances resulting in the hardship were beyond its control to avert; and
- (B) The manufacturer has exhausted all existing relief provisions in trying to remedy the situation; and
- (C) The manufacturer has proposed an effective, implementable, and enforceable plan to make up for any emission benefits that would be lost should the requested relief be provided.

(4) Executive Officer Discretion for Technical Changes.

The Executive Officer may revise or incorporate specific technical requirements with respect to the test procedures incorporated at § 2447 of these regulations. For the purposes of this subparagraph (4), "technical requirements" includes revisions to test procedures, test methodology, or any requirement to enhance alignment with similar federal regulations promulgated after the amendments to this Article 4.7, as noticed June 6, 2008, are adopted. Such technical requirements shall be electronically noticed to listserv subscribers, shall be made available to the public via appropriate ARB webpage postings, and shall be noticed in the California Regulatory Notice Register. Such technical requirements will become effective 30 days after notice, unless any person notifies the Executive Officer in writing that they object to any part of the technical requirements noticed.

- (h) Practices for Rebuilding Engines. The rebuilding practices described in Part I, Section 7 of the incorporated test procedures shall apply to all spark-ignition marine engines subject to the requirements of § 2442 that are rebuilt after December 31, 2009, including those engines that were originally manufactured on, or prior to, December 31, 2009.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

§ 2443.1. Emission Control Labels - Model Year 2001 and Later Spark-Ignition Marine Engines.

(a) * * * * *

(b) Applicability. This section applies to:

- (1) Model year 2001 and later spark-ignition personal watercraft and outboard marine engines and model year 2003 and later spark-ignition ~~inboard~~ and sterndrive/inboard marine engines, which have been certified to the applicable emission standards pursuant to Health and Safety Code section 43013;

* * * * *

(c) Engine Label and Location.

* * * * *

(2)

- (B) ~~Inboard and Sterndrive/Inboard~~ Inboard Engines. In selecting an acceptable location, the engine manufacturer must consider visibility and the possibility of accidental damage (e.g., possibility of tools or sharp instruments coming in contact with the label). The engine label must be affixed in such a manner that it cannot be removed without destroying or defacing the label. The engine label must contain the unique identification number that has been assigned to the engine, pursuant to subsection (a) of this section. If the engine manufacturer claims there is inadequate space to attach the label, the Executive Officer will determine a suitable location.

* * * * *

(4) The engine label must contain the following information:

(A) * * * * *

(B) The full corporate name or trademark of the engine manufacturer.

(i)

1. An engine manufacturer may request the Executive Officer's approval to delete its name and trademark, and substitute the name and trademark of another engine

manufacturer, original equipment manufacturer or third-party distributor.

~~(ii)~~

2. Approval under paragraph (4)(B)~~(ii)~~1. above does not relieve the engine manufacturer granted an engine family Executive Order of any requirements imposed by these provisions on the applicable engines.

* * * * *

- (D) Identification of the Exhaust and/or Evaporative Emission Control System(s) (Abbreviations may be used and must conform to the nomenclature and abbreviations provided in the latest revision of the Society of Automotive Engineer's (SAE) procedure J1930, "Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations and Acronyms", and as specified in section 1977, Title 13, California Code of Regulations).

* * * * *

- (G) An unconditional statement of compliance with the appropriate model year California regulations. For example, "THIS ENGINE CONFORMS TO (model year) CALIFORNIA EMISSION REGULATIONS FOR SPARK-IGNITION MARINE ENGINES." For an engine family certified in California with an FEL different from the FEL assigned federally for the engine family, the following statement shall be appended to the unconditional statement of compliance: "...AND IS CERTIFIED TO (specify FEL) g/kW-hr HC+NO_x ENGINE FAMILY EXHAUST EMISSION STANDARD IN CALIFORNIA."

(H) The engine and evaporative family identification(s) (i.e., engine and, where applicable, evaporative family name(s)). The engine and evaporative family identification(s) shall be in accordance with the current format(s) used by the United States Environmental Protection Agency.

* * * * *

(d) For ~~Inboard and Sterndrive~~/Inboard Engines used solely for Competition.

* * * * *

(4) * * * * *

(B) The full corporate name or trademark of the engine manufacturer.

~~(i)~~

1. An engine manufacturer may request the Executive Officer's approval to delete its name and trademark, and substitute the name and trademark of another engine manufacturer, original equipment manufacturer or third-party distributor.

~~(ii)~~

2. Approval under paragraph (4)(B)~~(i)~~1. above does not relieve the engine manufacturer granted an engine family Executive Order of any requirements imposed by these provisions on the applicable engines.

* * * * *

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

§ 2443.2. Consumer / Environmental Label Requirements.

(a) * * * * *

(b) Applicability. This section applies to:

- (1) Model year 2001 and later spark-ignition personal watercraft and outboard marine engines and model year 2003 and later spark-ignition ~~inboard~~ and sterndrive/inboard marine engines, which have been certified to the applicable emission standards pursuant to Health and Safety Code section 43013;

* * * * *

(c) * * * * *

- (1) Facsimiles of the label format are shown in Figure 1.

Figure 1



(NOTE: Labels are not to scale.)

(A) The engine manufacturer must ensure that the label has the following characteristics:

(i)

1. Oval shape;

(ii)

2. Dimensions of no less than three inches wide by two and a half inches high, except that it may be no less than

two inches by one and two-thirds inches high for engines that have power outputs of 11.2 kW (15 hp) or less;

(iii)

3. Watermark

(i) For all except five star labels, Aa watermark as shown in Figure 2 that is a clear laminate. The watermark must cover the entire label and be screened at no less than fifteen percent; and

(ii) For five star labels, a colored or black and white watermark consisting of the central portion of the California State flag as shown in the five star label format in Figure 1. The watermark must cover the entire label and be screened at no less than fifteen percent; and

(iv)

4. All written information required by paragraph (c)(4)(B) must be in the English language and the font must be sans serif. The characters must be a minimum of two (2) millimeters in height except as specified in paragraph (b)(1)(B)(i)(d)(c)(1)(B)5., and of a color that contrasts with the background on which it is displayed.

Figure 2



(B) Multiple levels of cleanliness. Progressively clean engines shall carry the following notations (as applicable):

(i)

1. An engine that has an FEL or that has been certified at or below the hydrocarbon plus oxides of nitrogen standard listed in Table 1 of this section for Tier 1 must include the phrase "LOW EMISSION" and a single star symbol as shown in Figure 1.

(ii)
2. An engine that has an FEL or that has been certified at or below the hydrocarbon plus oxides of nitrogen standard listed in Table 1 of this section for Tier 2 must include the phrase “VERY LOW EMISSION” and two star symbols as shown in Figure 1.

(iii)
3. An engine that has an FEL or that has been certified at or below the hydrocarbon plus oxides of nitrogen standard listed in Table 1 of this section for Tier 3 must include the phrase “ULTRA LOW EMISSION” and three star symbols as shown in Figure 1.

(iv)
4. An engine that has an FEL or that has been certified at or below the hydrocarbon plus oxides of nitrogen standard listed in Table 1 of this section for Tier 4 must include the phrase “SUPER ULTRA LOW EMISSION” and four star symbols as shown in Figure 1.

5. An engine that has an FEL or that has been certified at or below the hydrocarbon plus oxides of nitrogen standard listed in Table 1 of this section for Tier 5 must include the phrase “LEVEL FIVE EXTREMELY CLEAN” and five star symbols as shown in Figure 1.

Table 1.

Hydrocarbon plus Oxides of Nitrogen Standards (in g/kW-hr)		
<i>Tier</i>	<i>P < 4.3</i>	<i>P ≥ 4.3</i>
1	81.00	$(0.25 \times (151+557/P^{0.9})) + 6.0$
2	64.80	$(0.20 \times (151+557/P^{0.9})) + 4.8$
3	30.00	$(0.09 \times (151+557/P^{0.9})) + 2.1$
4	5.0	5.0
<u>5</u>	<u>2.5</u>	<u>2.5</u>

Where P means the average power in kW (sales-weighted) of the subject engine family.

(iv)

6. All phrases encircling the top portion must have block characters that are a minimum of five (5) millimeters in height except that the characters may be three (3) millimeters for labels sized as allowed pursuant to paragraph (c)(1)(A)~~(i)~~2. for engines that have power outputs of 11.2 kW (15 hp) or less.

(C) Language other than that specified in paragraph (b)(1)(B) must not be used unless permitted by the Executive Officer.

(D) The color of the outer oval and stars on the labels must contrast with the engine cover or watercraft hull. The color of the interior oval (i.e., background for the stars) must contrast with the color of the outer oval and stars.

(2) Label Location. For outboard engines, a single label must be permanently affixed to the back of the engine cover or cowling. For personal watercraft, a single label must be affixed two to three inches to the right of the required location of the California Assigned Vessel Number displayed on the port side of the hull. For ~~inboard and sterndrive~~/inboard engines, labels must be affixed to the engine and to the port side of the hull, either to the right or left and in close proximity to the required location of the California Assigned Vessel Number. Each label must be manufactured and permanently affixed so that it cannot be removed without destroying or defacing the label, must be readily visible and must not be affixed to any location that is likely to be replaced during the engine's useful life. For the purposes of this paragraph, readily visible means that the label's shape and number of stars are discernible from a distance of 100 feet.

* * * * *

(5) For ~~Inboard and Sterndrive~~/Inboard Marine Engines:

* * * * *

(e) Replacement engines installed in hulls, cowlings or watercraft that had been previously labeled in accordance with these specifications must have identical or improved emissions to that of the original certified engine in accordance with the provisions in § 2442 (e).

* * * * *

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code. Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.






§ 2443.3. Environmental Label/Consumer Notification Requirements.

- (a) Applicability. This section applies to model year 2001 and later spark-ignition personal watercraft and outboard marine engines and model year 2003 and later spark-ignition ~~inboard and sterndrive~~/inboard marine engines, which have been certified to the applicable emission standards pursuant to Health and Safety Code section 43013.
- (b) A nonpermanent label (i.e., hang tag) must be attached to each personal watercraft or outboard engine, as applicable, at time of sale. A nonpermanent label (i.e., hang tag) produced and supplied by the engine manufacturer must be attached, by the seller, to each ~~inboard and sterndrive~~/inboard engine or watercraft, as applicable, when introduced for sale to ultimate purchasers. Environmental labels pursuant to this section shall include a copy of the following:

Front of Hang Tag:

The Star Label means Cleaner Marine Engines

This engine has been certified as a:

				
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(<Check appropriate box.>)

The Symbol for Cleaner Marine Engines:

Cleaner Air and Water – for a healthier lifestyle and environment.

Better Fuel Economy – burns up to 30 - 40 percent less gas and oil than conventional carbureted two-stroke engines, saving money and resources.

Longer Emissions Warranty – protects consumer for worry free operation.

Back of Hang Tag:

<facsimile of the one-star label>

One Star – Low Emission

The one-star label identifies engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2001 exhaust emission standards. Engines meeting these standards have 75% lower emissions than conventional carbureted two-stroke engines. These engines are equivalent to the U. S. EPA's 2006 standards for marine engines.

<facsimile of the two-star label>

Two Stars – Very Low Emission

The two-star label identifies engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2004 exhaust emission standards. Engines meeting these standards have 20% lower emissions than One Star – Low Emission engines.

<facsimile of the three-star label>

Three Stars – Ultra Low Emission

The three-star label identifies engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2008 exhaust emission standards or the Sterndrive and Inboard marine engine 2003-2008 exhaust emission standards. Engines meeting these standards have 65% lower emissions than One Star – Low Emission engines.

<facsimile of the four-star label>

Four Stars – Super Ultra Low Emission

The four-star label identifies engines that meet the Air Resources Board's Sterndrive and Inboard marine engine 2009 exhaust emission standards. Personal Watercraft and Outboard marine engines may also comply with these standards. Engines meeting these standards have 90% lower emissions than One Star – Low Emission engines.

<facsimile of the five-star label>

Five Stars - Level Five Extremely Clean

The five-star label identifies engines that meet the Air Resources Board's Voluntary Standards for spark-ignition marine engines. Engines meeting these standards have 50% lower emissions than Four Stars – Super Ultra Low Emission engines.

<White Space for dealer or manufacturer identification or additional information>

Cleaner Watercraft – Get the Facts
1-800-END-SMOG
www.arb.ca.gov

- (1) * * * * *
- (2) For outboard engines greater than 130 horsepower, facsimiles of only the “Low Emission Engine” and “Very Low Emission Engine” labels described in sections 2443.2(c)(1)(B)(i)1. and (ii)2. need to be displayed on the nonpermanent label until the earlier of:

* * * * *

- (3) For personal watercraft, facsimiles of only the “Low Emission Engine” and “Very Low Emission Engine” labels described in sections 2443.2(c)(1)(B)(i)1. and (ii)2. need to be displayed on the nonpermanent label until the earlier of:

* * * * *

- (4) For any spark-ignition marine engine or personal watercraft not certified to the voluntary standards in § 2442(d), facsimiles of only the “Low Emission Engine,” “Very Low Emission Engine,” “Ultra Low Emission Engine,” and “Super Ultra Low Emission Engine” labels described in §§ 2443.2(c)(1)(B)1. through 2443.2(c)(1)(B)4. need to be displayed on the nonpermanent label, except as permitted in (b)(2) and (b)(3) of this section:

- ~~(4)~~
(5) All textual information (i.e., characters and/or lettering) required by this section must be no smaller than two (2) millimeters in height.

(c) * * * * *

- (d) Samples of all labels produced pursuant to this section must be submitted to the Executive Officer with the applicable certification application. The Executive Officer may require a demonstration of durability for any hang tag, submitted per the provisions of this section, that s/he believes may become illegible, damaged, or otherwise not intact at the time of sale, for a period of two years, when displayed under normal conditions.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

§ 2444.1. In-Use Compliance Testing and Recall Regulations – Model Year 2001 and Later Spark-Ignition Marine Engines.

(a) Applicability. This section applies to model year 2001 and later spark-ignition personal watercraft and outboard marine engines, which have been certified to the applicable emission standards pursuant to Health and Safety Code section 43013. Spark-ignition ~~inboard and sterndrive~~/inboard marine engines shall comply with the in-use compliance testing and recall requirements found in Title 13, California Code of Regulations, Sections 2111 through 2140 and 2147.

(b) * * * * *

(3) * * * * *

(B) * * * * *

~~(i)~~

1. A minimum of two (2) engines per family provided that no engine fails any standard. For each failing engine, two (2) more engines must be tested until the total number equals ten.

~~(ii)~~

2. For engine families of less than 50 engines (California sales) for the identified model year or for engine manufacturers who make less than or equal to 200 engines (California sales) for that model year, a minimum of one engine per family provided that this engine does not fail any standard. If this engine fails, two (2) more engines shall be tested. For each additional engine failure, the engine manufacturer must continue testing two (2) additional engines until the total number equals eleven.

~~(iii)~~

3. If an engine family was certified using carryover emission data and has been previously tested under paragraph (b)(3)(B) without an ordered recall, then only one engine for that family must be tested. If this engine fails any standard, testing must be conducted as outlined in paragraphs (b)(3)(B), as applicable.

* * * * *

(E) * * * * *

~~(i)~~
1. engine family production in California is less than or equal to 20 per year; or

~~(ii)~~
2. engines cannot be obtained for testing because they are used substantially in watercraft that are not conducive to engine removal such as large watercraft where the engine cannot be removed without dismantling either the engine or the watercraft; or

~~(iii)~~
3. other compelling circumstances associated with the structure of the industry and uniqueness of spark-ignition marine engine applications. Such alternatives shall be designed to determine whether the engine family is in compliance in-use.

(F) * * * * *

(G) * * * * *

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

- a. The engine manufacturer must obtain information from the end users regarding the accumulated usage, maintenance, operating conditions and storage of the test engines.
- b. Documents used in the procurement process must be maintained as required by section 30 of the Test Procedures.

~~(ii)~~
2. The engine manufacturer may perform minimal "set-to-specification" 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 manual for engines with the amount of service and age of the acquired test engine. Documentation shall be maintained and retained as required by section 30 of the Test Procedures.

~~(iii)~~

3. At least one valid emission test, performed according to the test procedures outlined in Part IV of the Test Procedures is required for each in-use engine.

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

~~(v)~~
5. If a selected in-use engine fails to comply with any applicable emission standard, the engine manufacturer must determine the reason for noncompliance. The engine manufacturer must report all such reasons of noncompliance within fifteen days of completion of testing.

* * * * *

(e)

* * * * *

(4) Record keeping and Reporting Requirements.

(A) * * * * *

~~(i)~~
1. Engine family and emission recall campaign number designated by the engine manufacturer.

~~(ii)~~
2. Date engine/watercraft owner notification was begun, and date completed.

~~(iii)~~
3. Number of engines involved in the voluntary or ordered recall campaign.

~~(iv)~~
4. Number of engines known or estimated to be affected by the nonconformity and an explanation of how this number was determined.

~~(v)~~
5. Number of engines inspected pursuant to the voluntary or ordered recall plan.

~~(vi)~~
6. Number of inspected engines found to be affected by the nonconformity.

~~(vii)~~
7. Number of engines receiving repair under the recall plan and a listing of these engines' engine identification numbers.

~~(viii)~~
8. Number of engines determined to be ineligible for recall action due to removed or modified parts.

~~(ix)~~
9. A copy of any service bulletins transmitted to dealers or other authorized repair facilities which pertain to the nonconformity to be corrected and that have not previously been reported.

~~(x)~~
10. A copy of all communications transmitted to engine/watercraft owners that relate to the nonconformity and that have not previously been submitted.

(B) If the engine manufacturer determines that any of the information submitted pursuant to paragraph (4)(A) above has changed or was incorrect, revised information and an explanation must be submitted. Responses to subsections (4)(A)~~(v)~~5., ~~(vi)~~6., ~~(vii)~~7., ~~(viii)~~8. and ~~(ix)~~9. above shall be cumulative totals.

(C) * * * * *

~~(i)~~
1. To whom notification was given;

~~(ii)~~

2. Whose engines were repaired or inspected under the recall plan; and

~~(iii)~~

3. Whose engines were determined not to qualify for repair due to removed or modified components.

(D)

* * * * *

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

§ 2444.2. On-Board Engine Malfunction Detection System Requirements - Model Year 2007 and Later Spark-Ignition ~~Inboard and Sterndrive/Inboard~~ Marine Engines.

- (a) (1) Engines certified under Option 1 of Section 2442(b)(1):

All 2007 and 2008 model year spark-ignition ~~inboard and standard performance sterndrive/inboard~~ marine engines certified to the 5.0 grams per kilowatt-hour HC+NO_x standard shall comply with the requirements for subsections (b) through (i) below, except as noted. For all 2009 model year and later spark-ignition ~~inboard and standard performance sterndrive/inboard~~ marine engines, the requirements in *italics* shall also apply.

- (2) Engines certified under Option 2 of Section 2442(b)(1):

All 2008-2009 model year spark-ignition ~~inboard and standard performance sterndrive/inboard~~ marine engines shall comply with the requirements for subsections (b) through (i) below, except as noted. For all 2010 model year and later spark-ignition ~~inboard and sterndrive/inboard~~ standard performance marine engines, the requirements in italics shall also apply.

- (3) High Performance Engines

All 2009-2010 model year spark-ignition high performance sterndrive/inboard marine engines shall comply with the requirements for subsections (b) through (i) below, except as noted and applicable. For all 2011 model year and later spark-ignition high performance sterndrive/inboard marine engines, the requirements in italics shall also apply.

This section shall be implemented according to the provisions of the following subsections or by means determined by the Executive Officer to be equivalent in meeting the requirements of this section.

~~This section shall be implemented according to the provisions of the following subsections or by means determined by the Executive Officer to be equivalent in meeting the requirements of this section.~~

- (b) General requirements.

- (1) Spark-ignition ~~sterndrive and inboard/inboard~~ marine engines sold as new shall be equipped with an integrated malfunction detection and notification system, hereinafter known as On-~~b~~Board Diagnostics-Marine (OBD-M) system, to identify emission-related malfunctions of the catalyst, fuel system, primary oxygen sensors used for feedback fuel control, secondary oxygen sensors (if

equipped) used for catalyst monitoring, computer-sensed comprehensive components, and the on-board computer itself, by means of diagnostic trouble codes stored in non-volatile computer memory. For this section, a computer-sensed comprehensive component is any electronic device that:

- (A) provides information to the on-board computer and significantly impacts emissions when malfunctioning; or
- (B) is used to enable or disable any other OBD-M monitoring strategy.

(2) ~~For model years 2010 and subsequent, the OBD-M system shall not be required to identify engine misfire per the provisions in subsection (c)(5) unless such monitoring is determined necessary by the Executive Officer to preserve or protect the catalyst system except as otherwise permitted in these regulations. The Executive Officer shall (as part of the in-water testing and development program to be conducted in conjunction with U.S. EPA, the U.S. Coast Guard, the marine industry, and catalyst manufacturers) identify whether, and to what extent, misfire in spark-ignition inboard and stern-drive marine engines may affect catalyst durability and performance. If the Executive Officer determines that engine misfire is a significant factor in reducing the durability and/or performance of marine catalysts, engine manufacturers shall be required to incorporate appropriate misfire detection diagnostics into the OBD-M system. In that case, the provisions in subsection (c)(5) shall be considered sufficient for satisfying the obligation to monitor misfire. Alternate misfire monitoring strategies shall be considered by the Executive Officer and may be implemented in lieu of subsection (c)(5) if demonstrated by the engine manufacturer to provide an equivalent degree of catalyst protection. Otherwise the provisions of that subsection shall be voluntary. In making a determination, the Executive Officer shall consider the cost effectiveness of requiring additional monitoring to address the concerns identified by the test program in addition to the leadtime necessary to modify existing hardware and software, to add misfire detection hardware (e.g., sensors) if necessary, and to develop engine-specific calibrations to accommodate misfire monitoring. Notwithstanding, misfire monitoring shall not be required prior to the 2009 model year, and may be delayed beyond that date pending Executive Officer discretion.~~

(3) The OBD-M system shall not be required to detect any emissions-related malfunction that prevents the engine from starting. The OBD-M system shall not be required to monitor any emissions-related component or system if the only reliable way to accomplish such monitoring would either significantly impair

engine/vessel operability or decrease the safety involved with operating the engine/vessel.

- (4) OBD-M systems shall have the capability to activate an audio or visual alert device located on the marine vessel to inform vessel occupants in the event of a malfunction, and to transmit diagnostic information locally via a standardized data link connector.
- (5) Spark-ignition sterndrive ~~and~~ inboard marine vessels shall be equipped with an audio alert device and/or visual alert device that is compatible with the activation function of the OBD-M system on the installed engine.
 - (A) If equipped, the audio alert device shall provide sufficient volume and intensity to be readily perceptible to vessel occupants during normal modes of vessel operation and occupant activity, but shall not exceed applicable maximum noise levels as set by authorized federal or State agencies. Further, the audio alert device shall in no way impede the function of required sound-signaling devices, or other safety-related devices, already present on the vessel. The audio alert device shall sound briefly in the engine-run key position before engine cranking to indicate that the audio alert device is functional.
 - (B) If equipped, the visual alert device shall provide sufficient activation and be located such that it is readily visible under normal lighting conditions, but shall in no way impede the function of any visual distress-signaling device, fog signal, or navigational light. The visual alert device shall activate in the engine-run key position before engine cranking to indicate that the visual alert device is functional and shall, when activated, display the phrase "Service Required" or an equivalent standardized phrase or symbol to be determined as specified in Subsection (h).
- (6) Malfunction thresholds for catalyst, misfire, fuel system, oxygen sensor, and computer-sensed comprehensive component diagnostics shall be determined by the engine manufacturer. However, the engine manufacturer must demonstrate that the determination of these thresholds is sufficient for detecting emission-related malfunctions in a timely and meaningful manner subject to Executive Officer approval (see Subsection (f)(2)).
- (7) Regarding diagnostic system monitoring and audio/visual alert device activation requirements, engine manufacturers are required to define monitoring conditions that are representative of typical

in-use operation, and which will result in the routine execution and completion of all OBD-M diagnostics in-use.

- (8) For model years 2007-2008 on engines complying with paragraph (a)(1) of this section, ~~and for model years 2008-2009 on engines complying with paragraph (a)(2) of this section,~~ and for model years 2009-2010 on engines complying with paragraph (a)(3) of this section, activation of the audio/visual alert device upon detection of excessive engine misfire or a catalyst, fuel system, or oxygen sensor malfunction shall be optional. However, there are no exemptions from storing diagnostic trouble codes in non-volatile computer memory during these model years for any malfunction. The OBD-M must be capable of fully communicating stored information to a generic scan tool via the standardized data link connector.
- (9) Engine manufacturers may employ alternate statistical audio/visual alert device activation and diagnostic trouble code storage protocols to those specified in these requirements, subject to Executive Officer approval, based on comparable timeliness in detecting a malfunction and evaluating system performance.
- (10) Should emission control devices/strategies be introduced on the engine in addition to those identified herein as requiring monitoring (e.g., exhaust gas recirculation), the engine manufacturers shall notify the Executive Officer and submit a plan for monitoring the new device/strategy prior to its incorporation into the OBD-M system. This would not apply to carbon canisters, non permeable fuel tanks, or low-permeation hoses ~~should they be used to comply with the supplemental emission reduction requirements of evaporative requirements for high performance engines in § 2442(b)(2), the Option 2 requirements for standard performance engines in § 2442(b)(4), or the alternative requirements for large volume dual category manufacturers in § 2442(b)(5) in Section 2442(b)(1).~~
- (11) Engine manufacturers may request Executive Officer approval to disable any diagnostic strategy at ambient engine starting temperatures below forty (40) degrees Fahrenheit (low ambient temperature conditions may be determined based on intake air or engine coolant temperature at engine starting), and at elevations above six thousand five hundred (6,500) feet above sea level provided the engine manufacturer submits data and/or an engineering evaluation which adequately demonstrate that monitoring would be unreliable when such conditions exist. Notwithstanding, diagnostic system disablement may be requested at other ambient engine starting temperatures if the engine manufacturer adequately demonstrates with data and/or an

engineering evaluation that misdiagnosis would occur due to the impact of such ambient temperatures on the performance of the component itself.

- (12) Engine manufacturers may disable individual monitors that can be affected by running out of fuel, provided disablement will not occur when the fuel level is above fifteen percent of the nominal capacity of the fuel tank.
- (13) The Executive Officer may grant an extension for compliance with the requirements of this section, with respect to an engine model or engine family, if the engine manufacturer demonstrates that a present electronic control system cannot be modified in time for the ~~2007, or 2008, or 2009~~ model year, as applicable per subsection (a) of this section, because major design changes, not consistent with the engine manufacturer's projected changeover schedule, would be needed to comply with the provisions of the regulation. The period of extension shall not exceed that period of time necessary to enable modification of the electronic control system in accordance with the engine manufacturer's projected changeover schedule, or a period of two years, whichever first occurs. Engine manufacturers requesting an extension shall, no later than six months prior to the applicable model year, submit to the Executive Officer a written request for exemption, setting forth the required demonstration and specifying the period for which the extension is requested.
- (14) All engines certified to the 5.0 gram per kilowatt-hour NMHC+NO_x standard, including those engines certified using the corporate averaging provisions in 2442(b) and discontinuation allowance in 2442(g)(2), must be equipped with OBD-M for the engine's emission-related components. Notwithstanding, current production engines not yet required to possess an OBD-M system would not be required to incorporate OBD-M under the discontinuation allowance until the allowance had expired.

(c) Monitoring requirements.

(1) Catalyst monitoring.

(A) Purpose and scope:

(i)
1.

The diagnostic system shall monitor the catalyst system on spark-ignited marine engines to ensure that the performance of the catalyst has not been compromised due to engine misfire or other factors that can decrease catalyst durability.

- (ii)
2. Manufacturers of spark-ignited lean-burn marine engines may request that the Executive Officer exempt such applications from these catalyst monitoring requirements if it can be demonstrated that a reliable monitoring technology is not available. The Executive Officer shall approve such a request upon determining that all reasonable monitoring technologies have been considered to the extent possible.

(B) Malfunctioning criteria:

- (i)
1. The catalyst system shall be considered malfunctioning when the temperature of the measured catalyst(s) exceeds a threshold value, as determined by the engine manufacturer, indicating abnormally high operating temperature; or when the catalyst temperature fails to reach a minimum value, as determined by the engine manufacturer, indicating “light-off” of the catalyst after a manufacturer-specified time interval has elapsed.

- (ii)
2. Subject to executive officer approval, alternate malfunction criteria (e.g., correlating oxygen sensor frequencies to catalyst conversion efficiency) may be employed by the engine manufacturer if the alternate criteria are appropriate and would provide for enhanced monitoring capability.

(C) Monitoring conditions:

- (i)
1. The engine manufacturer shall define conditions for monitoring the catalyst with the constraints that the check shall:
 - a. be conducted at the earliest acceptable opportunity encountered after the beginning of each operating cycle; and
 - b. the monitoring system shall operate at least once per in-use operating cycle during which the engine manufacturer-defined monitoring conditions are met.

(D) Malfunctioning notification and diagnostic trouble code storage:

(i)

1. Upon detection of a catalyst malfunction, the audio/visual alert device shall be activated and a diagnostic trouble code stored no later than the end of the next operating cycle during which monitoring occurs provided the malfunction is again present.

(ii)

2. The diagnostic system shall temporarily disable catalyst monitoring when a malfunction exists that could affect the proper evaluation of catalyst efficiency.

(iii)

3. The monitoring method for the catalyst(s) shall be capable of detecting when a catalyst trouble code has been cleared (except diagnostic system self-clearing), but the catalyst has not been replaced (e.g., catalyst over-temperature approaches may not be acceptable).

(2) Fuel system monitoring.

(A) Purpose and scope:

The diagnostic system shall monitor the fuel delivery system for its ability to dynamically adjust fuel delivery.

(B) Malfunction criteria:

The engine manufacturer shall establish malfunction criteria to monitor the fuel delivery system. If the engine is equipped with fuel trim circuitry, the engine manufacturer shall include as one of the malfunction criteria the condition where the trim circuitry has used up all of the trim adjustment allowed within the engine manufacturer's selected limit(s). Engine manufacturers may compensate the criteria limit(s) appropriately for changes in altitude or for other similar identifiable operating conditions when they occur.

(C) Monitoring conditions:

The fuel system shall be monitored continuously for the presence of a malfunction.

(D) Malfunction notification and diagnostic trouble code storage:

(i)

1.

For fuel systems with short-term trim only capability, the diagnostic system shall store a diagnostic trouble code after the fuel system has attained the criteria limit for an engine manufacturer-defined time interval sufficient to determine a malfunction. If the malfunction criteria limit and time interval are exceeded, the audio/visual alert device shall be activated and a diagnostic trouble code stored no later than the end of the next operating cycle in which the criteria and interval are again exceeded; unless operating conditions similar to those under which the problem was originally detected (manufacturer-defined conditions) have been encountered without such an exceedance, in which case the initial temporary code and stored conditions may be erased. Furthermore, if similar operating conditions are not encountered during forty (40) operating cycles subsequent to the initial detection of a malfunction, the initial temporary code and stored conditions may be erased.

(ii)

2.

For fuel systems with long-term fuel trim capability, upon attaining a long-term based malfunction criteria limit independent of, or in combination with, the short-term trim system status, the audio/visual alert device shall be activated and a diagnostic trouble code stored no later than the end of the next operating cycle if the malfunction is again detected. If the malfunction is not detected during the second operating cycle, the audio/visual alert device shall be activated and a diagnostic trouble code stored no later than the next operating cycle in which the malfunction is again detected; unless operating conditions similar to those under which the problem was originally detected (manufacturer-defined conditions) have been encountered without an indication of a malfunction, in which case the initial temporary code and stored conditions may be erased. Furthermore, if similar operating conditions are not encountered during forty (40) operating cycles subsequent to the initial detection of a malfunction, the initial temporary code and stored conditions may be erased.

(3) Oxygen sensor monitoring.

(A) Purpose and scope:

~~(i)~~

1. The diagnostic system shall monitor the output voltage and response rate of all primary (fuel control) oxygen (lambda) sensors for malfunction. It shall also monitor secondary oxygen sensors when used as a monitoring device for proper output voltage and/or response rate. Response rate is the time required for the oxygen sensor to switch from lean-to-rich once it is exposed to a richer than stoichiometric exhaust gas mixture or from rich-to-lean when exposed to a leaner than stoichiometric exhaust gas mixture. As a precaution, measuring oxygen sensor switching frequency may not be an adequate indicator of oxygen sensor response rate, particularly at low speeds.

~~(ii)~~

2. Either the lean-to-rich or both the lean-to-rich and rich-to-lean response rates shall be checked. Response rate checks shall evaluate the portions of the sensor's dynamic signal that are most affected by sensor malfunctions such as aging or poisoning.

Engine manufacturers may observe the voltage envelope of the sensor when cycled at a frequency of 1.5 Hertz or greater, as determined by the engine manufacturer, to evaluate a slow response rate sensor (i.e., a slow sensor cannot achieve maximum and/or minimum voltage as will a good sensor, given a properly chosen switching frequency and fuel step change for the check). With Executive Officer approval, engine manufacturers may use alternative parameters to comply with this requirement such as voltage ranges and fuel-air switching frequencies based on a determination that the modifications will result in an accurate and timely evaluation of the sensor.

~~(iii)~~

3. For sensors with different characteristics, the engine manufacturer shall submit data and an engineering evaluation to the Executive Officer for approval based on showing equivalent evaluation of the sensor.

(B) Malfunction criteria:

An oxygen sensor shall be considered malfunctioning when the voltage, response rate, or other criteria, as determined by the engine manufacturer, are exceeded, or when sensor output characteristics are no longer sufficient (e.g., lack of sensor switching) for use as a diagnostic system monitoring device (e.g., for catalyst efficiency monitoring).

(C) Monitoring conditions:

~~(i)~~

1.

The engine manufacturer shall define conditions for monitoring the oxygen sensor(s) with the constraints that the check shall:

- a. be conducted at the earliest acceptable opportunity encountered after the beginning of each operating cycle; and
- b. operate at least once per in-use operating cycle during which the engine manufacturer-defined monitoring conditions are met.

~~(ii)~~

2.

For primary oxygen sensors(s) used for fuel control, the response rate and output voltage shall be monitored for malfunction after the engine has commenced closed-loop operation. If the oxygen sensor(s) is used as part of the monitoring strategy for the catalyst, the oxygen sensor(s) diagnostics should be scheduled to execute before the catalyst diagnostics begin.

(D) Malfunction notification and diagnostic trouble code storage: Upon detection of any oxygen sensor malfunction, the diagnostic system shall store a diagnostic trouble code and the audio/visual alert device shall activate no later than the end of the next operating cycle during which monitoring occurs provided the malfunction is again present.

(4) Computer-sensed comprehensive component monitoring.

(A) Purpose and scope:

The diagnostic system shall monitor for malfunction any computer-sensed electronic engine components not otherwise described in this subsection that provide input to

(directly or indirectly) the on-board computer, and that: 1) can affect emissions during any reasonable in-use operating condition, or 2) are used as part of the diagnostic strategy for any other monitored system or component.

(i)

1. The monitoring system shall have the capability of detecting, *at a minimum*, lack of circuit continuity *and out of range values to ensure proper operation of the input device*. The determination of out of range values shall include logic evaluation of available information to determine if a component is operating within its normal range (e.g., a low throttle position sensor voltage would not be reasonable at a high engine speed with a high mass airflow sensor reading). To the extent feasible, said logic evaluation shall be "two-sided" (i.e., verify a sensor output is not inappropriately high or low).

(ii)

2. Computer-sensed comprehensive components may include, but are not limited to, the engine speed sensor, crank angle sensor, knock sensor, throttle position sensor, coolant temperature sensor, cam position sensor, and other electronic components such as sensors and fuel injectors.

(iii)

3. The coolant temperature sensor shall be monitored for achieving a stabilized minimum temperature level that is needed to achieve closed-loop operation within an engine manufacturer-specified time interval after starting the engine. The time interval shall be a function of starting engine coolant temperature and/or a function of intake air temperature. Engine manufacturers may suspend or delay the diagnostic if the engine is subjected to conditions which could lead to false diagnosis (e.g., engine operation at idle for more than 50 to 75 percent of the warm-up time).

(B) Malfunction criteria:

Computer-sensed comprehensive components shall be considered malfunctioning when, *at a minimum*, lack of circuit continuity *or engine manufacturer-specified out-of-range values occurs*.

(C) Monitoring conditions:

Computer-sensed components shall be monitored continuously for *proper range of values and circuit continuity*.

For rationality monitoring (where applicable), engine manufacturers shall define appropriate operating conditions that are representative of typical in-use operation and will result in the routine execution and completion of all diagnostics in-use. Rationality monitoring shall occur at least once per operating cycle during which the engine manufacturer-defined monitoring conditions are met.

(D) Malfunction notification and diagnostic trouble code storage:

Upon detecting a malfunction, the diagnostic system shall store a diagnostic trouble code and activate the audio/visual alert device no later than the end of the next operating cycle during which monitoring occurs provided the malfunction is again detected.

(5) Misfire monitoring.

~~The provisions in this subsection shall be considered voluntary unless otherwise determined by the Executive Officer according to subsection (b)(2) above.~~

(A) Purpose and scope:

The diagnostic system shall identify the occurrence of engine misfire that can result in damage to the catalyst system. Identification of the misfiring cylinder is not required, however all patterns of misfire must be identified regardless of whether it occurs in a single or multiple number of cylinders.

(B) Malfunctioning criteria:

The diagnostic system shall identify a malfunction when the total number of misfires evaluated in 200 crankshaft-revolution increments for each engine speed and load condition exceeds a percentage (determined by the engine manufacturer to cause damage to the catalyst system) of the total number of firing events in each increment. These threshold percentages shall be provided in the certification documentation. Subject to Executive Officer approval, an interval longer than 200 crankshaft-revolutions may be used. The engine manufacturer shall submit in the certification documentation catalyst temperature data versus percent misfire over the full range of engine speed and load conditions. Alternatively, catalyst temperature data may be submitted for every 500 rpm increment along the Propeller Law curve beginning

at engine idle and continuing throughout the "Not to Exceed Zone" for marine propulsion engines with Fixed- and Variable-pitch propellers, as defined in 40 CFR, section 94.106, (July 1, 2001), which is incorporated by reference herein. The data shall be obtained from a representative cross section (from small to large displacements) of an engine manufacturer's production. Up to three such engine evaluations shall be documented per engine manufacturer, though an engine manufacturer may submit more data, if desired. An engineering evaluation shall be provided for establishing malfunction criteria for the remainder of engine families in the engine manufacturer's product line. The Executive Officer shall waive the evaluation requirement each year if, in the judgment of the Executive Officer, technological changes do not affect the previously determined malfunction criteria.

(C) Monitoring conditions:

(i)

1. Monitoring for misfire shall be continuous from engine starting under all steady-state positive torque engine speeds and load conditions.

(ii)

2. As an exception to monitoring misfire during all positive torque operating conditions, engine manufacturers may disable misfire monitoring in the engine operating region bound by the positive torque line (i.e., engine load with the transmission in neutral), and the two following engine operating points:

- a. an engine speed of 3,000 rpm with the engine load at the positive torque line; and
- b. the redline engine speed (defined in section 2441) with the engine's manifold vacuum at four inches of mercury lower than that at the positive torque line.

Misfire detection systems unable to detect all misfire patterns under all required conditions shall be evaluated for compliance by the Executive Officer based on, but not limited to, the following factors:

- c. the magnitude of the region(s) in which misfire detection is limited,

- d. the degree to which misfire detection is limited in the region(s) (i.e., the probability of detection of misfire events),
- e. the frequency with which said region(s) are expected to be encountered in-use,
- f. the type of misfire patterns for which misfire detection is troublesome, and
- g. demonstration that the monitoring technology employed is not inherently incapable of detecting misfire under required conditions (i.e., compliance can be achieved on other engines).

The evaluation shall be based on the following misfire patterns:

- h. equally spaced misfire occurring on randomly selected cylinders,
- i. single cylinder continuous misfire; and
- j. paired cylinder (cylinders firing at the same crank angle) continuous misfire.

Further, with Executive Officer approval, the engine manufacturer may disable misfire monitoring or employ higher malfunction criteria when misfire cannot be distinguished from other effects (e.g., turbulence causing the propeller to alternately emerge from then re-submerge into the water.) when using the best reasonably available monitoring technology. The engine manufacturer shall present data and/or an engineering evaluation to the Executive Officer to justify the proposed action. Executive Officer approval shall be based on the extent to which monitoring is expected to be disabled in relation to the capabilities of the best available monitoring technologies as applied to other engines. However, any such disablement occurring within the first 5 seconds after engine starting shall not require Executive Officer approval. Additionally, for engines with greater than eight cylinders, the Executive Officer shall waive the requirements of this section provided the engine manufacturer submits data and/or an engineering evaluation which adequately

demonstrates that misfire detection throughout the required operating region cannot be achieved when employing proven monitoring technology (i.e., a technology that provides for compliance with these requirements on other engines) and provided misfire is detected to the fullest extent permitted by the technology.

(D) Malfunction notification and diagnostic trouble code storage:

~~(i)~~

1.

Upon detection of the level of misfire specified in subsection (b)(5)(B) above, the following criteria shall apply for audio/visual alert device activation and diagnostic trouble code storage:

- a. A temporary diagnostic trouble code shall be stored no later than after the third exceedance of the specified misfire level when operating in the region bound by modes 2 through 5 of the spark-ignition marine engine test cycle and no later than after the first exceedance of the specified misfire level when operating at any other engine speed and load condition during a single operating cycle. If the level of misfire is exceeded again (a single exceedance) during the following operating cycle, or the next operating cycle in which similar conditions are encountered (manufacturer defined conditions), the audio/visual alert device shall activate, a diagnostic trouble code shall be stored, and the audio/visual alert device shall remain continuously activated, even if the misfire ceases. The initial temporary code and stored conditions may be erased if misfire is not detected during the following operating cycle and similar conditions have been encountered without an exceedance of the specified misfire level. The code and conditions may also be erased if similar operating conditions are not encountered during forty operating cycles subsequent to the initial detection of a malfunction.
- b. Notwithstanding, in engines that provide fuel shutoff and default fuel control to prevent over fueling during misfire conditions, the audio/visual alert device need not activate

provided that the fuel shutoff and default control shall be activated as soon as misfire is detected. Fuel shutoff and default fuel control may be deactivated only to permit fueling outside of the misfire range.

(d) Additional audio/visual alert device activation and diagnostic trouble code storage protocol.

(1) Audio/visual alert device activation: For all emission-related components/systems, upon final determination of a malfunction, the OBD-M system shall activate an audio or visual alert device.

(A) If so equipped, visual alert devices shall remain activated continuously whenever a malfunction has been identified by the OBD-M system, and may be deactivated only according to the provisions in paragraph (2) below, or with a scan tool after appropriate repairs have been effected.

(B) If so equipped, audio alert devices may remain activated continuously when a malfunction has been identified by the OBD-M system; however, the Executive Officer shall consider alternative strategies in which the audio alert is activated on a discontinuous, but repetitive, basis. To be acceptable, discontinuous audio alert strategies must convey a sense of urgency to vessel operators regarding the presence of OBD-M malfunctions.

Upon fulfillment of the standardization processes referred to in subsection (g) below, a protocol for audio alert device activation shall be specified authorizing only discontinuous activation. A standardized notification format is necessary to facilitate consumer association of the audio alert pattern with the identification of an OBD-M malfunction independent of manufacturer or platform. OBD-M system designers are encouraged to cooperate fully with each other and the ARB early on in this endeavor to minimize the redesigning of OBD-M audio alert activation algorithms once a standardized protocol has been finalized.

(C) The diagnostic system shall store a diagnostic trouble code whenever the audio/visual alert device is activated. The diagnostic system shall activate the audio/visual alert device and shall store a diagnostic trouble code whenever the engine enters a default or "limp home" mode of operation. The diagnostic system shall activate the audio/visual alert device and shall store a diagnostic trouble code whenever the engine control system fails to enter closed-loop operation

(if employed) within an engine manufacturer specified minimum time interval.

- (2) Audio/visual alert device deactivation:
 - (A) *Misfire and Fuel System Malfunctions*: For *misfire or fuel system malfunctions*, the audio/visual alert device may be deactivated if the fault does not recur when monitored during three subsequent sequential operating cycles in which conditions are similar to those under which the malfunction was first determined.
 - (B) *All Other Malfunctions*: For all other faults, the audio/visual alert device may be deactivated after three subsequent sequential operating cycles during which the monitoring system responsible for activating the audio/visual alert device functions without detecting the malfunction and if no other malfunction has been identified that would independently activate the audio/visual alert device according to the requirements outlined above.
- (3) Erasing a diagnostic trouble code: The diagnostic system may erase a diagnostic trouble code if the same fault is not re-registered in at least forty (40) engine warm-up cycles, and the audio/visual alert device is not activated for that diagnostic trouble code.
- (e) Tampering protection: Computer-coded engine operating parameters shall not be changeable without the use of specialized tools and procedures (e.g. soldered or potted computer components or sealed (or soldered) computer enclosures). Subject to Executive Officer approval, engine manufacturers may exempt from this requirement those product lines that are unlikely to require protection. Criteria to be evaluated in making an exemption include, but are not limited to, current availability of performance chips, high performance capability of the engine, and sales volume.
- (f) Certification documentation: The engine manufacturer shall submit the following documentation for each engine family at the time of certification. With Executive Officer approval, one or more of the documentation requirements specified in this section may be waived or altered if the information required would be redundant or unnecessarily burdensome to generate:
 - (1) A written description of the functional operation of each monitoring strategy within the diagnostic system.

- (2) A table providing the following information for each monitored component or system (either computer-sensed or -controlled) of the emission control system:
 - (A) corresponding diagnostic trouble code.
 - (B) monitoring method or procedure for malfunction detection.
 - (C) primary malfunction detection parameter and its type of output signal.
 - (D) fault criteria limits used to evaluate output signal of primary parameter.
 - (E) other monitored secondary parameters and conditions (in engineering units) necessary for malfunction detection.
 - (F) monitoring time length and frequency of checks.
 - (G) criteria for activating the audio/visual alert device.
 - (3) A logic flowchart describing the general method of detecting malfunctions for each monitored emission-related component or system. To the extent possible, abbreviations in SAE J1930 "Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations, and Acronyms," May 1998, shall be used. J1930 is incorporated by reference herein. The information required in the ~~chart~~ table under (2) above may instead be included in this flow chart, provided all of the information required in (2) is included.
 - (4) A listing and block diagram of the input parameters used to calculate or determine calculated load values and the input parameters used to calculate or determine fuel trim values.
 - (5) Any other information determined by the Executive Officer to be necessary to demonstrate compliance with the requirements of this section.
- (g) Confirmatory testing: The ARB may perform confirmatory testing of engine manufacturers' diagnostic systems for compliance with requirements of this section in accordance with malfunction criteria submitted in the engine manufacturer's approved certification documentation. The ARB or its designee may install appropriately deteriorated or malfunctioning components in an otherwise properly functioning test engine (or simulate a deteriorated or malfunctioning component response) in order to test the fuel system, oxygen sensor, catalyst system, and misfire (if applicable) monitors for compliance with the applicable constraints in this section.

Diagnostic systems of a representative sample of engines that uniformly fail to meet the requirements of this section may be recalled for correction.

- (h) Standardization: ~~The spark ignition inboard and sterndrive marine industry, in cooperation with ARB, will develop and adhere to standardized specifications for the implementation of OBD-M, including diagnostics trouble code formats, communication, and scan tool protocols.~~ To ensure universal compatibility regarding diagnostic trouble code formats, communication protocols, and scan tool connectivity, OBD-M systems must incorporate the standardized conventions defined in the Society of Automotive Engineers (SAE) implementation guidance document J1939-05, issued February 2008, as well as the other standardized conventions referenced elsewhere in this section. Manufacturers may petition the Executive Officer to use updated versions of the referenced standardized conventions or the temporary employment of alternative conventions under the provisions of § 2442(g)(3).
- (i) Implementation schedule.
- (1) These OBD-M requirements, unless otherwise specified, shall be implemented beginning with the 2007 model year for engines complying with (a)(1) of this section, ~~and with the 2008 model year for engines complying with (a)(2) of this section,~~ and with the 2009 model year for engines complying with (a)(3) of this section.
- (2) All engine manufacturers shall meet these OBD-M requirements by the 2009 model year for engines complying with (a)(1) of this section, ~~and the 2010 model year for engines complying with (a)(2) of this section,~~ and the 2011 model year for engines complying with (a)(3) of this section.
- (3) The Executive Officer, upon receipt of an application from the engine manufacturer, may certify the engines in question even though said engines may not comply with one or more of the requirements of these subsections. Such certification is contingent upon the extent to which these requirements are satisfied overall on the engine applications in question and a demonstrated good-faith effort to meet these requirements in full by evaluating and considering the best available monitoring technology. Each incident of non-compliance will be recorded as a deficiency.
- (A) Engine manufacturers of non-complying systems shall be subject to fines pursuant to section 43016 of the California Health and Safety Code for each deficiency identified subject to the following limitations:

(i)
1. The specified fines shall apply to the third and subsequently identified deficiencies, with the exception that fines shall apply to all monitoring system deficiencies wherein a required monitoring strategy is completely absent from the OBD-M system; and

(ii)
2. Engine manufacturers may not carry over monitoring system deficiencies for more than two model years unless it can be adequately demonstrated that substantial engine hardware modifications and additional lead time beyond two years would be necessary to correct the deficiency, in which case the deficiency may be carried over for three model years.

(B) For the third deficiency and every deficiency thereafter identified in an engine model, the fines shall be in the amount of \$25 per deficiency per engine for non-compliance with any of the monitoring requirements specified in this section. Total fines per engine under this section shall not exceed \$250 per engine and shall be payable to the State Treasurer for deposit in the Air Pollution Control Fund.

NOTE: Authority cited: Sections 39515, 39600, 39601, 43013, 43018, 43104, and 44036.2, Health and Safety Code; Sections 27156 and 38395 Vehicle Code.
Reference: Sections 39002, 39003, 39667, 43000, 43004, 43008.6, 43013, 43016, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43204, and 44036.2, Health and Safety Code; Sections 27156, 38391, and 38395, Vehicle Code.

§ 2445.1. Defects Warranty Requirements for Model Year 2001 and Later Spark-Ignition Marine Engines.

(a) Applicability. This section applies to model year 2001 and later spark-ignition personal watercraft and outboard marine engines, and to model year 2003 and later spark-ignition ~~inboard~~ and sterndrive/inboard marine engines. The warranty period begins on the date the engine or equipment is delivered to an ultimate purchaser or first placed into service (e.g., a demonstration engine or watercraft).

(b) * * * * *

(c) * * * * *

(1) For model year 2001 and later spark-ignition personal watercraft and outboard marine engines, a period of 4 years or 250 hours of use, whichever first occurs ~~first~~.

(2) For model year 2003-2005 spark-ignition ~~inboard~~ and sterndrive/inboard marine engines, a period of 2 years.

(3) For model year 2006 and later spark-ignition ~~inboard~~ and sterndrive/inboard marine engines:

* * * * *

(e) * * * * *

~~(10)~~

(10) Evaporative System

(A) Carbon Canister(s)

(B) Fuel Tank(s)

(C) Purge Valve(s)

(11) Miscellaneous Items Used in Above Systems

(A) Hoses, clamps, fittings, tubing, sealing gaskets or devices, and mounting hardware

(B) Pulleys, belts and idlers

(C) Vacuum, temperature, check, and time sensitive valves and switches

(D) Electronic Controls

* * * * *

(g) Exclusions.

(1) * * * * *

(2) Engine manufacturers must warrant engines for the yearly warranty period specified in paragraph (c). For Outboard and Personal Watercraft engines, and for ~~inboard~~/sterndrive/inboard engines greater than 485 kilowatts, manufacturers may warrant engines for the hour warranty period if the engines:

(A) are equipped with hour meters; (an ECM-integrated hour meter for ~~inboard~~/sterndrive/inboard engines)

* * * * *

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

§ 2445.2. Emission Control Warranty Statements.

- (a) Each engine manufacturer must provide a verbatim copy of the following statement with each new 2001 model year and later spark-ignition personal watercraft and outboard marine engine and with each new 2003 model year and later spark-ignition ~~inboard and sterndrive~~/inboard marine engine, 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 engine manufacturer's name, optional) is (are) pleased to explain the emission control system warranty on your (model year) ~~(inboard, sterndrive)~~/inboard, outboard, or personal watercraft) engine. In California, new ~~(inboard, sterndrive)~~/inboard, outboard, or personal watercraft) engines must be designed, built and equipped to meet the State's stringent anti-smog standards. (Engine manufacturer's name) must warrant the emission control system on your ~~(inboard, sterndrive)~~/inboard, outboard, or personal watercraft) engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your ~~(inboard, sterndrive)~~/inboard, outboard or personal watercraft) engine.

Your emission control system may include parts such as the carburetor or fuel injection system, the ignition system, and catalytic converter. Also included may be hoses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, (engine manufacturer's name) will repair your ~~(inboard, sterndrive)~~/inboard, outboard or personal watercraft) engine at no cost to you, including diagnosis, parts and labor.

MANUFACTURER'S WARRANTY COVERAGE:

(For spark-ignition personal watercraft and outboard marine engines:) Select emission control parts from model year 2001 and later (outboard or personal watercraft) engines are warranted for 4 years, or for 250 hours of use, whichever first occurs ~~first~~.

(For 2003 - 2005 spark-ignition ~~inboard and sterndrive~~/inboard marine engines:) Select emission control parts from model year 2003 - 2005 ~~(inboard or sterndrive)~~/inboard) engines are warranted for 2 years.

(For 2006 - 2008 spark-ignition ~~inboard~~ and sterndrive/inboard marine engines certified according to Option 1 in Section 2442(b)(1):) Select emission control parts from model year 2006 - 2008 (~~inboard~~ or sterndrive/inboard) engines are warranted for 2 years.

(For 2006 - 2007 spark-ignition ~~inboard~~ and sterndrive/inboard marine engines certified according to Option 2 in Section 2442(b)(1):) Select emission control parts from model year 2006 - 2007 (~~inboard~~ or sterndrive/inboard) engines are warranted for 2 years.

(For 2008 spark-ignition ~~inboard~~ and sterndrive/inboard marine engines certified according to Option 2 in Section 2442(b)(1):) Select emission control parts from model year 2008 (~~inboard~~ or sterndrive/inboard) engines are warranted for 3 years or 480 hours, whichever first occurs.

(For 2009 and later spark-ignition ~~inboard~~ and sterndrive/inboard marine engines 373 kilowatts and less:) Select emission control parts from model year 2009 and later (~~inboard~~ or sterndrive/inboard) engines are warranted for 3 years or 480 hours, whichever first occurs.

(For 2009 and later spark-ignition ~~inboard~~ and sterndrive/inboard marine engines greater than 373 kilowatts, but less than or equal to 485 kilowatts:) Select electronic emission-related control parts from model year 2009 and later (~~inboard~~ or sterndrive/inboard) engines are warranted for 3 years or 480 hours, whichever first occurs. Select mechanical emission-related components are warranted for 3 years or 150 hours of operation, whichever first occurs.

(For 2009 and later spark-ignition ~~inboard~~ and sterndrive/inboard marine engines greater than 485 kilowatts:) Select electronic emission-related control parts from model year 2009 and later (~~inboard~~ or sterndrive/inboard) engines are warranted for 3 years or 480 hours, whichever first occurs. Select mechanical emission-related components are warranted for 1 year or 50 hours of operation, whichever first occurs.

However, warranty coverage based on the hourly period is only permitted for engines that are equipped with hour meters as defined in s 2441(a)(13) or their equivalent. If any emission-related part on your engine is defective under warranty, the part will be repaired or replaced by (engine manufacturer's name).

OWNER'S WARRANTY RESPONSIBILITIES:

– As the (~~inboard~~, sterndrive/inboard, outboard or personal watercraft) engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. (Engine manufacturer's name) recommends that you retain all receipts covering maintenance on your (~~inboard~~, sterndrive/inboard, outboard or personal watercraft) engine, but (engine manufacturer's name) cannot deny warranty solely for the lack of receipts or your failure to ensure the performance of all scheduled maintenance.

– As the (~~inboard~~, sterndrive/inboard, outboard or personal watercraft) engine owner, you should however be aware that (engine manufacturer's name) may deny you warranty coverage if your (~~inboard~~, sterndrive/inboard, outboard or personal watercraft) engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

– You are responsible for presenting your (~~inboard~~, sterndrive/inboard, outboard or personal watercraft) engine to a (engine manufacturer's name) distribution center as soon as a problem exists. The warranty repairs will be completed in a reasonable amount of time, not to exceed 30 days.

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

* * * * *

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

§ 2446. 2001 and Later Model Year Production-Line Test Procedures and Selective Enforcement Auditing Regulations for Spark-Ignition Marine Engines.

- (a) Applicability. This section applies to 2001 and later spark-ignition personal watercraft and outboard marine engines. The allowable methods of production-line testing are specified in subsections (b) and (c), unless the engine manufacturer can satisfactorily provide an alternate method that shows an equivalent assurance of compliance to that of subsection (b). The engine manufacturer must choose only one method for each model year and submit its method of production-line testing to the Executive Officer for approval no later than 90 days prior to the start of the subject model year production. The 2003 and later spark-ignition ~~inboard and sterndrive~~/inboard marine engines are only subject to the selective enforcement audit requirements specified within subsections (d) and (e) of this section. ~~Inboard and sterndrive engines certified using the provision in Section 2442(b)(2)(F) are exempt from this Section.~~

- (b) 2001 and Later Model Year Quality-Audit Production Line Test Procedures

* * * * *

(4) * * * * *

(B) * * * * *

~~(i)~~

1. The total production and sample size for each engine family.

~~(ii)~~

2. Engine identification numbers and explanation of the identification code.

~~(iii)~~

3. The applicable emissions standards or Family Emission Levels for each engine family.

~~(iv)~~

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

~~(v)~~
5. The exhaust emission data for HC+NO_x for each test engine or equipment. The data reported shall provide two significant figures beyond the number of significant figures in the applicable emission standard.

~~(vi)~~
6. The retest emissions data, as described in Paragraph ~~(v5.)~~ above for any engine or unit of equipment failing the initial test, and description of the corrective measures taken, including specific components replaced or adjusted.

~~(vii)~~
7. A statistical analysis of the quality-audit test results for each engine family stating:

~~1.~~
a. Number of engines or units of equipment tested.

~~2.~~
b. Average emissions and standard deviations of the sample for HC+NO_x.

~~(viii)~~
8. Every aborted test data and reason for the aborted test.

~~(ix)~~
9. The applicable quarterly report shall include the date of the end of the engine manufacturer's model year production for an engine family.

~~(x)~~
10. The required information for all engine families in production during the quarter regardless of sample size.

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

* * * * *

* * * * *

* * * * *

(c)

(1)

(A)

* * * * *

~~(i)~~

1.

For newly certified engine families: After two (2) engines are tested, the engine manufacturer will calculate the required sample size for the model year according to the Sample Size Equation in paragraph (c)(1)(B) of this section.

~~(ii)~~

2.

For carry-over engine families: After one engine is tested, the engine manufacturer must 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 (B) of this section.

~~(iii)~~

3.

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 quality-audit 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, P.O. Box 8001, 9528 Telstar Avenue, El Monte, CA, 91734-8001, before the start of production for the first year of production.

~~(iv)~~

4.

- a. Prior to the beginning of the 2001 model year, if an engine manufacturer cannot provide actual California sales data, it must provide its total production and an estimate of California sales at the end of the model year. The engine manufacturer must also provide supporting material for its estimate.
- b. For the 2001 and later model years, 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.

- (B) ~~(i)~~1. Engine manufacturers must 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 paragraph (c)(3)(C).

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

where:

- N = Required sample size for the model year.
- T₉₅ = 95% confidence coefficient. It is dependent on the actual number of tests completed, n, as specified in the table in paragraph (c)(1)(B)~~(i)~~2. of this section. It defines one-tail, 95% confidence intervals.
- FEL_{jx} = Family Emission Limit
- σ = Actual 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 actual sample
- n = The actual number of tests completed in an engine family

- ~~(i)~~2. Actual Number of Tests (n) and 1-tail Confidence Coefficients (t₉₅) are listed in Table 3 below:

Table 3

Actual Number of Tests (n) and 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

(iii)

3. An engine 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.

(iv)

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

(v)

5. An engine manufacturer must continue testing and updating each engine family's sample size calculations according to paragraphs (c)(1)(B)~~(i)~~1. through (c)(1)(B)~~(iv)~~4. of this section until a decision is made to stop testing as described in paragraph (c)(1)(B)~~(vi)~~6. of this section or a noncompliance decision is made pursuant to paragraph (c)(2)(A)~~(v)~~5. of this section.

(vi)

6. 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 actual sample size, n, and the sample mean, x, for each regulated pollutant is less than or equal to the FEL for that pollutant, the engine manufacturer may stop testing that engine family except as required by paragraph (c)(2)(A)~~(vi)~~6.

~~(vii)~~

7. If, at any time throughout the model year, the sample mean, \bar{x} , for any regulated pollutant is greater than the FEL, the engine manufacturer must continue testing that engine family at the appropriate maximum sampling rate.

~~(viii)~~

8. The maximum required sample size for an engine family (regardless of the required sample size, N , as calculated in paragraph (c)(1)(B)~~(i)~~1. of this section) is thirty (30) tests per model year.

~~(ix)~~

9. Engine manufacturers may elect to test additional randomly chosen engines. All additional randomly chosen engines tested in accordance with the testing procedures specified in the Test Procedures must be included in the Sample Size and Cumulative Sum equation calculations as defined in paragraphs (c)(1)(B)~~(i)~~1. and (c)(2)(A)~~(i)~~1. of this section, respectively.

* * * * *

(2)

* * * * *

(A)

* * * * *

~~(i)~~

1. Engine manufacturers must construct the following Cumulative Sum Equation for each regulated pollutant for each engine family. Test results used to calculate the variables in the Cumulative Sum Equation must be final deteriorated test results as defined in paragraph (c)(3)(C).

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

where:

C_i = The current Cumulative Sum statistic

C_{i-1} = The previous Cumulative Sum statistic. Prior to any testing, the Cumulative Sum statistic = 0 (i.e., $C_0 = 0$)

- X_i = The current emission test result for an individual engine
- FEL_{jx} = Family Emission Limit
- F = $0.25 \times \sigma$

After each test, C_i is compared to the action limit, H , the quantity that the Cumulative Sum statistic must exceed, in two (2) consecutive tests, before the engine family may be determined to be in noncompliance for purposes of paragraphs (a)(2)(A)(iv)~~4~~4. and (a)(2)(A)(v)~~5~~5.

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

~~(ii)~~

2. After each engine is tested, the Cumulative Sum statistic must be promptly updated according to the Cumulative Sum Equation in paragraph (c)(2)(A)(i)~~1~~1 of this section.

~~(iii)~~

3. If, at any time during the model year, an engine manufacturer amends the application for certification for an engine family as specified in Part I, section 28 or 29 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, or the use of a different deterioration factor), all previous sample size and Cumulative Sum statistic calculations for the model year will remain unchanged.

~~(iv)~~

4. A failed engine is one whose final deteriorated test results pursuant to paragraph (c)(3)(C), for a regulated pollutant exceeds the FEL for that pollutant.

~~(v)~~

5. An engine family may be determined to be in noncompliance if, at any time throughout the model year, the Cumulative Sum statistic, C_i , for a regulated pollutant is greater than the action limit, H , for two (2) consecutive tests.

(vi)

6. The engine manufacturer must perform a minimum of two tests per engine family per quarter, regardless of whether the conditions of paragraph (c)(1)(B)(vi)6. have been met. The Executive Officer may waive the requirement of this paragraph if the engine manufacturer does not have a failing engine family in the prior two model years of testing.

(vii)

7. All results from 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).

(viii)

8. 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 working days. Corrective action will be taken as noted in paragraph (c)(4)(E).

(ix)

9. If an engine 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.

* * * * *

(3)

* * * * *

(D) If, at any time during the model year, the Cumulative Sum statistic exceeds the applicable action limit, H, in two (2) consecutive tests, the engine family may be determined to be in noncompliance and the engine manufacturer must notify the Chief of the Mobile Source Operations Division ~~and the Manager of the New Vehicle Audit Section, P.O. Box 8001, 9528 Telstar Avenue, El Monte, CA, 91734-8001,~~ within ten working days of such exceedance by the Cumulative Sum statistic.

(E)

* * * * *

(i)

1. The location and description of the engine manufacturer's or other's exhaust emission test facilities that were utilized to conduct testing reported pursuant to this section;

- (ii)
2. Total production and sample sizes, N and n, for each engine family;
- (iii)
3. The applicable emissions standards for each engine family;
- (iv)
4. A description of the process to obtain engines on a random basis;
- (v)
5. A description of the test engines or equipment (i.e., date of test, engine family, engine size, engine or equipment identification number, fuel system, dynamometer power absorber setting in horsepower or kilowatts, engine code or calibration number, and test location);
- (vi)
6. The date of the end of the engine manufacturer's model year production for each engine family;
- (vii)
7. For each test conducted,
 - a. A description of the test engine, including:
 - 1.
 - (i) Configuration and engine family identification,
 - 2.
 - (ii) Year, make, and build date,
 - 3.
 - (iii) Engine identification number and explanation of the identification code, and
 - 4.
 - (iv) Number of hours of service accumulated on engine prior to testing;
 - b. Location where service accumulation was conducted and description of accumulation procedure and schedule;
 - c. 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;

- d. The exhaust emission data for CO, NO_x and HC for each test engine or watercraft. The data reported must provide two (2) significant figures beyond the number of significant figures in the applicable emission standard.
- e. The retest emissions data, as described in paragraph (b)(4)(B)~~(vi)~~6. of this section, for any engine or watercraft failing the initial test, and description of the corrective measures taken, including specific components replaced or adjusted.
- f. A complete description of any adjustment, modification, repair, preparation, maintenance, and/or testing that 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;
- g. A Cumulative Sum analysis, as required in paragraph (c)(2)(A)~~(i)~~1. of this section, of the production line test results for each engine family;
- h. Any other information the Executive Officer may request relevant to the determination whether the new engines being manufactured by the engine manufacturer do in fact conform with the regulations with respect to which the Executive Order was issued;

~~(viii)~~

8. For each failed engine as defined in paragraph ~~(vii)~~7.d., above, a description of the remedy and test results for all retests;

~~(ix)~~

9. Every aborted test data and reason for the aborted test;

~~(x)~~

10. The start and stop dates of batch-produced engine family production; and

~~(xi)~~

11. The required information for all engine families in production during the quarter regardless of sample size.

* * * * *

- (d) Test Procedures Applicable to All Production-Line and Selective Enforcement Audit Testing.

* * * * *

- (3) * * * * *

(D) If an engine manufacturer determines that the emission test results of an engine or watercraft 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 for all production-line testing, or as required by the ~~Executive~~Executive Officer for selective enforcement audit testing.

* * * * *

- (5) * * * * *

- (A) The Executive Order is automatically suspended with respect to any engine failing pursuant to paragraph (b)(3)(D) or (c)(2)(A)~~(iv)~~4. or whose test results for a regulated pollutant exceed the emission standards effective from the time that testing of that engine is completed.
- (B) The Executive Officer may suspend the Executive Order for an engine family that is determined to be in noncompliance pursuant to paragraphs (b)(3)(C) or (c)(2)(A)~~(v)~~5. This suspension will not occur before fifteen (15) days after the engine family is determined to be in noncompliance.
- (C) If the results of testing pursuant to these regulations indicate that engines of a particular family produced at one plant of an engine 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 engine manufacturer at all other plants.
- (D) Notwithstanding the fact that engines described in the application for certification may be covered by an Executive Order, the Executive Officer may suspend such Executive Order immediately in whole or in part if the Executive Officer finds any one of the following infractions to be substantial:
- ~~(i)~~
1. The engine manufacturer refuses to comply with any of the requirements of this section.
 - ~~(ii)~~
2. The engine manufacturer submits false or incomplete information in any report or information provided to the Executive Officer under this section.
 - ~~(iii)~~
3. The engine manufacturer renders inaccurate any test data submitted under this section.
 - ~~(iv)~~
4. An ARB enforcement officer is denied the opportunity to conduct activities authorized in this section.
 - ~~(v)~~
5. An ARB enforcement officer is unable to conduct activities authorized in paragraph (d)(2) of this section

because an engine manufacturer has located its facility in a foreign jurisdiction where local law prohibits those activities.

- (E) The Executive Officer will notify the engine 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 (15) days from the time an engine family is determined to be in noncompliance pursuant to paragraph (d)(1), except that the Executive Order is immediately suspended with respect to any failed engines as provided for in paragraph (b)(3)(D) or (c)(2)(~~iv~~)4. of this section.
- (F) The Executive Officer may revoke an Executive Order for an engine family after the Executive Order has been suspended pursuant to paragraphs (d)(5)(B) or (C) of this section if the proposed remedy for the nonconformity, as reported by the engine manufacturer to the Executive Officer, is one requiring a design change or changes to the engine and/or emission control system as described in the application for certification of the affected engine family.
- (G) Once an Executive Order has been suspended for a failed engine, as provided for in paragraph (d)(5)(A) of this section, the engine manufacturer must take the following actions before the Executive Order is reinstated for that failed engine:
 - (~~i~~)
1. Remedy the nonconformity;
 - (~~ii~~)
2. Demonstrate that the engine conforms to its applicable FEL by retesting the engine in accordance with these regulations; and
 - (~~iii~~)
3. Submit a written report to the Executive Officer, after successful completion of testing on the failed engine, that contains a description of the remedy and test results for each engine in addition to other information that may be required by this part.
- (H) Once an Executive Order for a failed engine family has been suspended pursuant to paragraphs (d)(5)(B), (C) or (D) of this section, the engine manufacturer must take the following actions before the Executive Officer will consider reinstating the Executive Order:

(i)

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

(ii)

2. Demonstrate that the engine family for which the Executive Order has been suspended does in fact comply with the regulations of paragraphs (b) or (c), as applicable, by testing as many engines as needed so that the Cumulative Sum statistic, as calculated in paragraph (c)(2)(A)(i)1., falls below the action limit, or the average emissions from the Quality-Audit testing as calculated in paragraph (b)(3)(A) remains below the FEL, as applicable. Such testing must comply with the provisions of paragraphs (b) or (c), as applicable. If the engine manufacturer elects to continue testing individual engines after suspension of an Executive Order, the Executive Order 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 Executive Order pursuant to paragraph (d)(5)(F) of this section.

- (I) Once the Executive Order has been revoked for an engine family, if the engine manufacturer wants to introduce into commerce a modified version of that family, the following actions must be taken before the Executive Officer may issue an Executive Order for that modified family:

(i)

1. If the Executive Officer determines that the proposed change(s) in engine design may have an effect on emission performance deterioration, the Executive Officer will notify the engine manufacturer, within five (5) working days after receipt of the report in paragraph (d)(5)(H)(i)1. of this section, whether subsequent testing under this section will be sufficient to evaluate the proposed change or changes or whether additional testing will be required; and

(ii)

2. After implementing the change or changes intended to remedy the nonconformity, the engine manufacturer

must demonstrate that the modified engine family does in fact conform with the regulations of paragraphs (b) or (c), as applicable, by testing as many engines as needed from the modified engine family so that the Cumulative Sum statistic, as calculated in paragraph (c)(2)(A)~~(i)~~1., falls below the action limit, or the average emissions from the Quality-Audit testing as calculated in paragraph (b)(3)(A) remains below the FEL, as applicable. When this requirement is met, the Executive Officer will reissue the Executive Order or issue a new Executive Order, as the case may be, to include that family. The revocation of engine family executive orders issued based on Cumulative Sum testing results remains in effect as long as the Cumulative Sum statistic remains above the action limit.

- (J) At any time after the suspension of an Executive Order for a test engine under to paragraph (d)(5)(A) of this section, but not later than fifteen (15) days (or such longer 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 (d)(5)(B), (C) or (F) of this section, an engine manufacturer may request a hearing pursuant to subchapter 1.25, Title 17, California Code of Regulations, as to whether the tests have been properly conducted or any sampling methods have been properly applied.
- (K) Any suspension of an Executive Order under paragraph (d)(5)(D) of this section:

- ~~(i)~~
1. must be made only after the engine manufacturer concerned has been offered an opportunity for a hearing pursuant to subchapter 1.25, Title 17, California Code of Regulations, and;

- ~~(ii)~~
2. does not apply to engines no longer in the possession of the engine manufacturer.

* * * * *

(e) Selective Enforcement Auditing Regulations.

(1) Test Orders.

(A) A test order addressed to the engine manufacturer is required for any testing under paragraph (e).

(B) The test order is signed by the Executive Officer or his or her designee. The test order must be delivered in person by an ARB enforcement officer or ARB authorized representative to a company representative or sent by registered mail, return receipt requested, to the engine manufacturer's representative who signed the application for certification submitted by the engine manufacturer, pursuant to the requirements of the applicable portions of Title 13, California Code of Regulations, section 2447. Upon receipt of a test order, the engine manufacturer must comply with all of the provisions of this subsection and instructions in the test order.

(C) Information included in test order.

~~(i)~~

1. The test order will specify the engine family to be selected for testing, the engine manufacturer's engine assembly plant or associated storage facility or port facility (for imported engines) from which the engines must be selected, the time and location at which engines must be selected, and the procedure by which engines of the specified family must be selected. The test order may specify the configuration to be audited and/or the number of engines to be selected per day. Engine manufacturers are required to select a minimum of four engines per day unless an alternate selection procedure is approved pursuant to paragraph (e)(2)(A), or unless total production of the specified configuration is less than four engines per day. If total production of the specified configuration is less than four engines per day, the engine manufacturer selects the actual number of engines produced per day.

~~(ii)~~

2. The test order may include alternate families to be selected for testing at the Executive Officer's discretion in the event that engines of the specified family are not available for testing because those engines are not being manufactured during the specified time or are not being

stored at the specified assembly plant, associated storage facilities, or port of entry.

~~(iii)~~

3. If the specified family is not being manufactured at a rate of at least two (2) engines per day in the case of engine manufacturers specified in paragraph (e)(4)(G)(i) of this section, or one engine per day in the case of engine manufacturers specified in paragraph (e)(4)(G)(ii) of this section, over the expected duration of the audit, the Executive Officer or her or his designated representative may select engines of the alternate family for testing.

~~(iv)~~

4. In addition, the test order may include other directions or information essential to the administration of the required testing.

- (D) An engine manufacturer may submit a list of engine families and the corresponding assembly plants, associated storage facilities, or (in the case of imported engines) port facilities from which the engine manufacturer prefers to have engines selected for testing in response to a test order. In order that an engine manufacturer's preferred location be considered for inclusion in a test order for a particular engine family, the list must be submitted prior to issuance of the test order. Notwithstanding the fact that an engine manufacturer has submitted the list, the Executive Officer may order selection at other than a preferred location.
 - (E) Upon receipt of a test order, an engine manufacturer must proceed in accordance with the provisions of paragraph (e).
- (2) Testing by the Executive Officer.
- (A) The Executive Officer may require by test order under paragraph (e)(1) that engines of a specified family be selected in a manner consistent with the requirements of paragraph (e)(3) and submitted to the Executive Officer at the place designated for the purpose of conducting emission tests. These tests will be conducted in accordance with paragraph (e)(4) to determine whether engines manufactured by the engine manufacturer conform with the regulations with respect to which the certificate of conformity was issued.

(B) Designating official data.

~~(i)~~

1. Whenever the Executive Officer conducts a test on a test engine or the Executive Officer and engine manufacturer each conduct a test on the same test engine, the results of the Executive Officer's test are the official data for that engine.

~~(ii)~~

2. Whenever the engine manufacturer conducts all tests on a test engine, the engine manufacturer's test data are accepted as the official data, provided that if the Executive Officer makes a determination based on testing conducted under paragraph (e)(2)(A) of this section that there is a substantial lack of agreement between the engine manufacturer's test results and the Executive Officer's test results, no engine manufacturer's test data from the engine manufacturer's test facility will be accepted for purposes of this subsection.

(C) If testing conducted under paragraph (e)(1) is unacceptable under paragraph (B)~~(i)~~2. of this subsection, the Executive Officer must:

~~(i)~~

1. Notify the engine manufacturer in writing of the Executive Officer's determination that the test facility is inappropriate for conducting the tests required by this subsection and the reasons therefore; and

~~(ii)~~

2. Reinstate any engine manufacturer's data upon a showing by the engine manufacturer that the data acquired under paragraph (e)(2) were erroneous and the engine manufacturer's data was correct.

(D) The engine manufacturer may request in writing that the Executive Officer reconsider the determination in paragraph (B)(ii) of this section based on data or information indicating that changes have been made to the test facility and these changes have resolved the reasons for disqualification.

- (3) Sample selection.
- (A) Engines comprising a test sample will be selected at the location and in the manner specified in the test order. If an engine manufacturer determines that the test engines cannot be selected in the manner specified in the test order, an alternative selection procedure may be employed, provided the engine manufacturer requests approval of the alternative procedure before starting test sample selection, and the Executive Officer approves the procedure.
 - (B) The engine manufacturer must produce and assemble the test engines of the family selected for testing using its normal production and assembly process for engines to be distributed into commerce. If, between the time the engine manufacturer is notified of a test order and the time the engine manufacturer finishes selecting test engines, the engine manufacturer implements any change(s) in its production or assembly processes, including quality control, which may reasonably be expected to affect the emissions of the engines selected, then the engine manufacturer must, during the audit, inform the Executive Officer of such changes. If the test engines are selected at a location where they do not have their operational and emission control systems installed, the test order will specify the manner and location for selection of components to complete assembly of the engines. The engine manufacturer must assemble these components onto the test engines using normal assembly and quality control procedures as documented by the engine manufacturer.
 - (C) No quality control, testing, or assembly procedures will be used on the 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 pursuant to paragraph (B) of this subsection.
 - (D) The test order may specify that an ARB enforcement officer(s) or authorized representative(s), rather than the engine manufacturer, select the test engines according to the method specified in the test order.
 - (E) The order in which test engines are selected determines the order in which test results are to be used in applying the sampling plan in accordance with paragraph (e)(5).

(F) The engine manufacturer must keep on hand all untested engines, if any, comprising the test sample until a pass or fail decision is reached in accordance with paragraph (e)(5)(E). The engine manufacturer may ship any tested engine which has not failed the requirements as set forth in paragraph (e)(5)(B). However, once the engine manufacturer ships any test engine, it may not conduct retests as provided in paragraph (e)(4)(I).

(4) Test procedures.

- (A) (i) 1. For spark-ignition marine engines subject to the provisions of this subsection, the prescribed test procedures are the test procedures as specified in Part IV of the Test Procedures.
- (ii) 2. The Executive Officer may, on the basis of a written application by an engine manufacturer, prescribe test procedures other than those specified in paragraph (i)1. for any spark-ignition marine engine he or she determines is not susceptible to satisfactory testing using the procedures specified in paragraph (i)1.
- (B) (i) 1. The engine manufacturer may not adjust, repair, prepare, or modify the engines selected for testing and may not perform any emission tests on engines selected for testing pursuant to the test order unless this adjustment, repair, preparation, modification, and/or tests are documented in the engine manufacturer's engine assembly and inspection procedures and are actually performed or unless these adjustments and/ or tests are required or permitted under this subsection or are approved in advance by the Executive Officer.
- (ii) 2. The Executive Officer may adjust or cause to be adjusted any engine parameter that the Executive Officer determines subject to adjustment for certification and Selective Enforcement Audit testing in accordance with Part I, section 18 of the Test Procedures, to any setting within the physically adjustable range of that parameter, as determined by the Executive Officer in accordance with section 18, prior to the performance of any tests. However, if the idle speed parameter is one which the Executive Officer has determined to be subject to adjustment, the Executive Officer may not adjust it to any setting that causes a lower engine idle speed than would have been possible within the physically adjustable

range of the idle speed parameter if the engine manufacturer had accumulated 12 hours of service on the engine under paragraph (C) of this section, all other parameters being identically adjusted for the purpose of the comparison. The engine manufacturer may be requested to supply information needed to establish an alternate minimum idle speed. The Executive Officer, in making or specifying these adjustments, may consider the effect of the deviation from the engine manufacturer's recommended setting on emission 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 information from similar in-use engines.

(C) Service Accumulation. Before performing exhaust emission testing on a selective enforcement audit test engine, the engine manufacturer may accumulate on each engine a number of hours of service equal to the greater of 12 hours or the number of hours the engine manufacturer accumulated during certification on the emission data engine corresponding to the family specified in the test order.

~~(i)~~

1.

Service accumulation must be performed in a manner using good engineering judgment to obtain emission results representative of normal production engines. This service accumulation must be consistent with the new engine break-in instructions contained in the applicable owner's manual.

~~(ii)~~

2.

The engine manufacturer must accumulate service at a minimum rate of 6 hours per engine during each 24-hour period, unless otherwise approved by the Executive Officer.

- a. The first 24-hour period for service begins as soon as authorized checks, inspections, and preparations are completed on each engine.
- b. The minimum service accumulation rate does not apply on weekends or holidays.

- c. If the engine manufacturer's service or target is less than the minimum rate specified (6 hours per day), then the minimum daily accumulation rate is equal to the engine manufacturer's service target.

~~(iii)~~

3. Service accumulation must be completed on a sufficient number of test engines during consecutive 24-hour periods to assure that the number of engines tested per day fulfills the requirements of paragraphs (G)~~(i)~~1. and (G)~~(ii)~~2. below.

- (D) The engine manufacturer may not perform any maintenance on test engines after selection for testing, nor may the Executive Officer allow deletion of any engine from the test sequence, unless requested by the engine manufacturer and approved by the Executive Officer before any engine maintenance or deletion.
- (E) The engine manufacturer must expeditiously ship test engines from the point of selection to the test facility. If the test facility is not located at or in close proximity to the point of selection, the engine manufacturer must assure that test engines arrive at the test facility within 24 hours of selection. The Executive Officer may approve more time for shipment based upon a request by the engine manufacturer accompanied by a satisfactory justification.
- (F) If an engine cannot complete the service accumulation or an emission test because of a malfunction, the engine manufacturer may request that the Executive Officer authorize either the repair of that engine or its deletion from the test sequence.
- (G) Whenever an engine manufacturer conducts testing pursuant to a test order issued under this subsection, the engine manufacturer must notify the Executive Officer within one working day of receipt of the test order as to which test facility will be used to comply with the test order. If no test cells are available at a desired facility, the engine manufacturer must provide alternate testing capability satisfactory to the Executive Officer.

~~(i)~~

1. An engine manufacturer with projected spark-ignition marine engine sales for the California market for the applicable year of 20 or greater must complete emission testing at a minimum rate of two (2) engines per 24-hour period, including each voided test.

(ii)

2. An engine manufacturer with projected spark-ignition marine engine sales for the California market for the applicable year of less than 20 must complete emission testing at a minimum rate of one engine per 24-hour period, including each voided test.

(iii)

3. The Executive Officer may approve a lower daily rate of emission testing based upon a request by an engine manufacturer accompanied by a satisfactory justification.

(H) The engine manufacturer must perform test engine selection, shipping, preparation, service accumulation, and testing in such a manner as to assure that the audit is performed in an expeditious manner.

(I) Retesting.

(i)

1. The engine manufacturer may retest any engines tested during a Selective Enforcement Audit once a fail decision for the audit has been reached in accordance with paragraph (e)(5)(E).

(ii)

2. The Executive Officer may approve retesting at other times based upon a request by the engine manufacturer accompanied by a satisfactory justification.

(iii)

3. The engine manufacturer may retest each engine a total of three times. The engine manufacturer must test each engine or vehicle the same number of times. The engine manufacturer may accumulate additional service before conducting a retest, subject to the provisions of paragraph (C) of this paragraph (4).

(J) An engine manufacturer must test engines with the test procedure specified in Part IV of the Test Procedures to demonstrate compliance with the exhaust emission standard (or applicable FEL) for HC+NO_x. If alternate procedures were used in certification pursuant to Part 1, section 20(c) of the Test Procedures, then those alternate procedures must be used.

- (5) Compliance with acceptable quality level and passing and failing criteria for selective enforcement audits.
 - (A) The prescribed acceptable quality level is 40 percent.
 - (B) A failed engine is one whose final test results for HC+NO_x pursuant to paragraph (b)(3)(D) or (c)(2)(iv)4, as applicable, exceed the applicable family emission level or whose test results for a regulated pollutant exceed the emission standards.

* * * * *

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43105, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

Chapter 9. Off-Road Vehicles and Engines Pollution Control Devices

Article 7. Certification Procedures for Aftermarket Parts For Off-Road Vehicles, Engines, Equipment

§ 2474. Add-On Parts and Modified Parts.

* * * * *

(e) The executive officer may exempt add-on and modified parts based on an evaluation conducted in accordance with the "Procedures for Exemption of Add-On and Modified Parts for Off-Road Categories," adopted July 14, 2000, as last amended June 5, 2009, which is hereby incorporated by reference herein.

* * * * *

(i)(1) No person shall install, sell, offer for sale or advertise any used catalytic converter for off-road vehicles, engines, or equipment in California unless such catalytic converter has been exempted pursuant to the "Procedures for Exemption of Add-On and Modified Parts for Off-Road Categories," adopted July 14, 2000, as last amended June 5, 2009, which is hereby incorporated by reference herein.

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Note: Authority cited: Sections 39600, 39601, 43013 and 43018, Health and Safety Code. Reference: Sections 39002, 39003, 43000, 43000.5, 43013, 43017 and 43018, Health and Safety Code; and Sections 27156, 38391 and 38395, Vehicle Code.

§ 2448. ~~Sunset Review of the California Regulations for 2001 and Later Model Year Spark-Ignition Marine Engines. [Reserved.]~~

~~Within five years from the effective date of adoption or date of implementation, whichever comes later, the Air Resources Board, in consultation with the Secretary for Environmental Protection, shall review the provisions of this Article to determine whether they should be retained, revised or repealed.~~

~~Note: Authority cited: Sections 39600, 39601, 43013 and 43018, Health and Safety Code.~~

~~Reference: Sections 39600 and 39601, Health and Safety Code.~~

~~(Operative 01-07-2000)~~