

**ATTACHMENT D  
to  
Resolution 08-36**

**Staff's Suggested Modifications**

**Title 13 California Code of Regulations**

**STAFF'S SUGGESTED MODIFICATIONS  
ATTACHMENT D TO RESOLUTION 08-36**

**Proposed Amendments to the California Regulations for New 2009 and Later  
Spark-Ignition Marine Engines and Boats**

NOTE: This document is written in a style to indicate changes from the existing provisions. All existing language is indicated by plain text. All additions to language are indicated by underlined text. All deletions to language are indicated by ~~strikeout~~. All additions to language proposed after the publication of the proposal are indicated by double underlining. All deletions to language proposed after the publication of the proposal are indicated by ~~double strikeout~~. Only those portions containing the suggested modifications from existing provisions are included. All other portions remain unchanged and are indicated by the symbol “\* \* \* \* \*” for reference.

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

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

**Article 4.7. Spark-Ignition Marine Engines**

**§ 2441. Definitions.**

(a)

\* \* \* \* \*

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

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

~~(3233) “Large Volume Dual-Category Manufacturer” means an engine manufacturer that produces both high performance and/or standard performance sterndrive/inboard engines for sale in California in combined quantities equal to or greater than 500 ~~75~~ units annually.~~

~~(30)~~~~(33)~~~~(34)~~ (3334) “Low-permeation fuel line (or supply) hose” means a fuel hose that does not exceed a 15.0 grams per square meter per day permeation rate on CE10 fuel at 23° Celsius, as tested per SAE J1527.

~~(31)~~~~(34)~~~~(35)~~ (3435) “Malfunction” means the inability of an emission-related component or system to remain within design specifications. Further, malfunction refers to the deterioration of any of the above components or systems to a degree that would likely cause the emissions of an aged engine with the deteriorated components or systems present at the beginning of the applicable certification emission test to exceed the HC+NO<sub>x</sub> emission standard by more than 50 percent, unless otherwise specified, as applicable pursuant to Subchapter 1 (commencing with Section 1900), Chapter 3 of Title 13.

~~(32)~~~~(35)~~~~(36)~~ (3536) “Marine engine manufacturer” means any person engaged in the manufacturing or assembling of new spark-ignition marine engines or the importing of such engines for resale, or who acts for and is under the control of any such person in connection with the distribution of such engines. A spark-ignition marine engine manufacturer does not include any dealer with respect to new spark-ignition marine engines received by such person in commerce.

~~(33)~~~~(36)~~~~(37)~~ (3637) “Marine warm-up cycle” means sufficient engine operation such that the coolant temperature has risen by at least 40 degrees Fahrenheit from engine starting and reaches a minimum temperature of at least 140 degrees Fahrenheit.

~~(34)~~~~(37)~~~~(38)~~ (3738) “Marine watercraft” means every description of boat, ship or other artificial contrivance used, or capable of being operated on water.

~~(38)~~~~(39)~~ (3839) “Marinize” means to modify an existing automobile engine to operate reliably in a marine environment. Some typical modifications include upgrading the composition of exhaust components to be more resistive against rust and corrosion, incorporating a water jacket within the exhaust manifolds to reduce temperatures, and providing better insulation for electrical contacts that might otherwise be exposed to corrosive sea water.

~~(39)~~~~(40)~~ (3940) “Maximum Engine Power” means the maximum brake power point on the nominal power curve for the engine configuration. The nominal power curve of an engine configuration is the relationship between maximum available engine brake power and engine speed for an engine, using the mapping procedures of 40 CFR part 1065, based on the manufacturer’s design and production specifications for the engine. This information may also be expressed by a torque curve that relates maximum available engine torque with engine speed. The nominal power curve must be within the range of the actual power curves of production engines considering normal production variability. The power value should be rounded to the nearest whole kilowatt. Except as indicated below in paragraphs (A) and (B) of this definition, the maximum engine power for an engine family is the weighted average value of maximum engine power for each

engine configuration within the engine family based on the total California production volume of engines produced from the engine family. Alternately:

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

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

~~(35)(4041)~~ “Maximum Rated Power” means the maximum brake kilowatt output of an engine at rated speed, as stated in the manufacturer’s application for certification.

~~(4442)~~ “Maximum Test Speed” means:

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

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

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

~~(36)(4243)~~ “Model year” means the engine manufacturer’s annual new model production period which includes January 1 of the calendar year for which the model year is named, ends no later than December 31 of the calendar year, and does not begin earlier than January 2 of the previous calendar year. Where an engine manufacturer has no annual new model production period, model year means the calendar year.

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

~~section in this Article which is applicable to such engine or watercraft, or which would be applicable to such engine or watercraft had it been manufactured for importation into the United States.~~

~~(4344)~~ “New Propulsion Marine Engine” or “New Engine” or “New,” – for purposes of this Article, means any of the following:

(A) A freshly manufactured propulsion marine engine for which the ultimate purchaser has never received the equitable or legal title. This kind of engine might commonly be thought of as “brand new.” In the case of this paragraph (A), the engine is new from the time it is produced until the ultimate purchaser receives the title or the product is placed into service, whichever comes first.

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

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

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

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

~~(38)(4445)~~ “Nonconformity” or “Noncompliance,”; for purposes of Title 13, California Code of Regulations, section 2444.1, means that:

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

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

(4546) "Nontrailerable boat" means a vessel equal to or greater than 8 meters in length ~~and~~ or 2.6 meters or more wide.

~~(39)~~(4647) "Operating cycle" consists of engine startup, engine run, and engine shutoff.

~~(40)~~(4748) "Original equipment manufacturer" means a manufacturer who purchases engines for installation in its equipment for sale to ultimate purchasers.

~~(41)~~(4849) "Outboard engine" means ~~a spark-ignition marine engine that, when properly mounted on a marine watercraft in the position to operate, houses the engine and drive unit external to the hull of the marine watercraft~~ an assembly of a spark-ignition marine engine and drive unit used to propel a vessel from a properly mounted position external to the hull of the vessel. An outboard drive unit is partially submerged during operation and can be tilted out of the water when not in use.

~~(49)~~(50) "Personal watercraft" means a vessel less than 4.0 meters (13 feet) in length that uses an installed internal combustion engine powering a water jet pump as its primary source of propulsion and is designed with no open load carrying area that would retain water. The vessel is designed to be operated by a person or persons positioned on, rather than within the confines of the hull. A vessel using an outboard engine as its primary source of propulsion is not a personal watercraft.

~~(42)~~(5051) "Personal watercraft engine" means ~~a spark-ignition marine engine that does not meet the definition of outboard engine, inboard engine or sterndrive engine, except that the Executive Officer may, in his or her discretion, classify a personal watercraft engine as an inboard or sterndrive engine if it is comparable in technology and emissions to an inboard or sterndrive engine~~ a spark-ignition engine used to propel a personal watercraft.

~~(43)~~(5452) "Production-line tests" are emission tests performed on a sample of production engines produced for sale in California and conducted in accordance with Title 13, California Code of Regulations, section 2446(a).

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

~~(52)~~(54) "Rebuild" or "Rebuilding" refers to a major overhaul in which the engine's pistons or power assemblies are replaced or other changes that significantly

increase the service life of the engine are made. It also includes replacing or rebuilding an engine's turbocharger or aftercooler or the engine's systems for fuel metering or electronic control so that it significantly increases the service life of the engine. For these provisions, rebuilding may or may not involve removing the engine from the equipment. Rebuilding does not normally include scheduled emission-related maintenance that the ~~standard-setting part~~ Test Procedures allows during the useful life period (such as replacing fuel injectors) or unscheduled maintenance that occurs commonly within the useful life period.

(44)(~~53~~55) "Redline engine speed" means the engine manufacturer recommended maximum engine speed as normally displayed on instrument panel tachometers, or the engine speed at which fuel shutoff occurs.

(45)(~~54~~56) "Response rate," with regards to oxygen sensors, refers to the delay (measured in milliseconds) between a switch of the sensor from lean to rich or vice versa in response to a change in fuel/air ratio above and below stoichiometric.

(46)(~~55~~57) "Sales" or "Eligible sales" means the actual or calculated sales of an engine family in California for the purposes of corporate averaging and production-line testing. Upon Executive Officer approval, an engine manufacturer may calculate its eligible sales through market analysis of actual federal production or sales volumes.

(47)(~~56~~58) "Scheduled maintenance" means any adjustment, repair, removal, disassembly, cleaning, or replacement of components or systems required by the engine manufacturer to be performed on a periodic basis to prevent part failure or marine watercraft or engine malfunction, or those actions anticipated as necessary to correct an overt indication of malfunction or failure for which periodic maintenance is not appropriate.

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

(~~57~~60) "Spark-ignition" means relating to a gasoline-fueled engine or any other type of engine with a spark plug (or other sparking device) and with operating characteristics significantly similar to the theoretical Otto combustion cycle. Spark-ignition engines usually use a throttle to regulate intake air flow to control power during normal operation.

(48)(~~58~~61) "Spark-ignition marine engine" or "Spark-ignition propulsion marine engine" means any engine used to propel a marine watercraft, and which utilizes the spark-ignition combustion cycle; including, but not limited to personal watercraft, outboard, ~~inboard~~ and sterndrive/inboard engines.

(5062) “Standard Performance Engine” or “Standard Performance SD/I Engine” means a spark-ignition sterndrive/inboard marine engine with maximum engine power less than or equal to 373 kilowatts.

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

(6063) “Sterndrive/inboard engine” or “sterndrive/inboard marine engine” means a spark-ignition engine that is used to propel a vessel, but is not an outboard engine or a personal watercraft engine. This includes engines on propeller driven vessels, jet boats, air boats, and hovercraft.

~~(50)~~(6464) “Test engine” means the engine or group of engines that an engine manufacturer uses during certification, production-line and in-use testing to determine compliance with emission standards.

~~(54)~~(6265) “Test Procedures” means the document entitled “California Exhaust Emission Standards and Test Procedures for 2001 Model Year and Later Spark-Ignition Marine Engines,” which includes the standards and test procedures applicable to 2001 and later spark-ignition personal watercraft, outboard, ~~inboard~~ and sterndrive/inboard marine engines, as adopted October 21, 1999, and as last amended ~~September 22, 2006~~ [insert date]. This document is incorporated by reference herein.

~~(52)~~(6366) “Ultimate purchaser” means, with respect to any new spark-ignition marine engine, the first person who in good faith purchases such new spark-ignition marine engine for purposes other than resale.

~~(53)~~(6467) “U.S.C.” means United States Code.

~~(54)~~(6568) “Used solely for competition” means exhibiting features that are not easily removed and that would render its use other than in competition unsafe, impractical, or highly unlikely.

~~(55)~~(66698) “Useful life” for spark-ignition marine engines means nine years for personal watercraft engines and sixteen years for outboard, ~~sterndrive~~, and sterndrive/inboard engines.

~~(56)~~(6770) “Warranty period” means the period of time the engine or part is covered by the warranty provisions.

~~(57)~~(6871) “Warranty station” means any dealer, service center or other agent that is authorized by the engine manufacturer to perform diagnostic labor, repairs or replacements of warranted engine components.



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

**§ 2442. Emission Standards.**

(a) Model year 2001 and later model year spark-ignition personal watercraft and outboard marine engines:

(1) Exhaust emissions from new spark-ignition marine engines manufactured for sale, sold, or offered for sale in California, or that are introduced, delivered or imported into California for introduction into commerce must not exceed the hydrocarbon plus oxides of nitrogen (HC+NO<sub>x</sub>) 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**

<b>Article I. Corporate Average Emission Standards by Implementation Date HC+NO<sub>x</sub> (g/kW-hr)</b>			
<b>Model Year</b>	<b>Max. Family Emission Limit (FEL)</b>	<b>P<sub>tx</sub> &lt; 4.3 kW<sup>1</sup></b>	<b>P<sub>tx</sub> ≥ 4.3 kW<sup>1</sup></b>
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 <sup>2</sup>	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 <sup>a</sup> [kilowatts]	CO STANDARD [grams per kilowatt-hour]
OB/PWC <sup>b</sup>	<del>2009</del> 2010 and later	kW ≤ 40	500 - 5 x P <sup>c</sup>
		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<sub>tx</sub> 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<sub>tx</sub> 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<sub>tx</sub> 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<sub>x</sub> 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<sub>jx</sub> = Number of units each engine family j produced for sale in California in model year x.

- $FEL_{jx}$  = The Family Emission Limit (FEL) for engine family j in model year x, which must be determined by the engine manufacturer subject to the following conditions: (1) no individual engine family FEL shall exceed the maximum allowed value as specified in Table 1.1; (2) no engine family designation or FEL shall be amended in a model year unless the engine family is recertified; and (3) prior to sale or offering for sale in California, each engine family must be certified in accordance with the test procedures referenced in section 2447 and must meet the engine manufacturer's FEL as a condition of the Executive Order. Before certification, the engine manufacturer must also submit estimated production volumes for each engine family to be offered for sale in California.
- $P_{jx}$  = The average power in kW (sales-weighted) of engine family j produced for sale in California in model year x. Engine power must be calculated using SAE standard J1228, November 1991, incorporated herein by reference.
- $STD_{ca}$  = An engine manufacturer's calculated corporate average HC+NO<sub>x</sub> exhaust emissions from those California spark-ignition marine engines subject to the California corporate average HC+NO<sub>x</sub> exhaust emission standard determined from Table 1.1, as established by an Executive Order certifying the California production for the model year. This Executive Order must be obtained prior to the issuance of certification Executive Orders for individual engine families for the model year.
- (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<sub>x</sub> 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 ~~inboard and sterndrive~~ sterndrive/inboard marine engines:

- (1) Exhaust emissions from all new model year 2003 and later spark-ignition ~~inboard and sterndrive~~ sterndrive/inboard marine engines must not exceed the ~~exhaust~~ emission standards listed in Table 2.1(a) for standard performance engines and/or 2.1(b) for high performance engines, for the designated emission durability test period.
  - (A) Prior to Model Year 2007 certification, each engine manufacturer must select either Option 1 (OPT 1) or Option 2 (OPT 2) for its entire production of standard performance engines for the 2007 and 2008 model years.

**Table 2.1(a)**  
**Standard Performance Inboard/Stern Drive/Inboard Marine Engine Standards**

MODEL YEAR	RATED POWER CATEGORY <sup>1</sup> [kilowatts]	COMPLIANCE OPTION <sup>42</sup>	DURABILITY [hours / years]	EXHAUST STANDARDS			SUPPLEMENTAL MEASURE <sup>45</sup>	
				NMHC <sup>23</sup> +NOx	TYPE <sup>34</sup>	CO [grams per kilowatt-hour]		
2003 - 2006	kW ≤ 373	N/A	N/A	16.0	AVE <sup>6</sup>	N/A	None	
2007	kW ≤ 373	OPT 1	N/A	16.0 (55%)	AVE <sup>6</sup>		None	
			480 / 10	5.0 (45%)	FIXED		Low-Permeation Fuel Line Hoses	
2008	kW ≤ 373	OPT 1	N/A	16.0 (25%)	AVE <sup>6</sup>		None	
			480 / 10	5.0 (75%)	FIXED		Low-Permeation Fuel Line Hoses	
		OPT 2	480 / 10	5.0	FIXED			
2009 and later	kW ≤ 373	N/A	480 / 10	5.0 <sup>6,7,8</sup>	FIXED		75.0 <sup>7,9</sup>	Carryover <sup>7,10</sup>
	373 < kW ≤ 485		450 <sup>6</sup> / 3	5.0 <sup>6</sup>	AVE			
	kW > 485		50 <sup>6</sup> / 4	5.0 <sup>6</sup>	AVE			

Notes:

1. For 2010 and subsequent model years, an engine or engine family's power category is based on maximum engine power; otherwise maximum rated power may be used
42. Once a manufacturer has chosen an option, that option must continue to be used exclusively across product lines
23. ~~The non-methane component of hydrocarbon~~For 2010 and subsequent model years, standards are measured in total hydrocarbons plus oxides of nitrogen; however, the non-methane component of hydrocarbon may be substituted in prior years
34. Corporate averaging (AVE) may be used to demonstrate compliance with the exhaust emission standard, except where a FIXED standard is required
45. Supplemental measures may be different than shown, but must provide equal and verifiable emission reductions to those indicated
5. ~~For the purpose of durability testing, engine components that have been approved with an hourly warranty period shorter than the full hourly durability period per § 2445.1 (e)(3)(C)4, may be replaced at the specified warranty interval~~
6. The corporate average calculation may be met with or without power weighting for these years
67. ~~All engines ≤ 373 kW must meet a 5.0 g/kW-hr NMHC+NOx capping standard. For engines > 373 kW, the standard may be met by sales averaging with engines equal to or less than 373 kVA 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+NOx 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 dual category 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+NOx standard when complying with high performance engines on a corporate average basis~~
9. Standard performance engines ≥ 6.0 liter displacement may alternatively meet a 25 g/kW-hr standard for Modes 2-5 of the ISO 8178-4 E4 marine test cycle
710. The same or better supplemental emission control hardware used to meet the standard comply in 2007 must be used every model year thereafter and all fuel hoses (i.e., not just the fuel line hose) must be low-permeation hoses

(B) At the time of, or prior to, model year 2009 certification, each large volume Dual Category 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+NOx through averaging or whether it will comply with the less stringent small volume high performance HC+NOx 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 <sup>a</sup> CATEGORY <i>[kilowatts]</i>	DURABILITY <i>[hours / years]</i>	HC <sup>b</sup> +NO <sub>x</sub> STANDARD <i>[grams per kilowatt-hour]</i>		CO STANDARD <i>[grams per kilowatt-hour]</i>
			Small Volume or Large Volume Single Category Manufacturers or Intermediate Volume Manufacturers that are not Qualified Intermediate Volume Manufacturers	Large Volume Dual-Category or Qualified Intermediate Volume Manufacturer	
2009 - 2010	373 < kW ≤ 485	150 <sup>c</sup> / 3	16.0 <sup>ed</sup>	5.0 <sup>de</sup>	350.0 <sup>ed</sup>
	kW > 485		25.0 <sup>ed</sup>		
2011 and later	373 < kW ≤ 485	50 <sup>c</sup> / 1	16.0 <sup>ed</sup>	5.0 <sup>de</sup>	350.0 <sup>ed</sup>
	kW > 485		22.0 <sup>ed</sup>		

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

ed 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<sub>x</sub> 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

de 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 dual-category 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 inboard and 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 that the supplier(s) of the enhanced evaporative control system has designed the system components to meet or exceed the diurnal and permeation design specifications listed in Table 2.2 throughout the useful life of the engine.

**Table 2.2 Sterndrive/Inboard Marine Evaporative Design Specifications**

	<u>PERMEATION STANDARDS<sup>1</sup></u> <i>[grams per square meter per day]</i>	<u>DIURNAL STANDARD<sup>2</sup></u> <i>[grams per gallon per day]</i>	<u>TEST TEMPERATURES</u> <i>[degrees Celsius]</i>
<u>Fuel Hoses</u>	<u>15.0</u>	<u>—</u>	<u>23 ± 2</u>
<u>Fuel Tank</u>	<u>1.5</u>	<u>—</u>	<u>28 ± 2</u>
<u>Trailerable Boat</u>	<u>—</u>	<u>0.40</u>	<u>25.6 – 32.2</u>
<u>Nontrailerable Boat</u>	<u>—</u>	<u>0.16</u>	<u>27.6 – 30.2</u>

1. Fuel hoses and tank permeation testing requires fuel with 10% ethanol content.

2. Diurnal testing requires fuel with 9 pounds per square inch (psi) Reid Vapor Pressure volatility and a 24-hour fuel temperature cycle.

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

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

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



$$\frac{\sum_{j=1}^n (\text{PROD}_{jx})(\text{EL}_{jx})(P_{jx})}{\sum_{j=1}^n (\text{PROD}_{jx})(P_{jx})} = \text{Corporate Average}$$

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where:

n = Total number of engine families available for averaging

PROD<sub>jx</sub> = Number of engines in engine family j produced for sale in California in model year x.

EL<sub>jx</sub> = The measured NMHC+NO<sub>x</sub> emission levels for engine family j in model year x; ~~or for engines > 485 kW, the manufacturer may choose to use 30 g/kW-hr as per paragraph (F) below.~~

P<sub>jx</sub> = The average power in kW (sales-weighted) of engine family j produced for sale in California in model year x. Engine power must be calculated using SAE standard J1228, November 1991, incorporated herein by reference.

- (A) ~~During the engine manufacturer's production year, for each engine family, the engine manufacturer shall provide the Executive Officer within 45 days after the last day in each calendar quarter the total number of spark-ignition marine engines produced for sale in California and their applicable EL(s).~~
- (B) The Executive Order certifying the California production for a model year must be obtained prior to the issuance of certification Executive Orders for individual engine families for the model year.
- (C) The engine manufacturer's average NMHC+NO<sub>x</sub> 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

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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.

~~(F) Engines exceeding 485 kilowatts maximum rated power: In lieu of exhaust emission testing, manufacturers may certify using a default exhaust emissions level of 30.0 grams per kilowatt-hour of NMHC+NO<sub>x</sub> in their corporate averaging calculation.~~

~~(3)~~

(4) Alternate Requirements for Standard Performance Manufacturers:

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

~~(A)~~

1. Each engine manufacturer that chooses Option 2 must provide written instructions, as part of the installation materials provided to purchasers of the engine, to use Low Permeation Fuel Line Hose for the primary fuel line connecting the fuel tank to the engine of any boat that is manufactured for sale, sold, or offered for sale in California, or that is introduced, delivered or imported into California for introduction into commerce.

~~(B)~~

2. Each boat manufacturer must install Low Permeation Fuel Line Hose for the primary fuel line connecting the fuel tank to the engine of any boat that is manufactured for sale, sold, or offered for sale in California that uses an engine from a manufacturer that chooses Option 2.

~~(4)~~ (B) Supplemental Measures. Prior to Model Year 2007 certification, manufacturers choosing Option 2 may request Executive Officer approval of a supplemental measure as an alternative to meeting the requirements of paragraph (b)(3).

In determining whether to approve a request, the Executive Officer will consider the following:

- (A) 1. Whether the proposed supplemental measure would achieve reductions in ~~MMHC+NO<sub>x</sub>~~ equivalent to using Low-Permeation Fuel Line Hoses,
  - (B) 2. The engine manufacturer's measures to ensure successful implementation of the proposed supplemental measure,
  - (C) 3. The durability of the proposed supplemental measure, and
  - (D) 4. Any additional information the Executive Officer deems relevant.
- (5) Alternate Requirements for Large Volume ~~Dual Category~~ and Qualified Intermediate Volume Manufacturers.

In lieu of complying with the 5.0 g/kW-hr HC+NO<sub>x</sub> exhaust standard in Table 2.1(b) for high performance engines, a large volume ~~dual category~~ or qualified intermediate volume engine manufacturer may certify high performance engines to the same HC+NO<sub>x</sub> 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 ~~large volume dual category~~ 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<sub>x</sub> standards

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intended for small volume high performance manufacturers in Table 2.1(b) of this section. The engine manufacturer shall also provide evidence 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.

- B 2. Each boat manufacturer shall 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+NOx 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+NOX 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

(RESERVED)

{Note to commenters: Upon promulgation by the United States Environmental Protection Agency of Not-to-Exceed (NTE) requirements for spark-ignition marine engines, the Executive Officer shall have the authority to adopt the same NTE requirements for California; such that, for engines subject to these regulations, California would have full authority to enforce the NTE limits independently of the federal government. The federal NTE proposal can be found at "Control of Emissions from Nonroad Spark-Ignition Engines and Equipment," Federal Register Volume 76, Number 92, Friday, May 18, 2007, 28098, at pages 28279-28281, as discussed at pp. 28121-28124. There will be no additional demonstrations of NTE compliance unique to California beyond those of the federally promulgated requirements.}

(d) Voluntary Standards. Model Year 2009 and later spark-ignition marine engines:

(1) Manufacturers may voluntarily certify their engines to the full useful life exhaust and evaporative emission standards in Table 3 below.

(2) Marine vessels powered by engines certified to the voluntary standards in Table 3 below and equipped with a fully compliant OBD-M system (see § 2444.2) shall display a five-star consumer/environmental emission label (see § 2443.2 and § 2443.3).

**Table 3 - Voluntary Standards**

<u>HC<sup>1</sup>+NO<sub>x</sub> STANDARD</u> <i>[grams per kilowatt-hour]</i>	<u>CO STANDARD</u> <i>[grams per kilowatt-hour]</i>	<u>PERMEATION STANDARDS</u> <i>[grams per square meter per day]</i>		<u>DIURNAL STANDARD<sup>2</sup></u> <i>[grams per gallon per day]</i>
		<u>Hose<sup>3</sup></u>	<u>Tank<sup>4</sup></u>	
<u>2.50</u>	<u>50.0</u>	<u>15.0</u>	<u>1.5</u>	<u>0.4</u>

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

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

(e) New Replacement Engine Requirements for Engine Manufacturers. A new spark-ignition marine engine produced solely to replace an engine originally manufactured in accordance with the requirements of § 2422 shall be identical in specifications to the most stringent certified emissions configuration currently available that can be installed in a vessel or personal watercraft without unreasonable modifications, as determined by

the Executive Officer. A new replacement engine with emissions performance less than maximum stringency shall be allowed only if all engines of greater stringency are incompatible with the vessel or personal watercraft and so long as the emissions performance of the new replacement engine is at least as stringent as that of the engine being replaced. New replacement engines that do not comply with current year emission requirements must be labeled as follows:

“SALE OR INSTALLATION OF THIS ENGINE FOR ANY PURPOSE OTHER THAN TO REPLACE AN ENGINE OF SIMILAR OR LESS STRINGENT EMISSIONS PERFORMANCE IS A VIOLATION OF CALIFORNIA LAW SUBJECT TO CIVIL PENALTY.”

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

(g) Special Provisions for Engine and/or Vessel Manufacturers

(1) Jet Boat Engines

(A) Jet boat engine families previously certified to the HC+NO<sub>x</sub> 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 2009 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/~~outboard~~ 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 ~~2010~~ 2012. ~~if new, or~~ 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 ~~2012 otherwise.~~
- (D) The OBD-M requirements in § 2444.2 would apply to new jet boat engine families in 2010 and to all jet boat engine families in 2012.

(2) Discontinuation of Marinized Sterndrive/Inboard Engines.

Sterndrive/inboard engine manufacturers who marinize base engines produced by another manufacturer may request a discontinuation allowance from the Executive Officer, subject to the following:

- (A) The base engine manufacturer has announced that it plans to discontinue the base engine.
- (B) Each marinizer may have a discontinuation allowance for only one engine family in effect at any time. As an alternative to the "one engine family" stipulation, manufacturers may petition the Executive Officer to allow a modified grouping of engines based on factors that logically link the engines to be discontinued including, but not necessarily limited to, the pre-marinized base configuration of the engines (e.g., the same base engine offered in one family with fuel injection and another family with carburetion).
- (C) The discontinuation allowance would allow the marinizing manufacturer to continue to certify the engine family to be discontinued to emission levels that are less stringent than the standards otherwise required for sterndrive/inboard engines in § 2442 (b) for a total of four model years, provided that on a corporate average basis, the manufacturer meets the required standards in § 2442 (b).
- (D) Manufacturers shall not certify engine families to emission levels less stringent than those in effect for previous model year versions of the same or similar engine family. Fluctuations in certification levels from year to year due to component variation would not violate this prohibition unless

the fluctuations result in an exceedance of the standards to which the engine family was previously certified.

- (E) Manufacturers shall comply with all applicable OBD-M and evaporative requirements in effect for:
  - 1. any previously uncertified engine family certified for the first time under paragraph (g)(2) of this section to emission levels that are less stringent than the standards otherwise required for sterndrive/inboard engines in § 2442 (b); and
  - 2. any current production engine family that has previously been certified with OBD-M or evaporative systems.
- (F) The applicable requirements of §§ 2442(b)(3), 2443.1, and 2443.2, including averaging, records keeping, reporting, and labeling, shall be applicable to manufacturers employing the discontinuation allowance provisions of this paragraph (g)(2).

(3) General Hardship Relief Provision

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

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

(4) Executive Officer Discretion for Technical Changes.

The Executive Officer may revise or incorporate specific technical requirements with respect to the test procedures incorporated at § 2441(a)(58) of these regulations. For the purposes of this subparagraph (4), "technical requirements" includes revisions to test procedures, test methodology, or any requirement to enhance



alignment with similar federal regulations promulgated after the amendments to this Article 4.7, as noticed June 6, 2008, are adopted. Such technical requirements shall be electronically noticed to listserv subscribers, shall be made available to the public via appropriate ARB webpage postings, and shall be noticed in the California Regulatory Notice Register. Such technical requirements will become effective 30 days after notice, unless any person notifies the Executive Officer in writing that they object to any part of the technical requirements noticed.

- (h) Practices for Rebuilding Engines. The rebuilding practices described in Part I, Section 7 of the incorporated test procedures shall apply to all spark-ignition marine engines subject to the requirements of § 2422 that are rebuilt after December 31, 2009, including those engines that were originally manufactured on, or prior to, December 31, 2009.

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

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