Attachment D

15-Day Modifications to the Original Proposal

Proposed Amendments to Small Off-Road Engine Evaporative Emissions Test Procedure, TP-902, Test Procedure for Determining Evaporative Emissions from Small Off-Road Engines

[Note: The originally proposed modifications to the regulatory language are shown in underline to indicate additions and ~~strikethrough~~ to indicate deletions. The proposed 15-day modifications to the proposed regulations are shown in double underline to indicate additions and ~~double strikethrough~~ to indicate deletions. Only these double underlined and ~~double strikethrough~~ modifications are subject to comment during this comment period. Only text with proposed 15-day modifications are included in this attachment. For all amendments to TP-902 approved by the Board during the December 9, 2021, hearing, refer to Staff Report: Initial Statement of Reasons Appendix D. The symbol "* * * * *" indicates that intervening text for which modifications are not proposed is not shown. [Bracketed text] is not part of the proposed amendments. Final page numbers subject to change upon Office of Administrative Law approval.]

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Small Off-Road Engine Evaporative Emissions Test Procedure

TP-902

Test Procedure for Determining Evaporative ~~Diurnal~~ Emissions from Small Off-Road Engines

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4. ~~INSTRUMENTATION~~Instrumentation

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4.3 Other Instruments and Equipment

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The balance shall be calibrated annually per the balance manufacturer's instructions, or more often as needed per the manufacturer instructions ~~(e.g., if the balance is moved)~~, using *Système International d'Unités* (SI)-traceable mass standards through National Institute of Standards and Technology (NIST) or another member of the Mutual Recognition Arrangement of the *Comité International des Poids et Mesures* (CIPM MRA). The SI-traceable mass standards shall be calibrated annually by an independent organization or more often as needed.

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5. ~~TEST PROCEDURE~~Test Procedure

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5.1 Evaporative Emission Control System Preconditioning

The purpose of the preconditioning period is to introduce gasoline into the evaporative emission control system and precondition all evaporative emission control system components. Precondition the evaporative emission control system by filling the fuel tank to its nominal capacity with fresh test fuel as specified in Section 6 of this procedure. After filling the tank, start the engine and allow it to run at maximum governed speed (unloaded or blade load) for approximately five minutes. Stop the engine and add fuel to fill the fuel tank to its nominal capacity. Soak the evaporative emission control system at 30 ± 10 °C for not less than 140 days. Measure and record the temperature at least every five minutes. Take steps to ensure that the fuel remains at nominal capacity throughout preconditioning. As an alternative, accelerated preconditioning of the evaporative emission control system can be accomplished by soaking at an elevated temperature. Accelerated preconditioning shall not be less than 70 days. Data documenting that the hot soak and diurnal emissions will not increase with further preconditioning must be provided for tanks soaked less than 140 days as follows: perform the test sequence in sections 5.2 through 5.4 twice, separated by at least 15 days, and calculate hot soak and diurnal emissions as described in section 5.5 of this procedure. The hot soak and diurnal emissions measured in the second test sequence must be no higher than the hot soak and diurnal emissions measured in the first test sequence to demonstrate that the hot soak and diurnal emissions will not increase with further preconditioning. The fuel tank shall be filled to nominal capacity and the evaporative emission control system shall continue to be preconditioned at the elevated temperature between the test sequences. Record the preconditioning temperature on the test report. The period of slosh testing and ultraviolet radiation exposure may be considered part of the preconditioning period provided the ambient temperature remains within the specified temperature range and each fuel tank is at least 50 percent full; fuel may be added or replaced as needed to conduct the specified durability tests. Record the fuel fill amount and dates on the test report if fuel is added or replaced. Drain the fuel tank and refill with fresh test fuel to nominal capacity 15 days prior to ending preconditioning. The fuel tank must not be empty for more than 15 minutes. Record the date and time the fuel tank is drained and refilled with fresh test fuel, and record the fuel fill amount on the test report.

5.2 Refueling and Hot Soak

Following the preconditioning period, drain the fuel tank and refill to 50 percent of its nominal capacity with test fuel. The fuel tank must not be empty for more than 15 minutes. Record the date and time the fuel tank is drained and refilled with fresh test fuel, and record the fuel fill amount on the test report. For evaporative emission control systems that use ~~a~~ an actively-purged carbon canister, the canister must be purged following the preconditioning period but prior to initiating the hot soak test. Prior to purging the carbon canister, measure and record the carbon canister mass on the test report (optional). Purging for an actively-purged carbon canister consists of drawing 400 bed volumes of ~~nitrogen or dry~~ air through the canister at the canister manufacturer's recommended purge rate. For evaporative emission control systems that use a passively-purged carbon canister, purging occurs due to vacuum created in the fuel tank when the engine is run in this section 5.2 and during forced cooling in section 5.3 of this procedure. Measure and record the carbon canister mass on the test report after purging (optional).

Perform a tilt sequence by rotating the test unit in three of the following four directions with respect to the plane on which the test unit sits and leaving the test unit in each position for 5 minutes: 90° forward, 90° backwards, 90° to the left, and 90° to the right. It is not required to tilt the engine in the direction which results in the air inlet of the engine pointing downward. This tilt sequence may be omitted for a test unit with displacement greater than or equal to 225 cc if engines from the evaporative family will not be used in equipment that is designed to be tilted during operation, transport, maintenance, or storage. Any fuel leaking from any part of the engine or evaporative emission control system denotes a failure and shall be reported on the test report. Measure and record the carbon canister mass on the test report after performing this tilt sequence (optional).

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5.4 24-Hour Diurnal Test

Immediately after soaking for two hours at 18.3 °C, purge the enclosure to reduce the hydrocarbon concentration to background levels and perform a 24-hour diurnal test using the temperature profile shown in Table 5-1. Measure and record the carbon canister mass after the diurnal test on the test report (optional).

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7. ~~ALTERNATIVE TEST PROCEDURES~~Alternative Test Procedures

Test procedures, other than specified above, such as the use of a mini-SHED to measure~~ diurnal~~ evaporative emissions, shall only be used if prior written approval is obtained from the CARB Executive Officer. In order to secure the CARB Executive Officer's approval of an alternative test procedure, the applicant is responsible for demonstrating to the CARB Executive Officer's satisfaction that the alternative test procedure is equivalent to this test procedure.

Procedure for Determining Carbon Canister Performance:
Durability Demonstration and Working Capacity

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6 ~~CARBON CANISTER WORKING CAPACITY DETERMINATION~~Carbon Canister Working Capacity Determination

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6.2 Canister Purge

The sequence starts by first purging the canister with 400 bed volumes of ~~dry~~ air ~~or nitrogen~~ in 30 minutes at laboratory conditions. Bed volume is the design volume of the carbon contained in the canister. The purge rate will therefore vary with canister size. Purge may be accomplished by drawing a vacuum at the tank or purge port, or by pushing air or N_2 into the atmospheric vent.