

➡§ 2440. Applicability.

(a)(1) This article applies to model year 2001 and later spark-ignition marine engines, unless otherwise indicated.

(2) Every new spark-ignition marine engine 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, and which is subject to any of the standards prescribed in this article must be covered by an Executive Order, issued pursuant to this article.

(3) Spark-ignition 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.

(b) Each part of this article is severable, and in the event that any part of this chapter is held to be invalid, the remainder of this article remains in full force and effect.

(c)(1) For purposes of this article, military tactical vehicles or equipment means vehicles or equipment owned by the U.S. Department of Defense and/or the U.S. military services and used in combat, combat support, combat service support, tactical or relief operations, or training for such operations.

(2) This article shall not apply to engines used in off-road military tactical vehicles or equipment which have been exempted from regulations under the federal national security exemption, 40 CFR, subpart J, section 90.908, which is incorporated by reference herein. It shall also not apply to those vehicles and equipment covered by the definition of military tactical vehicle that are commercially available and for which a federal certificate of conformity has been issued under 40 CFR Part 91, subpart B, which is incorporated by reference herein.

(3) The U.S. Department of Defense shall submit to the ARB a list of all vehicles and equipment that are exempted under the above provisions and which are located in the State of California. If any additional vehicle and equipment types are added to the list during any calendar year, the U.S. Department of Defense shall update the list and submit it to the ARB by January 1 of the following year.

➡§ 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)	$P_{tx} < 4.3 \text{ kW}^1$	$P_{tx} \geq 4.3 \text{ kW}^1$
2001–2003	Not Applicable	81.00	$(0.25 \times (151 + 557/P_{tx}^{0.9})) + 6.0$
2004–2007	80	64.80	$(0.20 \times (151 + 557/P_{tx}^{0.9})) + 4.8$
2008 and Later ²	44	30.00	$(0.09 \times (151 + 557/P_{tx}^{0.9})) + 2.1$

1. For 2010 and subsequent model years, an engine or engine family's power category is based on maximum engine power; otherwise maximum rated power may be used.

2. For 2010 and subsequent model years, standards are measured in total hydrocarbons plus oxides of nitrogen.

Table 1.2

Outboard and Personal Watercraft Carbon Monoxide Standards

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

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_{jx} 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 of 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; (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, 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.

(A) For purposes of compliance under this paragraph, engine manufacturers must not corporate average outboard engine families in combination with personal watercraft engine families.

(B) 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 FEL(s).

(C) 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.

(D) The engine manufacturer's average HC+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.

(E) 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.

(F) For each model, the engine manufacturer shall submit California sales data ninety (90) days after the end of the model year.

(b) Model year 2003 and later model year spark-ignition sterndrive/inboard marine engines:

(1) Exhaust emissions from all new model year 2003 and later spark-ignition 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 Sterndrive/Inboard Marine Engine Standards

MODEL YEAR	POWER CATEGORY ¹ [kilowatts]	COMPLIANCE OPTION ²	DURABILITY [hours / years]	EXHAUST STANDARDS		SUPPLEMENTAL MEASURE ⁵
				HC ³ +NO _x [grams per kilowatt-hour]	CO [grams per kilowatt-hour]	
2003-2006	kW ≤ 373	N/A	N/A	16.0	AVE ⁶	None
2007	kW ≤ 373	OPT 1	N/A 480 / 10	16.0 (55%) 5.0 (45%)	AVE ⁶ FIXED	None
		OPT 2	N/A	14.0	FIXED	N/A Low-Permeation Fuel Line Hoses
2008	kW ≤ 373	OPT 1	N/A 480 / 10	16.0 (25%) 5.0 (75%)	AVE ⁶ FIXED	None
		OPT 2	480 / 10	5.0	FIXED	Low-Permeation Fuel Line Hoses
2009 and later	kW ≤ 373		480 / 10	5.0 ^{7,8}	FIXED	75.0 ^{7,9} Carryover ¹⁰

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
2. Once a manufacturer has chosen an option, that option must continue to be used exclusively across product lines
3. For 2010 and subsequent model years, standards are measured in total hydrocarbons plus oxides of nitrogen; however, the non-methane component of hydrocarbon may be substituted in prior years
4. Corporate averaging (AVE) may be used to demonstrate compliance with the exhaust emission standard, except where a FIXED standard is required
5. Supplemental measures may be different than shown, but must provide equal and verifiable emission reductions to those indicated
6. The corporate average calculation may be met with or without power weighting for these years
7. 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

10. The same or better supplemental emission control hardware used to 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

MODEL YEAR	POWER ^a CATEGORY [kilowatts]	DURABILITY [hours / years]	HC ^b +NO _x STANDARD [grams per kilowatt-hour]		CO STANDARD [grams per kilowatt-hour]
			Small Volume Manufacturers or Intermediate Volume Manufacturers that are not Qualified Intermediate Volume Manufacturers	Large Volume or Qualified Intermediate Volume Manufacturers	
2009–2010	373 < kW ≤ 485	150 ^c / 3	16.0 ^d	5.0 ^e	350.0 ^d
	kW > 485	50 ^e / 1	25.0 ^d		
2011 and later	373 < kW ≤ 485	150 ^c / 3	16.0 ^d	5.0 ^e	350.0 ^d
	kW > 485	50 ^e / 1	22.0 ^d		

^a For 2010 and subsequent model years, an engine or engine family's power category is based on maximum engine power; otherwise maximum rated power may be used

^b For 2010 and subsequent model years, standards are measured in total hydrocarbons plus oxides of nitrogen; however, the non-methane component of hydrocarbon may be substituted in prior years

^c For the purpose of durability testing, engine components that have been approved with an hourly warranty period shorter than the full hourly durability period per § 2445.1 (c)(3)(C)4. may be replaced at the specified warranty interval

^d These standards are fixed except that engine families certified under the discontinuation allowance in Title 13, California Code of Regulations, § 2442(g)(2) may continue to meet current certification levels for HC+NO_x over the engine's useful life provided that the manufacturer certifying such an engine family also certifies one or more engine families to family emissions limits sufficiently low to enable compliance on a corporate average basis

^e This standard may be met on a corporate average basis between high performance engines and/or between standard performance and high performance engines. Alternately, large volume manufacturers that produce high performance engines and qualified intermediate volume manufacturers may comply with the exhaust standards for small volume manufacturers provided a sufficient number of vessels with the manufacturer's standard performance engines are equipped with enhanced evaporative control systems as noted in Title 13, California Code of Regulations, § 2442(b)(5). Manufacturers must declare their intent to use this alternative prior to certifying engines for the 2009 model year and must continue to certify future model year engines using this alternative exclusively across product lines

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

(D) Production and sale of spark-ignition marine engines that result in noncompliance with the California standard for the model year shall cause an engine manufacturer to be subject to: revocation or suspension of Executive Orders for the applicable engine families; 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) For each engine family, the engine manufacturer shall submit the total number of engines produced for sale in California, or the total number of engines produced for sale nationally, ninety (90) days after the end of the model year.

(2) Evaporative Requirements for All High Performance Engine Manufacturers and Boat Manufacturers:

(A) For 2009 and subsequent model year engines, each engine manufacturer must provide written instructions, as part of the installation materials provided to boat manufacturers, to use enhanced evaporative control systems on any boat that is manufactured for sale, sold, or offered for sale in California, or that is introduced, delivered or imported into California for introduction into commerce. The engine manufacturer shall also provide evidence to the Executive Officer, as part of its application for certification, that the supplier(s) of the enhanced evaporative control system has designed the system components to meet or exceed the diurnal and permeation design specifications listed in Table 2.2 throughout the useful life of the engine.

Table 2.2 Sterndrive/Inboard Marine Evaporative Design Specifications

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

1. Fuel hoses and tank permeation testing requires fuel with 10% ethanol content.
 2. Diurnal testing requires fuel with 9 pounds per square inch (psi) Reid Vapor Pressure volatility and a 24-hour fuel temperature cycle.

(B) For 2009 and subsequent model year engines, each boat manufacturer must install an enhanced evaporative control system on every boat that is manufactured for sale, sold, or offered for sale in California that uses a high performance engine.

(3) Compliance with the standards on a corporate averaging basis is calculated as follows:

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

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 HC+NOx emission levels for engine family j in model year x .

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 HC+NOx exhaust emissions must meet the corporate average standard at the end of the engine manufacturer's production for the model year. At the end of the model year, the manufacturer must calculate a corrected corporate average using sales or eligible sales rather than projected sales.

(D) Production and sale of spark-ignition marine engines that result in noncompliance with the California standard for the model year shall cause an engine manufacturer to be subject to: revocation or suspension of Executive Orders for the applicable engine families; 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 engine manufacturer.

(E) For each engine family, the engine manufacturer shall submit California sales data within one hundred eighty (180) days after the end of the model year.

(4) Alternate Requirements for Standard Performance Manufacturers:

(A) Requirements of engine manufacturers and boat manufacturers under Option 2 and using Low Permeation Fuel Line Hose:

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.

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.

(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:

1. Whether the proposed supplemental measure would achieve reductions in HC+NO_x equivalent to using Low-Permeation Fuel Line Hoses,
2. The engine manufacturer's measures to ensure successful implementation of the proposed supplemental measure,
3. The durability of the proposed supplemental measure, and
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) x (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

<i>Pollutant</i>	<i>Subzone 1</i>	<i>Subzone 2</i>
HC+NO _x	1.50	1.00
CO	N/A	1.00

2. For two-stroke engine families certified without a catalytic converter, the values listed in Table 2.4 below shall apply. Compliance with the NTE Limits for these engine families shall be based on the weighted discrete mode emissions measurement method specified in Part I, section 20., paragraph (c) of the incorporated Test Procedures; or

Table 2.4

NTE Multipliers for Two-Stroke Engines without Catalysts

<i>Pollutant</i>	<i>All Test Points</i>
HC+NO _x	1.2
CO	1.2

3. For all other engine families that do not meet the criteria in (c)(1)(B)1. or (c)(1)(B)2. above, the values listed in Table 2.5 below shall apply across the applicable zone specified in Part I, section 20., paragraph (c) of the incorporated Test Procedures.

Table 2.5

NTE Multipliers for Four-Stroke Engines without Catalysts

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

(2) Each NTE Limit shall be rounded to the same number of decimal places as the applicable standard in Tables 1.1, 1.2, or 2.1(a) of § 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

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

1. The exhaust standard includes total hydrocarbons
2. Diurnal testing assumes a trailerable boat and requires fuel with 9 pounds per square inch (psi) volatility and a 24 hour fuel temperature cycle of 25.6 to 32.2 °Celsius
- 3 Fuel line permeation testing requires gasoline fuel with 10% ethanol content and must be performed at a test temperature of 23 ± 2 °Celsius
- 4 Fuel tank permeation testing requires gasoline fuel with 10% ethanol content and must be performed at a test temperature of 28 ± 2 °Celsius

(3) Spark-ignition marine engines certified to the voluntary standards are subject to the same in-use compliance and recall requirements as engines certified to the required exhaust and evaporative standards.

(e) 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."

(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.

(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.

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

(a) Purpose. The Air Resources Board recognizes that certain emissions-critical or emissions-related parts must be properly identified and maintained to ensure that engines meet the applicable emission standards. The purpose of this section is to require engine manufacturers to affix a label (or labels) on each production engine (or watercraft, as applicable) to provide the engine owner and service mechanic with information necessary for the proper maintenance of these parts in customer use. These specifications also require the engine manufacturer to permanently identify the engine with a unique identification number that will be used for enforcement purposes, including in-use testing.

(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 sterndrive/inboard marine engines, which have been certified to the applicable emission standards pursuant to Health and Safety Code section 43013;

(2) Engine manufacturers and original equipment manufacturers, as applicable, that have certified such engines; and

(3) Original equipment manufacturers, regardless of whether they have certified the engine, if their equipment obscures the emission control labels of such certified engines.

(c) Engine Label and Location.

(1) A legible label must be welded, riveted or otherwise permanently attached by the engine manufacturer to an area of the engine (e.g., block or crankcase) in such a way that it will be readily visible to the average person after installation of the engine in the watercraft. If such an attachment is not feasible, the Executive Officer may allow the label to be attached on components of the engine or watercraft assembly (as applicable) that satisfy the requirements of Subsection (c)(2)(A) or (c)(2)(B) below, as applicable. Such labels must be attached on all complete engine assemblies that are produced by an engine manufacturer.

(2) (A) Personal Watercraft and Outboard Engines. In selecting an acceptable location, the engine manufacturer must consider the possibility of accidental damage (e.g., possibility of tools or sharp instruments coming in contact with the label). Each engine label must be affixed in such a manner that it cannot be removed without destroying or defacing the label, and must not be affixed to any engine (or watercraft, as applicable) part that is likely to be replaced during the engine's (or watercraft's, as applicable) useful life or that is not integral to the engine's operation. The engine label must not be affixed to any engine (or watercraft, as applicable) component that is easily detached from the engine. If the engine manufacturer claims there is inadequate space to attach the label, the Executive Officer will determine a suitable location.

(B) Sterndrive/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.

(3) The engine label information must be written in the English language and use block letters (i.e., sans serif, uppercase characters) except for units of measurement, which may be sans serif, lower-case characters. The characters must be of a color that contrasts with the background of the label.

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

(A) The heading "EMISSION CONTROL INFORMATION."

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

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.

2. Approval under paragraph (4)(B)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.

(C) The statement, "THIS (WATERCRAFT'S ENGINE or ENGINE, as applicable) IS CERTIFIED TO OPERATE ON (specify operating fuel(s))."

(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.

(E) Any specific fuel or engine lubricant requirements (e.g., fuel-oil ratio(s), lead content, research octane number, engine lubricant type).

(F) Date of manufacture (day (optional), month and year).

(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.

(I) Engine displacement (in cubic centimeters, cubic inches, or liters) of the individual engine upon which the engine label is affixed.

(J) The maintenance specifications and adjustments recommended by the engine manufacturer, including, as applicable: valve lash, ignition timing, idle air/fuel setting procedure and value (e.g., idle speed drop), high idle speed and spark plug gap. These specifications must indicate the proper transmission position, if applicable, during tune-up and what accessories, if any, should be in operation, and what systems, if any (e.g., vacuum advance, battery, air pump), should be disconnected during the tune-up. If the engine manufacturer does not recommend adjustment of the foregoing specifications, the engine manufacturer may substitute in lieu of the specifications, the single statement, "NO OTHER ADJUSTMENTS NEEDED." For all engines, the instructions for tune-up adjustments must be sufficiently clear on the engine label to preclude the need for a mechanic or equipment owner to refer to another document in order to correctly perform the adjustments.

(5) If there is insufficient space on the engine to accommodate an engine label that contains all of the information required in Subsection (4) above, the Executive Officer may allow the engine manufacturer to modify the engine label in one or more of the following ways:

(A) Exclude the information required in Subsections (4)(C), (D) and (E) from the engine label. This information must be specified elsewhere on the engine, or in the owner's manual.

(B) Substitute the information required in Subsection (4)(J) with the statement, "REFER TO THE OWNER'S MANUAL FOR MAINTENANCE SPECIFICATIONS AND ADJUSTMENTS." When such a statement is used, the information required by Subsection (4)(J) must be specified in the owner's manual.

(C) Exclude the information required by Subsection (4)(F) on the engine label if the date the engine was manufactured is stamped or labeled permanently on the engine (e.g., within the serial number), and this date is readily visible.

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

Engines manufactured solely for use in sanctioned competition are not required to comply with the emission standards and other requirements. Manufacturers may incorporate the engine label to identify the engines as produced for competition according to the provisions in this subsection.

(1) A legible label must be welded, riveted or otherwise permanently attached by the engine manufacturer to an area of the engine in such a way that it will be readily visible to the average person after installation of the engine in the watercraft. If such an attachment is not feasible, the Executive Officer may allow the label to be attached on components of the engine that satisfy the requirements of Subsection (d)(2). Such labels must be attached on all complete engine assemblies that are produced by an engine manufacturer.

(2) 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.

(3) The engine label information must be written in the English language and use block letters (i.e., sans serif, uppercase characters) except for units of measurement, which may be sans serif, lower-case characters. The characters must be of a color that contrasts with the background of the label.

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

(A) The heading "EMISSION CONTROL INFORMATION."

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

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.

2. Approval under paragraph (4)(B)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.

(C) Date of manufacture (day (optional), month and year).

(D) An unconditional statement of noncompliance with the appropriate model year California regulations. For example, "THIS ENGINE DOES NOT CONFORM TO (model year) CALIFORNIA EMISSION REGULATIONS FOR SPARK-IGNITION MARINE ENGINES AND MAY NOT BE INSTALLED ON A BOAT FOR ANY PURPOSE OTHER THAN COMPETITION."

(E) Engine displacement (in cubic centimeters, cubic inches, or liters) of the individual engine upon which the engine label is affixed.

(e) An engine label may state that such engine conforms to any other applicable state or federal emission standards for new spark-ignition marine engines, or any other information that the engine manufacturer deems necessary for, or useful to, the proper operation and satisfactory performance of the engine.

(f) Engine identification number. Each engine must have a legible, unique engine identification number permanently affixed to or engraved on the engine.

(g) Supplemental Engine Label Content and Location for Personal Watercraft and Outboard Engines only.

(1) When a final engine, equipment, or watercraft assembly that is marketed to any ultimate purchaser is manufactured and the engine label affixed by the engine manufacturer is not readily visible, the manufacturer of the final engine, equipment or watercraft assembly (i.e., original equipment manufacturer) must affix a supplemental engine label upon the engine, equipment or watercraft. The supplemental label must be made of plastic or metal, and must be welded, riveted or otherwise affixed permanently to an area of the engine, equipment or watercraft so as to be readily visible.

(2) The original equipment manufacturer required to affix a supplemental label must consider the possibility of accidental damage to the supplemental engine label in the determination of the label location. Such a label must not be attached to any engine, equipment or watercraft component that is likely to be replaced during the useful life of the engine, equipment or watercraft (as applicable), and/or is not integral to the engine's operation. Such a label must not be attached to any engine or equipment component that is easily detached from the engine, equipment or watercraft (as applicable).

(3) The supplemental engine label must conform to the engine label requirements in Subsections (c)(3) and (4), except that the date of manufacture specified in Subsection (c)(4)(F) may be deleted from the supplemental engine label. When the date of engine manufacture does not appear on the supplemental engine label, the responsible original equipment manufacturer must display (e.g., label, stamp, etc.) the date elsewhere on the engine, equipment or watercraft so as to be readily visible. The original equipment manufacturer must also display the engine identification number elsewhere on the engine that is readily visible if the original number is obscured by the equipment manufacturer's equipment.

(h) As used in this section, readily visible means that a label is readable by an average person from a distance of 46 centimeters (18 inches) without any obstructions from equipment, watercraft or engine parts (including all engine manufacturer or original equipment manufacturer (as applicable) available optional equipment) except for flexible parts (e.g., vacuum hoses, ignition wires) that can be moved out of the way without disconnection. Alternatively, the label and engine identification information required by these specifications must be no smaller than two (2) millimeters in height (with the exception of units of measurement) provided that no equipment or engine parts (including all engine manufacturer available optional equipment), except for flexible parts, obstruct the label(s).

(i) The label(s), engine identification number(s) and any adhesives used must be designed to withstand, for the engine's or watercraft's useful life, typical environmental conditions in the area where the label(s) required by this section are affixed. Typical equipment environmental conditions include, but are not limited to, exposure to extreme heat or cold, engine fuels, lubricants and coolants (e.g., gasoline, motor oil, saltwater, ethylene glycol). The engine manufacturer must submit, with its certification application, a statement attesting that its labels and engine identification numbers comply with these

requirements.

(j) The engine manufacturer must obtain approval from the Executive Officer for all label and engine identification number formats and locations in conjunction with the engine family certification. Approval of specific maintenance settings on labels is not required; however, the format for all such setting and tolerances, if any, is subject to review. If the Executive Officer finds that the information on the label or engine identification number is vague or subject to misinterpretation, or that the location does not comply with these specifications, the Executive Officer may require that the label(s), engine identification number(s) or location(s) be modified accordingly.

(k) Samples of all actual production labels used within an engine family must be submitted to the Executive Officer within thirty days after the start of production. Engine manufacturers must provide samples of their own applicable production labels, and samples of applicable production original equipment manufacturer labels that are accessible to the engine manufacturers due to the direct market arrangement between such manufacturers.

(l) The Executive Officer may approve alternate label and engine identification number locations. The Executive Officer may also, upon request, waive or modify the label content requirements provided that the intent of this section is met.

(m)(1) If the Executive Officer finds any engine manufacturer using labels and engine identification numbers that are different from those approved or do not substantially comply with the readability or durability requirements set forth in these specifications, the engine manufacturer will be subject to revocation or suspension of Executive Orders for the applicable engine families and subject to being enjoined 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. Additional penalties may be assessed to the extent permissible under Part 5, Division 26 of the Health and Safety Code. Before seeking remedial action against the engine manufacturer, the Executive Officer will consider any information provided by the engine manufacturer.

(2) If the Executive Officer finds any original equipment manufacturer using labels for which it has responsibility for attaching that are different from those approved or that do not substantially comply with the readability or durability requirements set forth in these specifications, the equipment manufacturer will be subject to being enjoined from any further sales or distribution, of applicable equipment product line that uses noncompliant labels in the State of California pursuant to section 43017 of the Health and Safety Code. Additional penalties may be assessed to the extent permissible under Part 5, Division 26 of the Health and Safety Code. Before seeking remedial action against the equipment manufacturer, the Executive Officer will consider any information provided by the equipment manufacturer.

(a) Purpose. The purpose of this section is to require engine manufacturers to affix a single label on each production spark-ignition marine engine (or watercraft, as applicable) that provides potential engine owners, engine owners, and enforcement personnel with information on the relative cleanliness of the engine under the Air Resources Board's standards.

(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 sterndrive/inboard marine engines, which have been certified to the applicable emission standards pursuant to Health and Safety Code section 43013;

(2) Federally certified spark-ignition marine engines produced prior to model year 2001 that comply with the emission standards pursuant to section 2442; and

(3) Spark-ignition personal watercraft and outboard marine engines produced prior to model year 2001 and shown by the manufacturer to comply with the emission standards pursuant to section 2442.

(c) If an engine manufacturer has certified a spark-ignition marine engine family to an FEL at or below the exhaust emission standard designated in section 2442(a), Table 1, the engine manufacturer (or equipment/watercraft manufacturer who uses such engines) must label each new engine within the engine family as a compliant engine pursuant to this section. If the engine family fails in-use compliance and/or production line testing and corrective action is not taken within thirty (30) days, the engine manufacturer must cease representation of any engines within the family as compliant engines. In this case, corrective action refers only to physical changes made to bring the engine into compliance with its original FEL. Spark-ignition marine engines as described in paragraph (b)(2) may be labeled pursuant to the provisions of this section before the 2001 model year if such engines comply with Title 40, Code of Federal Regulations, Part 91 [October 4, 1996], which is incorporated herein by reference. Spark-ignition marine engines as described in paragraph (b)(3) may be labeled pursuant to the provisions of this section before the 2001 model year if such engines are tested using certification test procedures plus a thirty (30) percent deterioration factor, as applicable. Alternative demonstrations of emissions performance may be used for engines described in paragraphs (b)(2) and (b)(3) if the engine manufacturer demonstrates to the Executive Officer's satisfaction that the emissions performance is representative of actual emissions for the engine family. Any use of the label described below counter to the requirements set forth herein violates this section and may subject the engine manufacturer to penalties as permitted by Part 5, Division 26 of the Health and Safety Code.

(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:

1. Oval shape;

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;

3. Watermark

(i) For all except five star labels, a 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

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 (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):

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.
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.
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.
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
5	2.5	2.5

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

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)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 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.

(3) The labels and any adhesives used must be designed to withstand, for the engine's or watercraft's useful life, typical environmental conditions in the area where the labels required by this section are affixed. Typical equipment environmental conditions include, but are not limited to, exposure to extreme heat or cold, moisture, engine fuels, lubricants and coolants (e.g., gasoline, motor oil, saltwater, ethylene glycol). The engine manufacturer must submit, with its certification application, a statement attesting that its labels and engine identification numbers comply with these requirements.

(4) For Personal Watercraft and Outboard Marine Engines:

(A) Labels must be affixed to new watercraft or engines by the engine manufacturer or the original equipment manufacturer. If affixed by the original equipment manufacturer, the engine manufacturer remains the ultimate party responsible for ensuring that the labels are correctly administered. Improper labeling or distribution of labels will subject the engine manufacturer to penalties as described in paragraph (h).

(B) Labels on engines or watercraft described in paragraphs (b)(2) and (b)(3) may be applied by either the engine manufacturer, the original equipment manufacturer, distributors or dealers. However, the engine manufacturer remains the ultimate party responsible for ensuring that the labels are correctly administered. Improper labeling or distribution of labels will subject the engine manufacturer to penalties as described in paragraph (h). If the labels are applied by the distributor or dealer, the engine

manufacturer must include its name and a serial number on the lower portion of the label as shown in Figure 1. The format of the serial number will be two alpha characters followed by five numeric characters (e.g., AA12345). The serial numbers must be recorded by the distributor or dealer and reported to the manufacturer of the engine when installed on a pre-2001 model year watercraft or engine. These numbers must be made available to the Executive Officer upon request.

(5) For Sterndrive/Inboard Marine Engines:

(A) Labels on Engines. Labels must be affixed to new engines by the engine manufacturer. The engine manufacturer is responsible for ensuring that appropriate environmental labels are properly applied to its engines. Improper labeling or distributing of labels will subject the engine manufacturer to penalties as described in paragraph (h) of this section.

(B) Labels on Watercraft. Labels must be affixed to the port side of watercraft by the watercraft/original equipment manufacturer. The watercraft/original equipment manufacturer is responsible for ensuring that appropriate labels are properly applied to its watercraft. Improper labeling or distributing of hull environmental labels will subject the watercraft/original equipment manufacturer to penalties as described in paragraph (h).

Engine manufacturers are responsible for providing labels that correspond with the engine for all engines supplied to watercraft/original equipment manufacturers. Engine manufacturers also are responsible for providing to the watercraft/original equipment manufacturers instructions regarding label selection and placement. Failure to provide appropriate labels and instructions to the watercraft/original equipment manufacturer will subject the engine manufacturer to penalties as described in paragraph (h) of this section.

(d) If the engine or watercraft cannot be adequately labeled under the requirements of paragraph (c), the engine manufacturer may request modification of these requirements from the Executive Officer.

(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).

(f) Samples of all labels produced pursuant to this section must be submitted to the Executive Officer with the applicable certification application.

(g) Engines that are labeled in accordance with this section and subsequently modified with add-on or modified parts that are not exempted by the Executive Officer are subject to label removal by an ARB Enforcement Officer or other authorized party.

(h) If the Executive Officer finds any engine manufacturer using labels for which it has responsibility for attaching that are different from those approved or that do not

substantially comply with the discernibility or durability requirements set forth in these specifications, the engine manufacturer will be subject to being enjoined from any further sales or distribution of applicable equipment product line that uses noncompliant labels in the State of California pursuant to section 43017 of the Health and Safety Code. If the Executive Officer finds any engines or watercraft with labels that are not affixed in accordance with paragraph (c)(1)(B), the engine manufacturer or watercraft/original equipment manufacturer that was responsible for label placement must remove the labels from all affected watercraft and engines and will be subject to being enjoined from any further sales or distribution, of applicable equipment product line that uses noncompliant labels in the State of California pursuant to section 43017 of the Health and Safety Code. Additional penalties may be assessed to the extent permissible under Part 5, Division 26 of the Health and Safety Code. Before seeking remedial action against the engine or equipment manufacturer, the Executive Officer will consider any information provided by the engine or equipment manufacturer.

➡§ 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 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 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:



(<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 identified engines that meet the Air Resources Voluntary Standards for spark-ignition marine engines. Engines meeting these standards have 50% lower emissions than the 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) Facsimiles of the four environmental labels, as described in section 2443.2(c)(1), with the appropriate label circled or otherwise identified as being applicable to the spark-ignition marine engine, must be displayed on the nonpermanent label. Each facsimile must have dimensions no less than one inch by four-fifths inch.

(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)1. and 2. need to be displayed on the nonpermanent label until the earlier of:

(A) the 2004 model year; or

(B) the first model year after the date the ARB certifies the first outboard engine family greater than 130 horsepower to the 2008 model year standards.

(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)1. and 2. need to be displayed on the nonpermanent label until the earlier of:

(A) the 2004 model year; or

(B) the first model year after the date the ARB certifies the first personal watercraft engine family to the 2008 model year standards.

(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:

(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) The information required by paragraph (b) must also be provided in the owner's manual and in the engine manufacturer's application for certification.

(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.

➡§ 2444. In-Use Compliance Testing and Recall Regulations - Model Year 2001 and Later Spark-Ignition Marine Engines. [Renumbered]

➡§ 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 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) Manufacturer In-Use Compliance Test Procedures.

(1) For the purposes of this section, the Air Resources Board will accept emission data collected from the in-use testing program implemented by the United States Environmental Protection Agency as specified in Title 40, Code of Federal Regulations, section 91.803 [October 4, 1996], which is incorporated herein by reference.

(2) The Executive Officer, may, upon notice to the engine manufacturer and after review of the engine families identified by the United States Environmental Protection Agency for federal in-use testing, prescribe that a California-specific in-use testing program be conducted pursuant to paragraph (b)(3) at the engine manufacturer's expense if:

(A) The results obtained from the federal in-use test program pursuant to paragraphs (b)(1) of this section are determined not to be representative of engines sold and operated in California; or,

(B) The necessity is supported by other data or information (e.g., California-only engine families).

(3) California In-Use Testing Program.

(A) The Executive Officer shall identify engine families and those configurations within families offered for sale in California that the engine manufacturer must then subject to in-use testing for the specified model year. The number of engine families identified shall not exceed 25 percent of the engine manufacturer's families offered for sale in California. The Executive Officer may allow for reduced testing upon the engine manufacturer's demonstration of consistent compliance with the applicable emission standards.

(B) Number of Engines to be Tested. The number of engines to be tested by an engine manufacturer must be determined by the following method:

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.

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.

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.

(C) At the discretion of the Executive Officer, an engine manufacturer may test more engines than the minimums described in paragraph (b)(3)(B) or may concede failure before testing a total of ten engines.

(D) The Executive Officer will consider failure rates, average emission levels and the existence of any defects among other factors in determining whether to pursue remedial action under this subsection. The Executive Officer may request an ordered recall pursuant to paragraph (e)(2)

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

1. engine family production in California is less than or equal to 20 per year; or
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
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) Collection of In-Use Engines. The engine manufacturer shall procure in-use engines that have been operated between half and three-quarters of the engine's useful life. For purposes of paragraph (b) only, "useful life" means ten (10) years or 350 hours of operation for outboard engines and five (5) years or 350 hours of operation for personal watercraft engines. The engine manufacturer may test engines from more than one model year in a given year. The engine manufacturer shall begin testing within twelve (12) months after receiving notice that the Executive Officer has identified a particular engine family for testing and shall complete testing within twelve months from the start of such testing. Test engines may be procured from sources associated with the engine manufacturer (i.e., manufacturer-established fleet engines, etc.) or from sources not associated with the engine manufacturer (i.e., consumer-owned engines, independently-owned fleet engines, etc.).

(G) Maintenance, Procurement and Testing of In-Use Engines.

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.
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.
 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.
 4. The Executive Officer may waive portions or requirements of the test procedures, if any, that are not necessary to determine in-use compliance.
 5. If a selected in-use engine fails to comply with any applicable emission 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.

(c) Reports and Evaluation

- (1) The engine manufacturer must maintain and submit sufficient records to the Executive Officer within three months of completing testing from the in-use program. These records must include, but need not be limited to, the following for each test engine:
 - (A) Engine family.
 - (B) Engine model.
 - (C) Engine identification (or serial) number.
 - (D) Date of manufacture.
 - (E) Estimated hours of use.
 - (F) Date and time of each test attempt.
 - (G) Results (if any) of each test attempt.
 - (H) Results of all emission testing.
 - (I) Summary of all maintenance and/or adjustments performed.

(J) Summary of all modifications and/or repairs.

(K) Determinations of noncompliance and probable causes of failure.

(L) Description of operating and storage conditions.

(2) If the results of the in-use emission tests indicate that the average emissions of the test engines for any regulated pollutant exceed the applicable emission standards specified in Title 13, California Code of Regulations, section 2442, the entire engine population so represented shall be deemed to exceed the standards. The Executive Officer shall notify the engine manufacturer of the test results and upon receipt of the notification, the engine manufacturer has 45 days to submit a plan to make up all excess emissions resulting from in-use testing non-compliance in accordance with paragraph (c)(3). If excess emissions cannot be made up in accordance with paragraph (c)(3), the engine manufacturer must implement a voluntary recall plan in accordance with the applicable portions of paragraphs (d) and (e). If no excess emissions cannot be made up in accordance with paragraph (c)(3) and the engine manufacturer does not implement a voluntary recall plan, the Executive Officer may prescribe the implementation of an ordered recall pursuant to the applicable portions of paragraph (e)(2).

(3) All excess emissions resulting from in-use noncompliance with the California standard must be made up in the model year following the model year in which the notification of noncompliance is received. In-use noncompliance may not be remedied through implementation of the federal in-use credit program described in Title 40, Code of Federal Regulations, Part 91, Subpart N [October 4, 1996]. As an alternative to recall and with prior approval from the Executive Officer, the engine manufacturer may make up the excess emissions by any one or combination of the following options:

(A) Recertification of the noncompliant engine family to a lower emission level (or higher FEL) that makes up for the noncompliance, while maintaining compliance on a corporate average basis;

(B) Implementation of a running change and/or field fix on the noncompliant engine family;

(C) Implementation of market-based incentives, to be approved by the Executive Officer, to make up the noncompliance; or

(D) Payment of a noncompliance penalty to be determined by the Executive Officer on a per engine basis as provided by Part 5, Division 26 of the Health and Safety Code.

(d) Voluntary Emission Recalls.

(1) When an engine manufacturer initiates a voluntary emission recall campaign, the Executive Officer shall be notified of the recall at least thirty (30) days before owner notification is to begin. The engine manufacturer shall also submit a voluntary recall plan for approval, as described in paragraph (e) below. A voluntary recall plan shall be

deemed approved by the Executive Officer within thirty (30) days after receipt of the recall plan unless objected to in the interim.

(2)(A) When any engine manufacturer, based on enforcement test results or any other information provided to or required by the ARB, proposes to initiate a voluntary emission recall program, the engine manufacturer shall submit for approval by the Executive Officer an emission recall plan as described in paragraph (e) below. The plan shall be submitted within 45 days following the receipt of a notification from the ARB that enforcement test results or other information demonstrate an engine noncompliance.

(B) The Executive Officer shall approve the recall plan in writing if it contains the information specified in paragraph (e) where specified and is designed to notify the engine/watercraft owner and correct the noncompliance in an expeditious manner. Notification of engine/watercraft owners and the implementation of recall repairs shall commence no later than the schedule specified under paragraph (e)(1)(C) and (e)(1)(D), respectively, unless the engine manufacturer can show good cause for the Executive Officer to extend the deadline. If the plan does not contain the provisions of paragraph (e), the Executive Officer shall disapprove the plan in writing and require revisions where deemed necessary. The engine manufacturer may contest such a disapproval by requesting a hearing pursuant to Subchapter 1.25, Title 17, California Code of Regulations. If no request for a hearing is made or the hearing upholds the disapproval, the engine manufacturer shall incorporate all requested revisions to the plan and begin implementation of the recall plan within sixty (60) days of receipt of the disapproval.

(C) The engine manufacturer may also request a public hearing pursuant to the procedures set forth in Subchapter 1.25, Title 17, California Code of Regulations to contest the finding of nonconformity and the need for an ordered recall. If such a hearing occurs and the nonconformity is confirmed therefrom, the engine manufacturer shall submit the recall plan required by paragraph (e)(2) within thirty (30) days after receipt of the Board's decision unless an extension is granted by the Executive Officer.

(e) Voluntary and Ordered Recall Plans.

(1) The recall plan for voluntary and ordered recalls must be submitted to the Executive Officer for review and must contain the following information unless otherwise specified:

(A) A description of each class or category of engines recalled, including the number of engines to be recalled, the model year, and such other information as may be required to identify the engines recalled;

(B) A description of the specific modifications, alterations, repairs, corrections, adjustments or other changes to be made to correct the engines affected by the emission-related defect;

(C) A description of the method by which the engine manufacturer will notify engine/watercraft owners;

(D) A description of the procedure to be followed by engine/watercraft owners to obtain correction of the nonconformity. This may include the date on or after which the engine/watercraft owner can have the nonconformity corrected, the time reasonably necessary to perform the labor to correct the nonconformity and the designation of facilities at which the nonconformity can be remedied;

(E) A description of the class of persons other than dealers and authorized warranty agents of the engine manufacturer who will remedy the defect;

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

(G) A copy of the letter of notification to be sent to engine/watercraft owners; and

(H) A copy of all necessary instructions to be sent to those persons who are to perform the repair.

(2) For an ordered recall, the recall plan shall include the information required for voluntary recall plans as specified in paragraphs (e)(1). Additionally, it shall include the following:

(A) A plan describing how the maximum feasible capture rate will be achieved for recalls based on either the exceedance of emission standard or on the failure of an emission-related component.

(B) The plan shall also include a schedule for implementing actions to be taken including identified increments of progress towards implementation and deadlines for completion of each increment. If, after good faith efforts, the engine manufacturer cannot reach the maximum feasible capture rate by the applicable deadline, the engine manufacturer must propose mitigation efforts to be approved by the Executive Officer that will offset the emissions of the unrepaired engines.

(3) The engine manufacturer must not condition repair of the noncomplying engine/watercraft on the proper maintenance or use of the engine except for compelling reasons approved by the Executive Officer. The

engine manufacturer, however, is not obligated to repair a component which has been removed or modified.

(4) Record keeping and Reporting Requirements.

(A) The engine manufacturer shall report on the progress of the voluntary or ordered recall program by submitting a report one year from the date owner notification begins

and a final report an additional year later. Such reports shall be submitted to the Chief, Mobile Source Operations Division, P.O. Box 8001, 9528 Telstar Avenue, El Monte, CA 91734-8001. For each class of engine subject to the recall program, the yearly report shall contain:

1. Engine family and emission recall campaign number designated by the engine manufacturer.
2. Date engine/watercraft owner notification was begun, and date completed.
3. Number of engines involved in the voluntary or ordered recall campaign.
4. Number of engines known or estimated to be affected by the nonconformity and an explanation of how this number was determined.
5. Number of engines inspected pursuant to the voluntary or ordered recall plan.
6. Number of inspected engines found to be affected by the nonconformity.
7. Number of engines receiving repair under the recall plan and a listing of these engines' engine identification numbers.
8. Number of engines determined to be ineligible for recall action due to removed or modified parts.
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.
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)5., 6., 7., 8. and 9. above shall be cumulative totals.

(C) The engine manufacturer shall maintain the names and addresses of engine/watercraft owners:

1. To whom notification was given;
2. Whose engines were repaired or inspected under the recall plan; and
3. Whose engines were determined not to qualify for repair due to removed or modified components.

(D) All reports shall be maintained for not less than one year beyond the useful life of the engines and shall be made available to authorized personnel of the ARB upon request.

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

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

All 2007 and 2008 model year spark-ignition 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 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 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 standard performance sterndrive/inboard 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.

(b) General requirements.

(1) Spark-ignition sterndrive/inboard marine engines sold as new shall be equipped with an integrated malfunction detection and notification system, hereinafter known as On-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 be required to identify engine misfire per the provisions in subsection (c)(5) except as otherwise permitted in these regulations. 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.

(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/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, 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 used to comply with the 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).

(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, 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 HC+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:

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.

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) Malfunction criteria:

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.

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:

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) Malfunction notification and diagnostic trouble code storage:

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.

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

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:

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.

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:

1. The diagnostic system shall monitor the output voltage and response rate of all primary (fuel control) oxygen (λ) 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.

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.

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:

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.

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 can affect emissions during any reasonable in-use operating condition or are used as part of the diagnostic strategy for any other monitored system or component.

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).*

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.

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* occur.

(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.

(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:

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

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 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: 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, 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, 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:

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
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.

➡§ 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 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) General Emissions Warranty Coverage. The manufacturer of each spark-ignition marine engine must warrant to the ultimate purchaser and each subsequent purchaser that the engine is:

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

(2) Free from defects in materials and workmanship that cause the failure of a warranted part to be identical in all material respects to that part as described in the engine manufacturer's application for certification.

(c) Warranty Period. In the case of all new, spark-ignition marine engines, the warranty period will be:

(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.

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

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

(A) Manufacturers certifying engines according to Option 1 in Section 2442(b)(1) for model years 2006-2008, a period of 2 years.

(B) Manufacturers certifying engines according to Option 2 in Section 2442(b)(1):

1. For model years 2006-2007, a period of 2 years.

2. For model year 2008, a period of 3 years or 480 hours, whichever first occurs.

(C) Model Year 2009 and Later:

1. Engines 373 kilowatts or less, a period of 3 years or 480 hours, whichever first occurs.

2. Engines greater than 373 kilowatts, but less than or equal to 485 kilowatts:

a. A period of 3 years or 480 hours, whichever first occurs, for electronic emission-related components including, but not limited to, sensors (e.g., oxygen sensors, mass air flow sensors, crankshaft position sensors, etc.), solenoids (e.g., fuel injectors, idle control valves, pressure regulators, etc.), ignition components, powertrain control modules, and for the following: catalyts, carburetors, fuel pumps, evaporative components (including low-permeation hoses), exhaust gas recirculation, and other direct emissions devices,

b. A period of 3 years or 150 hours, whichever first occurs, for mechanical emission-related components, including but not limited to, the engine block, crankshaft, camshaft, connecting rods, valves, manifolds, rotating parts, pistons, and turbo/superchargers.

3. Engines greater than 485 kilowatts:

a. A period of 3 years or 480 hours, whichever first occurs, for electronic emission-related components including, but not limited to, sensors (e.g., oxygen sensors, mass air flow sensors, crankshaft position sensors, etc.), solenoids (e.g., fuel injectors, idle control valves, pressure regulators, etc.), ignition components, powertrain control modules, and for the following: catalyts, carburetors, fuel pumps, evaporative components (including low-permeation hoses), exhaust gas recirculation, and other direct emissions devices,

b. A period of 1 year or 50 hours, whichever first occurs, for mechanical emission-related components, including but not limited to, the engine block, crankshaft, camshaft, connecting rods, valves, manifolds, rotating parts, pistons, and turbo/superchargers.

4. Notwithstanding (c)(3)(C)2. and (c)(3)(C)3. above, an engine manufacturer may request an alternate hourly warranty period for specific components in an engine family with rated power greater than 373 kW provided the following:

a. Under no circumstances may the manufacturer request an alternate interval that is less than 50 hours of operation, and the alternate interval must be at least as long as the engine manufacturer's recommended overhaul interval.

b. The manufacturer must submit actual durability test data if engines identical to those in the engine family for which the manufacturer is requesting an alternate warranty period have already been produced and are in use. Otherwise, the manufacturer must submit equivalent data from research engines or similar engine models that are already in production, along with an engineering evaluation relating the results of those data to the engine components for which an alternate interval is being requested.

c. The manufacturer may submit other information if the manufacturer believes it beneficial for demonstrating the appropriateness of the requested alternate interval.

d. The Executive Officer shall review the data provided, as well as any other information known to the executive officer, in determining whether or not the requested hourly interval is representative of the expected useful life of the affected components or of the engine itself. If this determination is affirmed, the Executive Officer shall approve the manufacturer's request for an alternate warranty period.

(d) Subject to the conditions and exclusions of Subsection (g), the warranty on emission-related parts is as follows:

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

(2) Any warranted part that is scheduled only for regular inspection in the written instructions required by Subsection (f) must be warranted for the warranty period defined in Subsection (c). A statement in such written instructions to the effect of "repair and replace as necessary" will not reduce the period of warranty coverage. Any such part repaired or replaced under warranty must be warranted for the remaining warranty period.

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

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

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

(6) The engine owner must not be charged for diagnostic labor that is directly associated with diagnosis of a defective, emission-related warranted part, provided that such diagnostic work is performed at a warranty station.

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

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

(9) Any replacement part may be used in the performance of any warranty maintenance or repairs and must be provided without charge to the owner. Such use will not reduce the warranty obligations of the engine manufacturer.

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

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

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

(1) Fuel Metering System

(A) Carburetor and internal parts (and/or pressure regulator or fuel injection system)

(B) Air/fuel ratio feedback and control system

(C) Cold start enrichment system

(D) Intake valve(s)

(2) Air Induction System

(A) Controlled hot air intake system

(B) Intake manifold

(C) Air Filter

(D) Turbocharger systems

(E) Heat riser valve and assembly

(3) Ignition System

(A) Spark plugs

(B) Magneto or electronic ignition system

(C) Spark advance/retard system

(D) Ignition coil and/or control module

(E) Ignition wires

(4) Lubrication System

(A) Oil pump and internal parts

(B) Oil injector(s)

(C) Oil meter

(5) Positive Crankcase Ventilation (PCV) System

(A) PCV valve

(B) Oil filler cap

(6) Exhaust Gas Recirculation (EGR) System

(A) EGR valve body, and carburetor spacer if applicable

(B) EGR rate feedback and control system

(7) Air Injection System

(A) Air pump or pulse valve

(B) Valves affecting distribution of flow

(C) Distribution manifold

(8) Exhaust System

(9) Catalyst or Thermal Reactor System

(A) Catalytic converter

(B) Thermal reactor

(C) Exhaust manifold

(D) Exhaust valve(s)

(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

(f) Each engine manufacturer must provide with each new engine written instructions for the maintenance and use of the engine by the owner. The instructions must be consistent with this Article. A copy of the instructions for each engine family must be provided to the Executive Officer upon commencement of its production.

(g) Exclusions.

(1) The repair or replacement of any warranted part otherwise eligible for warranty coverage under Subsection (d) may be excluded from such warranty coverage if the engine manufacturer demonstrates that the engine has been abused, neglected, or improperly maintained, and that such abuse, neglect, or improper maintenance was the direct cause of the need for the repair or replacement of the part.

(2) Engine manufacturers must warrant engines for the yearly warranty period specified in paragraph (c). For Outboard and Personal Watercraft engines, and for 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 sterndrive/inboard engines)

(B) are equipped with devices similar to hour meters that are approved by the Executive Officer; or

(C) are or will be accompanied by other evidence or methods that the Executive Officer determines reliable for determining engine usage in hours.

(3) Except as provided in Subsection (1) above, any adjustment of a component that has a factory installed, and properly operating, adjustment limiting device (such as an idle limiter cap or plug) is eligible for warranty coverage under Subsection (d).

➡§ 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 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)(sterndrive/inboard, outboard, or personal watercraft) engine. In California, new (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 (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 (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 (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.

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

(For 2006-2008 spark-ignition sterndrive/inboard marine engines certified according to

Option 1 in Section 2442(b)(1):) Select emission control parts from model year 2006-2008 (sterndrive/inboard) engines are warranted for 2 years.

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

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

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

(For 2009 and later spark-ignition 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 (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 sterndrive/inboard marine engines greater than 485 kilowatts:) Select electronic emission-related control parts from model year 2009 and later (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 § 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 (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 (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 (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 (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 (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.

(b) Commencing with the 2001 model year, each engine manufacturer must also provide with each new engine a warranty statement in accordance with section 2445.1, Title 13, California Code of Regulations, that generally describes the obligations and rights of the engine manufacturer and engine owner under this article. Engine manufacturers must also include in the warranty statement a phone number the consumer may use to obtain their nearest franchised service center.

(c) Each engine manufacturer must submit the documents required by Subsections (a) and (b) with the engine manufacturer's application for new engine certification for approval by the Executive Officer. The Executive Officer may reject or require modifications of the documents to the extent the submitted documents do not satisfy the requirements of Subsections (a) and (b). Approval by the Executive Officer of the documents required by Subsections (a) and (b) is a condition of certification. The Executive Officer will approve or disapprove the documents required by Subsections (a) and (b) within ninety (90) days of the date such documents are received from the engine manufacturer. Any disapproval must be accompanied by a statement of reasons therefore. In the event of disapproval, the engine manufacturer may petition the Board to review the decision of the Executive Officer pursuant to Subchapter 1.25 of Title 17, California Code of Regulations.

➡§ 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 sterndrive/inboard marine engines are only subject to the selective enforcement audit requirements specified within subsections (d) and (e) of this section.

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

(1) Engine Sample Selection.

(A) Except as provided in subsection (b)(2), the engine manufacturer must randomly select one percent of the California sales volume of engines from each engine family for quality-audit testing.

(B) The Executive Officer may, upon notice to the engine manufacturer, require the sample rate to be increased to a maximum of ten percent of production (not to exceed 30 additional engines or units of equipment) of the calendar quarterly production of any engine family.

(2) Alternate Quality-Audit Engine Selection Criteria for 2001 and Later Model Years.

(A) An engine manufacturer may use the alternate engine selection method outlined in this Subsection.

(B) Engines or equipment must be randomly selected at a rate of 1.0 percent of engine family production at the beginning of production. When test results of the first 10 engines or units of equipment have been accumulated, an evaluation as indicated below must be made.

(C) Calculate the family mean and standard deviation of HC+NO_x. Identify engines or units of equipment that have emission levels greater than three standard deviations above the mean. Eliminate these emission data points and recalculate the mean and standard deviation. Continue the calculation until there are no values greater than three standard deviations above the mean. Count the number of these data points greater than the emission standard (outlier). If the total number of outlier is equal to or less than the allowable number in Table 1 for HC+NO_x, the engine family is eligible to continue to a second evaluation, shown in paragraph (D) below. Otherwise, sampling must continue at a rate of 1.0 percent of production for the rest of the month.

(D) If the allowable outlier criterion is met, the family mean standard deviation, and sample size determined for HC + No_x before excluding any outlier, are substituted in the following expression:

$$\frac{(\text{emission standard} - \text{mean}) (N)^{0.5}}{(\text{standard deviation})}$$

(E) If the expression is greater than C in Table 2 below, and the engine manufacturer reasonably estimates that the quarterly engine family production will exceed 5,000 engines or units of equipment, the sampling rate for the remaining portion of the calendar month following the date of selection of the last of the 10 engines or equipment is 10 per month, applied on a prorated basis. If the expression is greater than C in Table 2 below, and the engine manufacturer reasonably estimates that the quarterly engine family production will be 5,000 engines or units of equipment or less, the sampling rate for the remaining portion of the calendar month following the date of selection of the last of the 10 engines or equipment is 5 per month, applied on a prorated basis. If the expression is

equal to or less than C in Table 2, the sampling rate continues to be 1.0 percent of production for the remaining portion of the month in which selection of the 10 engines or equipment is completed. The value of C is a function of the coefficient of variation (standard deviation/mean). The coefficient of variation and C must be rounded to the number of decimal places shown in Table 2.

Table 1

<i>Sample Size</i>	<i>Allowable Outlier</i>	<i>Sample Size</i>	<i>Allowable Outlier</i>
1- 32	1	430-478	11
33- 68	2	479-528	12
69-107	3	529-578	13
108-149	4	579-629	14
150-193	5	630-680	15
194-238	6	681-731	16
239-285	7	732-783	17
286-332	8	784-835	18
333-380	9	836-887	19
381-429	10	888-939	20

Table 2

<i>Coefficient of Variation</i>	<i>C</i>
0.1	0.5
0.2	1.2
0.3	1.8
0.4	2.5
0.5	3.1
0.6	3.8
0.7	4.4
0.8	5.1
0.9	5.7

(F) At the conclusion of each month of quarterly engine family production, the emission test data must be evaluated in order to determine the sampling rate as set forth in Paragraphs C and D above. This evaluation must utilize all test data accumulated in the applicable quarter. The sample rate for the next month of production must be determined as follows: ten (10) engines per month when the engine manufacturer's estimated quantity of quarterly engine family production is greater than 5,000; five (5) engines per month when the engine manufacturer's estimated quantity of quarterly engine family production is equal to or less than 5,000; or, one (1) percent of the quarterly engine family production as determined by the sampling evaluation method set forth in Paragraphs D and E.

(G) For each subsequent quarter, the preceding sample selection method must be followed. The sample rate determination for the first month of each subsequent quarter must be based on the accumulated data from the previous quarter. The sample rate for the succeeding months of the quarter must be determined as previously set forth.

(H) If the start of production does not coincide with the first of a quarter, the sequence for sample rate determination must be followed, but references to remaining calendar months may not be appropriate.

(I) Where an engine manufacturer has sampled engines or equipment at a rate of 5 per month following a reasonable estimate that the quarterly engine family production will be 5,000 engines or units of equipment or less, and subsequently determines, or reasonably should determine based on information available to the engine manufacturer, that the quarterly engine family production will exceed 5,000 engines or units of equipment, the engine manufacturer must increase the sampling rate for the quarter such that the requirements of Paragraph D applicable to families reasonably estimated to exceed a quarterly production of 5,000 engines or units of equipment are satisfied.

(3) Compliance Evaluation.

(A) Each engine manufacturer must review the test results of the first 10 test engines or equipment of each engine family, from each calendar quarter of production or from the start of calendar year production. It must also review the quarter's cumulative test results of each engine family at the end of each month. If 10 or more engines or units of equipment have been tested, 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, in writing within ten working days whenever an engine family exceeds an emission standard.

(B) At the end of the quarter, all of the data accumulated during the quarter are evaluated, and the compliance of the engine family with the family emission levels or emission standards, whichever is applicable, is determined. If a sample size for a particular production quarter is less than ten engines, the data from that quarter must be combined with all of the data from each successive quarter of the calendar year until data from at least ten engines that have been quality-audit tested are included in the quarterly evaluation. If the sample size for the first quarter's production for a calendar year does not contain at least ten engines, the data available for that quarter are evaluated. However, compliance of the engine family with the family emission levels or emission standards, whichever is applicable, is not determined until subsequent quarterly production data is available that includes evaluations of at least ten engines. If the sample size for the last final quarter's production for a calendar year does not contain at least ten engines, the data from the last final quarter must be combined with all the data from each preceding quarter of the calendar year until the sample size contains at least ten engines.

(C) When the average value of any pollutant that is rounded off to the same number of significant digits as is the standard, in accordance with ASTM E 29- 93a, exceeds the applicable family emission level or emission standard, whichever is applicable; or, when the engine manufacturer's submitted data reveal that the production line tests were performed improperly, the engine family may be determined to be in noncompliance. The Executive Officer will follow the manufacturer notification procedures in section (d)(4).

(D) A failed engine is one whose emission test results for a regulated pollutant exceeds the emission standard or FEL, as applicable.

(4) Reports.

(A) Each engine manufacturer shall submit a written report to the ARB within 45 calendar days of the end of each calendar quarter.

(B) The quarterly report shall include the following:

1. The total production and sample size for each engine family.
2. Engine identification numbers and explanation of the identification code.
3. The applicable emissions standards or Family Emission Levels for each engine family.
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).
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.
6. The retest emissions data, as described in Paragraph 5. 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.
7. A statistical analysis of the quality-audit test results for each engine family stating:
 - a. Number of engines or units of equipment tested.
 - b. Average emissions and standard deviations of the sample for HC+NO_x.
8. Every aborted test data and reason for the aborted test.
9. The applicable quarterly report shall include the date of the end of the engine manufacturer's model year production for an engine family.
10. The required information for all engine families in production during the quarter regardless of sample size.
11. The start and stop dates of batch-produced engine family production.

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

(c) 2001 and Later Model Year Cumulative Sum Production-Line Test Procedures.

(1) Engine Sample Selection.

(A) At the start of each model year, the engine manufacturer will begin to randomly select engines from each engine family with California sales greater than 20 units for production line testing, according to the criteria specified herein.

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.

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.

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.

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)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).

<i>n</i>	<i>t</i> ₉₅	<i>n</i>	<i>t</i> ₉₅	<i>n</i>	<i>t</i> 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

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

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

2. Actual Number of Tests (*n*) and 1-tail Confidence Coefficients (*t*₉₅) are listed in Table 3 below:

Table 3

<i>n</i>	<i>t</i> ₉₅	<i>n</i>	<i>t</i> ₉₅	<i>n</i>	<i>t</i> 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

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.

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.

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

this section or a noncompliance decision is made pursuant to paragraph (c)(2)(A)5. of this section.

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, \bar{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)6.

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.

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

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)1. and (c)(2)(A)1. of this section, respectively.

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

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

(2) Calculation of the Cumulative Sum Statistic.

(A) Each engine manufacturer must review the test results obtained in paragraph (c)(1) using the following procedure:

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)4. and (a)(2)(A)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.

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)1. of this section.
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.
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.
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.
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)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.
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).
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).

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.

(B) Within 45 days after the end of the quarter, or when the Cumulative Sum analysis indicates that a decision has been made, the engine manufacturer must provide all the data accumulated during the quarter.

(3) Calculation and Reporting of Test Results.

(A) Initial test results are calculated following the applicable test procedure specified in the Test Procedures.

(B) Final test results are calculated by summing the initial test results derived in paragraph (A) for each test engine and dividing by the number of tests conducted on the engine.

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

(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 within ten working days of such exceedance by the Cumulative Sum statistic.

(E) Within 45 calendar days of the end of each quarter, each engine manufacturer must submit to the Executive Officer a report that includes the following information:

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;
2. Total production and sample sizes, N and n, for each engine family;
3. The applicable emissions standards for each engine family;
4. A description of the process to obtain engines on a random basis;
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);

6. The date of the end of the engine manufacturer's model year production for each engine family;

7. For each test conducted,

a. A description of the test engine, including:

(i) Configuration and engine family identification,

(ii) Year, make, and build date,

(iii) Engine identification number and explanation of the identification code, and

(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)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)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;

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

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

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

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

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

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

(1) Standards and Test Procedures. The emission standards are those specified in Section 2442. The exhaust sampling and analytical procedures are those described in the Test Procedures. An engine is in compliance with the production-line or selective enforcement audit standards and test procedures only when all portions of the production-line or selective enforcement audit test procedures and requirements specified in Part IV of the Test Procedures are fulfilled, except that any adjustable engine parameters must be set to any value or position that is within the range available to the ultimate purchaser.

(2) Air Resources Board (ARB) personnel and mobile laboratories must have access to engine or equipment assembly plants, distribution facilities, and test facilities for the purpose of engine selection, testing, and observation. Scheduling of access must be arranged with the designated engine manufacturer's representative and must not unreasonably disturb normal operations (See section 31 of the Test Procedures).

(3) Engine Preparation and Preconditioning.

(A) No emissions tests may be performed on an engine before the first production-line test or selective enforcement audit test on that engine.

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

(C) If an engine or watercraft is shipped to a remote facility for production-line or selective enforcement audit testing, and adjustment or repair is necessary because of such

shipment, the engine manufacturer must perform the necessary adjustments or repairs only after the initial test of the engine or watercraft. Engine manufacturers must report to the Executive Officer in the quarterly report for all production-line testing, or as required by the Executive Officer for selective enforcement audit testing, all adjustments or repairs performed on engines or watercraft prior to each test. In the event a retest is performed, a request may be made to the Executive Officer, within ten days of the production quarter, for permission to substitute the after-repair test results for the original test results. The Executive Officer will either affirm or deny the request by the engine manufacturer within ten working days from receipt of the request.

(D) If an engine manufacturer determines that the emission test results of an engine or 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 Officer for selective enforcement audit testing.

(4) Manufacturer Notification of Failure.

(A) The Executive Officer will notify the engine manufacturer that the engine manufacturer may be subject to revocation or suspension of the Executive Order authorizing sales and distribution of the noncompliant engines in the State of California of the noncompliant engines in the State of California pursuant to section 43017 of the Health and Safety Code. Prior to revoking or suspending the Executive Order, or seeking to enjoin an engine manufacturer, the Executive Officer will consider all information provided by the engine manufacturer, and other interested parties, including, but not limited to corrective actions applied to the noncompliant engine family.

(B) The Executive Officer will notify the equipment manufacturer that the equipment manufacturer may be subject to revocation or suspension of the Executive Order or penalized pursuant to section 43017 of the Health and Safety Code. Prior to revoking or suspending the Executive Order, or penalizing an equipment manufacturer, the Executive Officer will consider all information provided by interested parties, including, but not limited to corrective actions applied to the noncompliant engine family.

(5) Suspension and Revocation of Executive Orders.

(A) The Executive Order is automatically suspended with respect to any engine failing pursuant to paragraph (b)(3)(D) or (c)(2)(A)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)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:

1. The engine manufacturer refuses to comply with any of the requirements of this section.
2. The engine manufacturer submits false or incomplete information in any report or information provided to the Executive Officer under this section.
3. The engine manufacturer renders inaccurate any test data submitted under this section.
4. An ARB enforcement officer is denied the opportunity to conduct activities authorized in this section.
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)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:

1. Remedy the nonconformity;

2. Demonstrate that the engine conforms to its applicable FEL by retesting the engine in accordance with these regulations; and

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:

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.

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)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:

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)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

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)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:

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;
2. does not apply to engines no longer in the possession of the engine manufacturer.

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

(M) To permit an engine manufacturer to avoid storing non-test engines while conducting subsequent testing of the noncomplying family, an engine manufacturer may request that the Executive Officer conditionally reinstate the Executive Order for that family. The Executive Officer may reinstate the Executive Order subject to the following condition: the engine manufacturer must commit to recall all engines of that family produced from the time the Executive Order is conditionally reinstated, and must commit to remedy any nonconformity at no expense to the owner.

(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.

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.

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.

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.

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.

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.

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)2. of this subsection, the Executive Officer must:

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

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)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.

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 1. for any spark-ignition marine engine he or she determines is not susceptible to satisfactory testing using the procedures specified in paragraph 1.

(B)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.

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.

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.

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.

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)1. and (G)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.

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.

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.

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.

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).

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

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)4., as applicable, exceed the applicable family emission level or whose test results for a regulated pollutant exceed the emission standards.

(C) The engine manufacturer must test engines comprising the test sample until a pass or fail decision is reached for HC+NO_x. A pass decision is reached when the cumulative number of failed engines, as defined in paragraph (B), for HC+NO_x is less than or equal to the pass decision number, as defined in paragraph (D), appropriate to the cumulative number of engines tested. A fail decision is reached when the cumulative number of

failed engines for HC+NOx is greater than or equal to the fail decision number, as defined in paragraph (D), appropriate to the cumulative number of engines tested.

(D) The pass and fail decision numbers associated with the cumulative number of engines tested are determined by using the tables in Appendix A to this subsection (e), "Sampling Plans for Selective Enforcement Auditing of Spark-Ignition Marine Engines," appropriate to the projected sales as made by the engine manufacturer in its report to ARB under paragraph (b)(4) or (c)(3)(A). In the tables in Appendix A to this subsection, sampling plan "stage" refers to the cumulative number of engines tested. Once a pass or fail decision has been made for HC+NOx, the number of engines with final test results exceeding the emission standard for HC+NOx shall not be considered any further for the purposes of the audit.

(E) Passing or failing a selective enforcement audit occurs when the decision is made on the last engine required to make a decision under paragraph (C).

(F) The Executive Officer may terminate testing earlier than required in paragraph (C) upon either a manufacturers' or Executive Officer's admission that further testing would not change the pass/fail decision.

➡ Appendix to Paragraph (e) of Section 2446 -Sampling Plans for Selective Enforcement Auditing of Spark-Ignition Marine Engines

Table 1. -Sampling Plan Code Letter

Annual engine family sales(in California)	Code letter
20-50.....	AA. [FN1]
20-99.....	A.
100-299.....	B.
300-499.....	C.
500 or greater.....	D.

[FN1] An engine manufacturer may use either the sampling plan for code letter "AA" or sampling plan for code letter "A" for Selective Enforcement Audits of engine families with annual sales between 20 and 50 engines. Additionally, the engine manufacturer may switch between these plans during the audit.

Table 2. -Sampling Plan for Code Letter "AA"

[Sample inspection criteria]

Stage	Pass No.	Fail No.	Stage	Pass No.	Fail No.
1	([FN1])	([FN2])	11	4	8
2	([FN1])	([FN2])	12	4	9
3	0	([FN2])	13	5	9
4	0	([FN2])	14	5	10
5	1	5	15	6	10
6	1	6	16	6	10
7	2	6	17	7	10
8	2	7	18	8	10
9	3	7	19	8	10
10	3	8	20	9	10

[FN1] Test sample passing not permitted at this stage.

[FN2] Test sample failure not permitted at this stage.

Table 3. -Sampling Plan for Code Letter "A"

[Sample inspection criteria]

Stage	Pass No.	Fail No.	Stage	Pass No.	Fail No.
1	([FN1])	([FN2])	16	6	11
2	([FN1])	([FN2])	17	7	12
3	([FN1])	([FN2])	18	7	12
4	0	([FN2])	19	8	13
5	0	([FN2])	20	8	13
6	1	6	21	9	14
7	1	7	22	10	14
8	2	7	23	10	15
9	2	8	24	11	15
10	3	8	25	11	16
11	3	8	26	12	16
12	4	9	27	12	17
13	5	10	28	13	17
14	5	10	29	14	17
15	6	11	30	16	17

[FN1] Test sample passing not permitted at this stage.

[FN2] Test sample failure not permitted at this stage.

Table 4. -Sampling Plan for Code Letter "B"

[Sample inspection criteria]

Stage	Pass No.	Fail No.	Stage	Pass No.	Fail No.
1	([FN1])	([FN2])	21	9	14
2	([FN1])	([FN2])	22	9	15
3	([FN1])	([FN2])	23	10	15
4	([FN1])	([FN2])	24	10	16
5	0	([FN2])	25	11	16
6	0	6	26	11	17
7	1	7	27	12	17
8	2	7	28	12	18
9	2	8	29	13	18
10	3	9	30	13	19
11	3	9	31	14	19
12	4	10	32	14	20
13	4	10	33	15	20
14	5	11	34	16	21
15	5	11	35	16	21
16	6	12	36	17	22
17	6	12	37	17	22
18	7	13	38	18	22
19	7	13	39	18	22
20	8	14	40	21	22

[FN1] Test sample passing not permitted at this stage.

[FN2] Test sample failure not permitted at this stage.

Table 5. -Sampling Plan for Code Letter "C"

[Sample inspection criteria]

Stage	Pass No.	Fail No.	Stage	Pass No.	Fail No.
1	([FN1])	([FN2])	26	11	17
2	([FN1])	([FN2])	27	12	17
3	([FN1])	([FN2])	28	12	18
4	([FN1])	([FN2])	29	13	18
5	0	([FN2])	30	13	19
6	0	6	31	14	19
7	1	7	32	14	20

8	2	7	33	15	20
9	2	8	34	16	21
10	3	9	35	16	21
11	3	9	36	17	22
12	4	10	37	17	22
13	4	10	38	18	23
14	5	11	39	18	23
15	5	11	40	19	24
16	6	12	41	19	24
17	6	12	42	20	25
18	7	13	43	20	25
19	7	13	44	21	26
20	8	14	45	21	27
21	8	14	46	22	27
22	9	15	47	22	27
23	10	15	48	23	27
24	10	16	49	23	27
25	11	16	50	26	27

[FN1] Test sample passing not permitted at this stage.

[FN2] Test sample failure not permitted at this stage.

Table 6. -Sampling Plan for Code Letter "D"

[Sample inspection criteria]

Stage	Pass No.	Fail No.	Stage	Pass No.	Fail No.
1	([FN1])	([FN2])	31	14	20
2	([FN1])	([FN2])	32	14	20
3	([FN1])	([FN2])	33	15	21
4	([FN1])	([FN2])	34	15	21
5	0	([FN2])	35	16	22
6	0	6	36	16	22
7	1	7	37	17	23
8	2	8	38	17	23
9	2	8	39	18	24
10	3	9	40	18	24
11	3	9	41	19	25
12	4	10	42	19	26
13	4	10	43	20	26

14	5	11	44	21	27
15	5	11	45	21	27
16	6	12	46	22	28
17	6	12	47	22	28
18	7	13	48	23	29
19	7	13	49	23	29
20	8	14	50	24	30
21	8	14	51	24	30
22	9	15	52	25	31
23	9	15	53	25	31
24	10	16	54	26	32
25	11	16	55	26	32
26	11	17	56	27	33
27	12	17	57	27	33
28	12	18	58	28	33
29	13	19	59	28	33
30	13	19	60	32	33

[FN1] Test sample passing not permitted at this stage.

[FN2] Test sample failure not permitted at this stage.

- ➡§ 2447. California Exhaust Emission Standards and Test Procedures for 2001 Model Year and Later Spark-Ignition Marine Engines.

Test Procedures referred to in this article, including the "California Exhaust Emission Standards and Test Procedures for 2001 Model Year and Later Spark-Ignition Marine Engines," as adopted October 21, 1999, and as last amended June 5, 2009 which is incorporated by reference herein, may be obtained from the State Air Resources Board at P.O. Box 8001, 9528 Telstar Avenue, El Monte, California 91734-8001.

- ➡§ 2448. [Reserved]