

UPDATED INFORMATIVE DIGEST

AMENDMENTS TO THE EVAPORATIVE EMISSION REQUIREMENTS FOR SMALL OFF-ROAD ENGINES

Sections Affected:

Adoption of California Code of Regulations, title 13, section 2774. Amendments to California Code of Regulations, title 13, section(s) 2750, 2751, 2752, 2753, 2754, 2754.1, 2754.2, 2755, 2756, 2757, 2758, 2759, 2760, 2761, 2762, 2763, 2764, 2765, 2766, 2767, 2767.1, 2768, 2769, 2770, 2771, 2772, and 2773; and amendments to the following documents incorporated by reference therein:

- “CP-901, Certification and Approval Procedure for Small Off-Road Engine Fuel Tanks,” adopted July 26, 2004;
- “CP-902, Certification and Approval Procedure for Evaporative Emission Control Systems,” adopted July 26, 2004;
- “TP-901, Test Procedure for Determining Permeation Emissions From Small Off-Road Engine and Equipment Fuel Tanks,” adopted July 26, 2004;
- “TP-902, Test Procedure for Determining Diurnal Evaporative Emissions From Small Off-Road Engines and Equipment,” adopted July 26, 2004.

Background:

The Federal Clean Air Act grants California the unique authority to adopt and enforce rules to control mobile source emissions within the State. In order to attain the State ambient air quality standards by the earliest practicable date as required by the California Clean Air Act, the Air Resources Board (ARB or Board) seeks the maximum emissions reductions possible from vehicular and other mobile sources to protect the health and welfare of all California residents.

ARB first adopted regulations to reduce evaporative emissions from spark-ignited small off-road engines (SORE) rated at or below 19 kilowatts (25 horsepower) in September 2003. SORE are split into three engine displacement categories for the purposes of evaporative emission standards: 1) engines with displacement less than or equal to 80 cubic centimeters (cc), intended for use in handheld applications; 2) engines with displacement greater than 80 cc but less than 225 cc, intended for use in walk-behind applications such as lawnmowers; and 3) engines with displacement greater than or equal to 225 cc, intended for use in larger equipment such as riding mowers. The 2003 regulations are intended to control diurnal emissions from engines with displacement greater than 80 cc and fuel tank permeation emissions from engines with displacement less than or equal to 80 cc.

There are more than 16 million SORE currently being used in California to power a broad range of lawn and garden equipment including lawn mowers, leaf blowers, and lawn tractors, as well as generators and small industrial equipment. Evaporative emissions from gasoline-powered SORE equipment are a significant source of reactive organic gas (ROG) and toxic air contaminant (TAC) emissions, both when stored and during operation. In 2016, evaporation of gasoline from SORE equipment in California is estimated to have produced approximately 45 tons per day of ROG, which exceeds the emissions from the more than 10,000 gas stations statewide. ROG emissions contribute to ground-level ozone formation and the nonattainment of national ambient air quality standards for ozone in parts of California, such as the South Coast Air Basin and San Joaquin Valley Air Basin, which are designated extreme nonattainment areas. Emissions of TACs such as benzene pose a near-source health risk and contribute to increased morbidity and mortality in California.

Description of Regulatory Action:

At its November 17, 2016, public hearing, the Board approved for adoption the proposed amendments and additions to the evaporative emission requirements for small off-road engines, summarized below. The Board directed the Executive Officer to determine if additional conforming modifications to the regulation were appropriate and to make any proposed modified regulatory language available for public comment, with any additional supporting documents and information, for a period of at least 15 days as required by Government Code section 11346.8. The Executive Officer adopted the regulation after addressing all appropriate modifications.

The amendments include improvements to the certification procedures, revisions to the compliance testing procedure, an update of the certification test fuel to represent commercially available gasoline, and alignment of aspects of ARB's SORE requirements with those of the U.S. EPA. The amendments are expected to increase compliance with the diurnal emission standards, require certification test fuel formulated to reflect motor vehicle fuel currently dispensed at California gasoline stations, and enable SORE manufacturers to obtain ARB and U.S. EPA certification for fuel tanks based on a common set of test results. The current regulatory structure requires separate fuel tank test results for ARB and U.S. EPA.

The following are the major amendments:

- Requiring all SORE with displacement greater than 80 cc to meet diurnal emission standards;
- Reducing the number of SORE engine units needed to be tested in ARB's initial compliance testing from five to one;
- Requiring bonds for manufacturers without sufficient U.S. assets to cover enforcement obligations;
- Requiring recertification of evaporative components every four years;
- Requiring test fuel formulation to contain 10 percent ethanol (E10) to reflect motor vehicle fuel currently available in California; and

- Aligning, where practical, and without compromising ARB requirements, SORE certification and test procedures with those of U.S. EPA.

Currently, only the individual evaporative emission system components (fuel tank, fuel lines, and carbon canisters) of design-certified SORE can be tested for compliance, without accounting for other sources of evaporative emissions, such as carburetors. Manufacturers of performance-certified SORE are only required to test a single unit for certification, while ARB currently is required to test five SORE units to determine compliance. These amendments harmonize the number of units needed for certification and initial compliance testing, thus enabling ARB to evaluate and take potential enforcement action against a larger number of SORE manufacturers.

Requiring all > 80 cc SORE to meet the diurnal emission standards will allow ARB to compliance test the assembled SORE as a unit to ensure compliance with those standards. Aligning compliance testing and certification testing requirements will also facilitate compliance testing by making the two sets of requirements comparable. This alignment will have the benefit of allowing ARB to perform more compliance tests with the same level of resources.

By establishing bonding requirements for manufacturers with less than \$3-10 million in U.S. assets, depending on the length of time they have had certified SORE in California, the amendments will help ensure SORE manufacturers have the ability to meet any potential monetary obligations associated with enforcement actions, and will deter manufacturers from knowingly producing non-compliant SORE products. The bonding requirements are similar to those already adopted by U.S. EPA and in use nationally.

Certification renewal every four years for evaporative components will require Executive Order holders to assess whether any changes have been made that would affect the components' evaporative emissions. This revision will also provide ARB with a mechanism through which deficiencies can be corrected by withholding certification until information is provided that demonstrates compliance with SORE evaporative emission standards.

The change in test fuel formulation will have no immediate effect on real-world ROG emissions because motor vehicle fuel dispensed at California gasoline stations has already been changed. Fuel at gasoline stations has contained 10 percent ethanol since January 2010. Therefore, SORE currently in use in California operate using E10 fuel. SORE that comply with the diurnal emission standards when tested with the current certification test fuel are expected to also comply when tested with E10 fuel. However, requiring E10 certification test fuel, along with the other amendments that are intended to increase compliance rates, will help to ensure SORE introduced into California commerce meet current emission standards with commercially available gasoline.

Aligning ARB SORE certification and test procedures with those of U.S. EPA, where possible, eliminates duplicative requirements and gives manufacturers the option to certify fuel tanks based on a common set of data acceptable to both ARB and U.S. EPA.

The amendments will enhance ARB's ability to identify non-compliant equipment, while not unfairly penalizing compliant manufacturers. The amendments will increase compliance with the existing diurnal emission standards, ensuring that ROG emissions reductions needed for the State Implementation Plan are achieved, while reducing near-source exposure to TACs and the associated health risk.

Comparable Federal Regulations:

When California's SORE evaporative emission standards were adopted in September 2003, no comparable federal rules existed. In 2008, the U.S. EPA adopted Title 40, Part 1060, to control evaporative emissions from new and in-use nonroad and stationary equipment. The federal rules laid out evaporative emissions standards for SORE equipment, including fuel tanks and lines, which were similar to existing California requirements for design certification. While federal and California evaporative component emissions standards are similar, there are some differences between California and federal certification and test procedures. The amendments will help to align California's fuel tank test procedures with federal requirements, but differences will still exist between the two regulations. The amendments deviate from, and are more stringent than federal requirements as follows:

- Requirements for California include diurnal emission standards that control all sources of emissions from SORE, whereas the federal requirements only control fuel tank permeation, fuel line permeation, and running loss emissions.
- The California fuel tank permeation emission standards at 40 °C are 1.5 g TOG·m⁻²·day⁻¹ for engines with displacement greater than 80 cc and 2.0 g TOG·m⁻²·day⁻¹ for engines with displacement less than or equal to 80 cc, whereas the federal fuel tank permeation emission standard at 40 °C is 2.5 g TOG·m⁻²·day⁻¹. The more stringent fuel tank standards are necessary to achieve the greater level of control of evaporative emissions needed in California.
- Requirements for California continue to require testing five fuel tanks for certification and compliance testing, whereas comparable federal requirements would only require testing between one and three fuel tanks. By requiring testing of more fuel tanks for certification and compliance testing, staff expects that manufacturers will place a greater emphasis on quality control and consistently producing compliant products.
- California regulations require manufacturers to maintain a bond of \$500 per engine, whereas comparable federal requirements specify a bond amount of

\$25 – \$200 per engine. This bond requirement was chosen as a means of ensuring that manufacturers would have sufficient funds to pay the maximum penalty for one violation allowed under California statutes in the event that equipment is found to be out of compliance. Violations are determined per engine or component and each day in which there is a violation is considered a separate violation.

- Preconditioning temperature profiles differ between the California requirements and existing federal requirements, although the amendments provide a pathway to allow a common preconditioning process to be used for both. The preconditioning temperature profile was chosen in order to accurately reflect the temperature profile that SORE equipment will be exposed to over its useful operating life in California.
- Fuel specification differs between the California requirements and existing federal requirements, although the amendments provide a pathway to allow a single fuel to be used for both. The test fuel was chosen in order to accurately reflect the fuel formulation that SORE equipment will be exposed to over its useful operating life in California.

Changes to the Regulations:

Pursuant to Government Code section 11346.8, ARB conducted a 15-day supplemental comment period on changes to the initially proposed regulations. The additional changes are similar to the changes initially proposed. They will further the overall objectives and benefits of the proposed regulations, and in particular they will improve the testing and certification procedures and facilitate compliance. The following summarizes the substantive modifications. It does not include all modifications to correct typographical or grammatical errors, changes in numbering or formatting, or to improve clarity.

1. Title 13, California Code of Regulations

In section 2751(b)(3), the sentence, “Starting January 1, 2020, it is presumed that replacement components are subject to this Article if they are capable of being used on an evaporative emission control system on a small off-road engine regulated under this Article,” was added.

In section 2752, several definitions were added, updated, or deleted. In section 2752(a)(1), the definition of “coextruded multilayer fuel tank” was deleted.

In section 2752(a)(1), a new definition for “ANSI/OPEI B71.10-2013” was added.

In section 2752(a)(5), the definition of “equivalent fuel line” was updated to include additional fuel line test procedures and to clarify that fuel specified in 40 CFR Part 1065.710(b) for general testing may be used when testing fuel lines.

In section 2752(a)(8), the definition of “evaporative family” was updated to restore the inclusion of equipment models in addition to engine models in the same class that are grouped together, and to require engines with displacement less than or equal to 80 cubic centimeters to be grouped based on their fuel tanks and fuel lines.

In section 2752(a)(10), the definition of “evaporative family emission limit differential (EFELD)” was updated to be based on the model of engine or equipment within the evaporative family that is expected to exhibit the highest diurnal emission rate relative to the applicable diurnal emission standard and to restore existing language specifying that an EFELD “is applicable to the entire evaporative family represented by the model.”

In section 2752(a)(12), a new definition of “fuel line” was added.

In section 2752(a)(19), a new definition of “organic material hydrocarbon equivalent” was added.

In section 2752(a)(22), a new definition of “production volume” was added.

In section 2752(a)(23), the existing definition of “reactive organic gases (ROG)” was restored and amended to include additional low-reactive organic compounds exempted by the U.S. EPA.

In section 2752(a)(25) through 2752(a)(28), new definitions of “SAE J30,” “SAE J1527,” “SAE J1737,” and “SAE J2996” were added.

In section 2752(a)(30), the existing definition of “small production volume tank exemption” was restored.

In section 2752(a)(24), the definition of “total organic gases (TOG)” was deleted.

In section 2753(b), the requirement to determine which model in an evaporative family is expected to exhibit the lowest diurnal emissions relative to the applicable diurnal emission standard was deleted.

In section 2753(b)(2)(B), additional fuel line test procedures were included in the list of procedures that may be used to determine fuel line permeation rates. Similar changes were made throughout Attachments 1-5.

In section 2753(c), the requirement to determine which fuel tank in an evaporative family is expected to exhibit the lowest permeation emissions relative to the applicable permeation emission standard was deleted.

In section 2753(f), the requirement for an applicant who has not held an Executive Order of Certification for a previous model year to submit diurnal emission test results for all evaporative families using engines with displacement greater than 80 cc beginning in model year 2020 was deleted.

In section 2754(a), references in Table 1 to total organic gases or TOG were changed to either “organic material hydrocarbon equivalent” or “reactive organic gases” (ROG). Similar changes were made throughout Attachments 1-5.

In section 2754(b)(2), the description of types of fuel lines that must meet the permeation emission standard was deleted and replaced with the definition of “fuel line.”

In section 2754(c)(2), an existing sentence allowing an applicant to “submit the Executive Order numbers approving the fuel tank and carbon canister pursuant to section 2767.1 of this Article” was restored.

In section 2754(d) and 2754(e), the phrase, “for model year 2020 and subsequent model years,” was added.

In section 2754.1(b)(5), the requirement to determine an evaporative family emission limit differential (EFELD) for each model in an evaporative family was deleted. One EFELD will apply to the entire evaporative family. An existing sentence was restored and amended to require the EFELD to be “determined based on the diurnal test results, in accordance with TP-902, of the model of engine or equipment within an evaporative family expected to exhibit the highest diurnal emission rate relative to the applicable diurnal emission standard.”

In section 2754.1(e), the description of sales and how to determine sales was deleted and replaced with the definition of “production volume” in section 2752. Similar changes to replace “sales” with “production volume” were made throughout Attachments 1-5.

In section 2754.1(h)(2), the requirement to obtain Executive Officer approval to use alternative methods of tracking engines for credit calculation purposes was deleted.

In section 2754.1(h)(3), a provision was added for the Executive Officer to approve or specify a different address for the submission of production volume reports. Similar changes regarding submission of reports or other correspondence were made throughout Attachments 1-5.

In section 2755, clarification was added that fuel lines used on equipment subject to the section must meet the permeation standards in the table. A permeation emission standard of 225 grams per square meter per day for fuel lines used on chainsaws was added to the permeation emission standards table.

In section 2756(c), a requirement was added for fuel caps used on engines with displacement greater than 80 cc to meet the durability requirements in TP-902 beginning in 2020. Clarification was added in the standards table that only subsections (a) and (b) apply before model year 2020.

In section 2758, language was amended to specify the implementation of the amended test procedures for determining compliance with sections 2754, 2755, and 2757. The amended test procedures will be optional for model years 2018 and 2019, and will be required for model year 2020.

In section 2759(c)(4)(D), the requirement to identify the location of manufacture on the emission label was deleted.

In section 2759(d)(1), the requirement for component certification labels to be readily visible when installed on an engine or equipment unit was deleted.

In section 2759(f), the provision to place a label under a hinged door or other readily opened or removed cover was amended to be "subject to the limitations of subsection (c)(2) of this section."

In section 2761(f)(1), the sentence, "Production volume must be provided for each equipment type by engine family and fuel tank volume within each evaporative family," was added.

In section 2761(f)(2), the paragraph describing sales and how to calculate them was deleted and replaced with the definition of "production volume" in section 2752(a)(22).

In section 2765(a)(1), the minimum number of fuel lines, carbon canisters, or fuel tanks included in a compliance test was restored to five.

In section 2765(a)(2), the minimum number of fuel lines, carbon canisters, or fuel tanks included in a compliance test was specified as five.

In section 2765(a)(8), the provision describing a second test for any engine or equipment unit with diurnal emissions within five percent of the applicable diurnal emission standard was deleted.

Section 2765(b) describing notification of failure was modified to describe averaging of independent test results provided to the Executive Officer by an Executive Order Holder. The subsection was also amended to specify that components will be deemed to have passed compliance testing if all five samples meet the applicable standards, and to describe additional inspection or testing the Executive Officer may conduct and information the Executive Officer will consider after a failure occurs in ARB's initial testing. Clarification was added that a passing determination in subsection (b) would overcome a failing determination under subsection (a) of section 2765.

In section 2765(c)(5)(D) and 2770(a)(4), cross-references were added to clarify that a suspension of certification under section 2765 could be appealed.

In section 2766(a) and 2766(b), the exemptions for low permeation tanks and small production volume tanks were restored and made available through model year 2019. These two exemptions will not be available in model year 2020 or subsequent model years.

In section 2774(d)(1), a reference to "production volume under §1054.225" was changed to "production volume under CP-901 or CP-902."

2. CP-901

In section 5.3, additional fuel line test procedures were included in the list of procedures that may be used to determine fuel line permeation rates. In section 6.11, the requirement to submit an engine or equipment unit for inspection or testing upon the request of the Executive Officer was modified to allow the unit to be submitted when it is available.

In section 7, the requirement to submit all test results was modified to require results only from emissions-related tests to be submitted. A provision was added to submit executive order numbers for fuel tanks and fuel lines in lieu of some of the description for these components. A requirement was added for an applicant to submit a "description of any Quality Assurance/Quality Control (QA/QC) protocols used by the applicant to ensure production fuel tanks and fuel lines in the evaporative family comply with the applicable emission standards throughout their useful life."

3. CP-902

In section 4.1, the requirement to submit all test results was modified to require results only from emissions-related tests to be submitted. Two sentences were restored that require an applicant to submit an application for certification for each evaporative family and require ARB to approve or disapprove an application within 90 days.

In section 5.14, the requirement to submit an engine or equipment unit for inspection or testing upon the request of the Executive Officer was modified to allow the unit to be submitted when it is available.

In section 6, the requirement to submit all test results was modified to require results only from emissions-related tests to be submitted. A provision was added to submit executive order numbers for fuel tanks, fuel lines, and carbon canisters in lieu of some of the description for these components. The recommended purge rate was added to the list of required information for carbon canisters in the certification application. A requirement was added for an applicant to submit a "description of any Quality Assurance/Quality Control (QA/QC) protocols used by the applicant to ensure production evaporative emission control systems and their components in the evaporative family comply with the applicable emission standards throughout their useful life."

4. TP-901

In section 3, a tolerance of 2 degrees Celsius was added to the required test temperature of 40 degrees Celsius. The discussion of potential bias due to relative humidity was deleted.

In section 5, a relative humidity measuring instrument was made an optional piece of equipment.

In section 6, clarification was added that fuel specified in 40 CFR Part 1065.710(b) for general testing may be used for this test procedure.

In section 7, the requirement for a balance calibration to be completed by an independent organization was deleted, and accuracy checks during use were deleted.

In section 8.1, the existing sentence, "tanks that have a secondary operation for drilling holes for insertion of fuel line and grommet system may have these eliminated for purposes of durability and permeation testing," was restored.

In section 8.2, the sentence, “As an alternative to rocking the fuel tank, use a laboratory sample orbital shaker table or similar device to subject the tank to a centripetal acceleration of at least 2.4 meter·second⁻² at a frequency of 2 ± 0.25 cycles per second for one million cycles,” was added. This sentence is similar to an existing sentence that was deleted in the originally proposed amendments.

In section 8.4, requiring fuel cap installation cycles was made optional.

In section 10(a), the option to seal a fuel tank by fusion welding or using another technique other than using a fuel cap was restored.

In section 11(a)(2) and 11(a)(8), measuring relative humidity was made optional.

5. TP-902

In section 1, the phrase, “with gross power production less than or equal to 19 kilowatts,” was removed from the applicability.

In section 2.1(c), the sentence, “as an alternative to rocking the fuel tank, use a laboratory sample orbital shaker table or similar device to subject the tank to a centripetal acceleration of at least 2.4 meter·second⁻² at a frequency of 2 ± 0.25 cycles per second for one million cycles,” was added. This sentence is similar to an existing sentence that was deleted in the originally proposed amendments.

In section 3, the mention of a correction factor for ethanol was removed.

In section 4, the sentence, “Ethanol measurements in this test procedure may be omitted if the hydrocarbon mass calculated for the hot soak and diurnal emission tests in section 5.5 is multiplied by 1.08 as described in Part III.D.11. of the “California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles,” as last amended September 2, 2015,” was added.

In section 5, the step “Purge Carbon Canister (if equipped)” was restored in Figure 1.

In section 5.1, the sentence, “Stop the engine and add fuel to fill the fuel tank to its nominal capacity,” was added. The default preconditioning temperature range was restored to 30 ± 10 °C rather than the originally proposed 38 °C or higher.

In section 5.2, the sentences, “For evaporative emission control systems that use a carbon canister, the canister must be purged following the

preconditioning period but prior to initiating the hot soak test. Purging consists of drawing 400 bed volumes of nitrogen or dry air through the canister at the canister manufacturer's recommended purge rate," were restored.

In section 6, clarification was added that fuel specified in 40 CFR Part 1065.710(b) for general testing may be used for this test procedure.

6. In addition to the modifications described above, additional modifications correcting grammar, punctuation and spelling have been made throughout the changes. These changes are nonsubstantive.

Consistency with Existing State Regulations

The California Air Resources Board received comments that some aspects of how compliance is determined are not the same as for other regulatory programs developed by the Board. This does not create any inconsistency with other State regulations, where those regulations apply to different sources of air pollution. These regulations are not inconsistent or incompatible with existing State regulations.