

Appendix D4

Purpose and Rationale for Proposed Appendix B2

TP-934 Test Procedure for Determining Evaporative Emissions from Model Year 2028 and Subsequent On-Road Motorcycles

California Government Code section 11346.2(b)(1) requires a description of the specific purpose for each proposed adoption, or amendment, the problem the agency intends to address with the proposed regulation, and the rationale for determining that each proposed adoption and amendment is reasonably necessary to both carry out the purposes of the California Air Resources Board (CARB) staff's Proposal and to address the problems for which it is proposed. **Applicable to all sections in this Appendix are the following:**

- It is necessary to create the "TP-934 Test Procedure for Determining Evaporative Emissions from Model Year 2028 and Subsequent On-Road Motorcycles," in order to clearly identify the applicable requirements for demonstrating compliance with the proposed new evaporative emission standards for 2028 and subsequent model year on-road motorcycles in title 13, section 1976(b)(2) and to identify for the regulated industry important certification and testing requirements.
- The provisions are necessary to ensure California achieves reduced emissions while providing a path for the regulated industry to certify their on-road motorcycles (ONMCs) and to provide clarity to the regulated industry.
- The general summary and rationale and descriptions of necessity in Section V of the Staff Report: Initial Statement of Reason are incorporated into this Appendix and apply to all provisions below.
- The provisions are necessary to implement and enforce test procedures.
- All timeframes specified were chosen to achieve consistency with similar provisions in the federal provisions, light-duty and medium-duty regulations. They were also chosen to provide the regulated industry with sufficient time to submit information or take certain actions while balancing CARB's need to receive information, engage in certification activities, and implement the regulations.

Introductory Paragraph

Purpose:

The purpose of the introductory paragraph is to clearly state that the applicable versions of those section of the Code of Federal Regulations (CFR) that are incorporated into this test procedure are shown in Section 9 of this test procedure.

Rationale:

This introductory paragraph is necessary to clearly explain how to implement the requirements in this test procedure.

Section 1 Applicability

Purpose:

The purpose of this subsection is to describe which vehicles this procedure applies to, which are on-road motorcycles in 2028 and subsequent model years. This subsection also specifies the authority that CARB has implementing the ONMC evaporative standards and test procedures.

Rationale:

This subsection is necessary to define which vehicle types and emissions the test procedure is applicable to. The subsection also clarifies the authority that CARB has in requiring the standards and procedures.

Subsection 1.1 Terms and Definitions

Purpose:

The purpose of this subsection is to define terms and acronyms used throughout the test procedure. These are needed to enable the reader to understand the terms and acronyms of the test procedure.

Rationale:

This subsection is necessary to clarify terms and acronyms that the reader may not be familiar with.

Subsection 1.1.1

Purpose:

The purpose of this section is to define the term "Administrator" used within the document to mean the CARB Executive Officer or authorized representative.

Rationale:

This definition is included to provide clarification when the term “Administrator” is used when referencing or using federal test procedures.

Subsection 1.1.2**Purpose:**

The purpose of this subsection is to define the use of the term “ARB” or “CARB” is used throughout the test procedure.

Rationale:

This purpose of this subsection is to clarify the acronym used throughout the test procedure.

Subsection 1.1.3**Purpose:**

The purpose of this section is to define the term “Deterioration Factor”.

Rationale:

This subsection is necessary to provide manufacturers with a way to determine deterioration factors when evaluating carry-over and carry-across factors for durability testing for evaporative emissions components.

Subsection 1.1.4**Purpose:**

The purpose of this section is to define the term “Executive Officer”.

Rationale:

This subsection is necessary to clarify the term and authority of the “Executive Officer” when used in the test procedure.

Subsection 1.1.5**Purpose:**

The purpose of this section is to define the term “horizontal plane”.

Rationale:

This subsection is necessary for manufacturers who need a precise description of the “horizontal plane” when applying it in the test procedure.

Subsection 1.1.5.1

Purpose:

The purpose of this section is to clarify the term “horizontal plane” applies for vehicles with two wheels.

Rationale:

This subsection is necessary for manufacturers who need a precise description of the “horizontal plane” for two-wheeled vehicles. The term clarifies the term when it is used as part of the carbon canister protection tip test to ensure the carbon canisters are effective throughout their useful life.

Subsection 1.1.6**Purpose:**

The purpose of this subsection is to define the term “methanol” when used in this test procedure.

Rationale:

This subsection is necessary to specify that the term “methanol” means methanol or ethanol, whichever term applies. Ethanol is used instead of methanol in this procedure, but the term has been referenced from federal test procedures for emissions testing.

Subsection 1.1.7**Purpose:**

The purpose of this subsection is to define the term “travel axis” when used in this test procedure.

Rationale:

This subsection is necessary for manufacturers who need a precise description of the “travel axis” when conducting the carbon canister protection tip test.

Subsection 1.1.8**Purpose:**

The purpose of this subsection is to define the term “upright axis” when used in this test procedure.

Rationale:

This subsection is necessary for manufacturers who need a precise description of the “upright axis” when conducting the carbon canister protection tip test.

Subsection 1.2 Test Data Availability

Purpose:

The purpose of this subsection is to require manufacturers provide specific information that supports performance of this procedure when requested by an Executive Officer.

Rationale:

This subsection is necessary to give CARB the authority to request specific information from a manufacturer about the system performance of a vehicle within a reasonable time when requested by CARB.

Subsection 1.3 Safety

Purpose:

The purpose of this subsection is to make explicit that manufacturers should observe all safety precautions while testing with the use of flammable materials in this test procedure.

Rationale:

This subsection is necessary to make explicit and remind manufacturers to that this test procedure uses flammable materials and to adhere to all safety precautions before starting the test procedure.

Subsection 1.4 Test Fuel Specification

Purpose:

The purpose of this subsection to specify which fuels can be used for testing in this test procedure.

Rationale:

This subsection is necessary to define which fuel can be used for testing purposes. Only the specified certification fuel can be used for certification of evaporative emissions. Any other fuel could result in a misrepresentation of the evaporative emissions measurement.

Subsection 1.5 Alternative Test Procedures

Purpose:

The purpose of this subsection is to allow the use of alternative test procedures. This subsection also clarifies how an alternative test procedure is to be determined.

Rationale:

This subsection is necessary to provide flexibility to manufacturers who may test to more stringent or alternative test procedures. This subsection may help to reduce duplicative testing when necessary.

Subsection 1.6 40 Part 1066

Purpose:

The purpose of this subsection is to allow the use of 40 CFR Part 1066 with modifications or updates to 40 CFR Part 86 as used in this test procedure.

Rationale:

This subsection is necessary to allow manufacturers who have updated their evaporative emissions testing to 40 CFR Part 1066 complaint equipment to use this test procedure.

Section 2 Principle and Summary of Test Procedures

Purpose:

The purpose of this section is to establish the test procedure for measuring evaporative emissions. This section also specifies the process of measuring evaporative emissions by subjecting vehicles to durability tests, preconditioning, hot soak evaporative test, and a diurnal test. Evaporative families and engine families are defined in these subsections and how these families must be tested.

This section establishes that durability testing and vehicle preconditioning must be conducted before evaporative emissions testing. A brief description of the measurement of evaporative emissions is discussed through a hydrocarbon analyzer in a sealed testing enclosure and the total mass is determined based on concentration, known molecular weight, and the volume of the testing enclosure.

A flow chart is presented in this section step through the test procedure.

Rationale:

This section is necessary to present an overview of the test procedure and clarify the process for testing vehicles. This section is also necessary to provide clarification of the testing process, instruments, calculations that are necessary to conduct the test procedure.

Section 3 Instrumentation

Purpose:

The purpose of this section is to set forth the requirements of the equipment to be used in this test procedure. This section references the exact documents used to determine the requirements.

Rationale:

It is necessary to define the minimum requirements of the equipment used to measure evaporative emissions and obtain meaningful results. It is also necessary to ensure the correct version with the correct provisions and requirements is used.

Subsection 3.1 Vehicle Test Enclosure

Purpose:

The purpose of this subsection is to define the dynamometer equipment specifications and calibrations for ONMC evaporative emissions testing.

Rationale:

This subsection is equivalent to the current test procedure and requirements of 40 CFR section 86.508-78, 40 CFR section 86.108-00, or 40 CFR section 86.108-79 (2012), 40 CFR 1066.210, or ECE/TRANS/180/Add.2 (2005). The calibration requirements and temperature were added as clarifications for manufacturers.

Subsection 3.2 Dynamometer

Subsection 3.2.1 and 3.2.2

Purpose:

The purpose of this subsection is to define the dynamometer equipment specifications and calibrations for ONMC evaporative emissions testing.

Rationale:

This subsection is equivalent to the current test procedure and requirements of 40 CFR section 86.508-78, 40 CFR section 86.108-00, or 40 CFR section 86.108-79 (2012), 40 CFR 1066.210, or ECE/TRANS/180/Add.2 (2005). The calibration requirements and temperature were added as clarifications for manufacturers.

Subsection 3.3 Fuel Vapor and Alcohol Hydrocarbon Analyzer

Purpose:

The purpose of this subsection is to specify the requirements of the fuel vapor and hydrocarbon analyzer used in this test procedure. This subsection also explains the use of an adjustment factor if a manufacturer chooses to not measure ethanol concentrations for this test procedure.

Rationale:

This subsection is equivalent to the current test procedure and requirements 40 CFR section 86.107-96(b). This adjustment factor is equivalent to section 11.3.b in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976.

Subsection 3.4 Test Data Recording System**Purpose:**

The purpose of this subsection is to list the required parameters of a data recording system to be used in this test procedure.

Rationale:

This subsection is necessary to ensure proper recording of specific parameters system so that a manufacturer can collect the correct information for the test procedure.

Subsection 3.5 Carbon Canister Bench Aging Equipment**Purpose:**

The purpose of this subsection is to specify the minimum equipment requirements of the carbon canister aging bench.

Rationale:

This subsection is necessary to ensure that the carbon canister aging bench operates according to the specification of this test procedure.

Subsection 3.6 Carbon Canister Test Bench**Purpose:**

The purpose of this subsection is to specify the minimum equipment requirements of the carbon canister test bench.

Rationale:

This subsection is necessary to ensure that the carbon canister test bench operates according to the specification of this test procedure.

Section 4 Durability Testing**Purpose:**

The purpose of this section is to set forth the durability demonstration procedures for evaporative emissions. This subsection also specifies the test procedure reference of the durability demonstration procedures. Additional durability test procedures are also added to ensure exposure is comprehensive. Manufacturers may use components that have already been used for testing if they determine deterioration factors. Manufacturers may also propose alternative durability test procedures if they demonstrate that the vehicle has gone through an equivalent durability exposure testing. Vehicles that have done through partial mileage service accumulation may complete the useful life durability through component bench testing. This is calculated by applying the remaining percentage of mileage that is not completed by the useful life to the total number of cycles.

Rationale:

This subsection is necessary to establish the durability demonstration procedures before evaporative emissions testing is to be conducted. Durability procedures are necessary to ensure that evaporative emissions are controlled throughout its useful life. The durability demonstration procedures are identical to the current test procedure outlined in "TP-901 - Test Procedure for Determining Permeation Emissions from Small Off-Road Engines and Equipment Fuel Tanks" (2017). Flexibility to meet the durability procedures is allowed for manufacturers who can demonstrate that the components have been exposed to similar conditions such as full useful life testing. Additionally, partial bench testing has been added for service accumulated components to allow manufacturers to reach useful life of the evaporative components without excessive testing.

Subsection 4.1

Purpose:

The purpose of this subsection is to outline the details of the durability test procedures for systems that utilize a carbon canister. In addition, this section references the carbon performance procedures before the durability testing is to be conducted.

Rationale:

This subsection is necessary so that the durability procedures are conducted consistently and exposed to conditions that degrade the carbon canister over its life. The durability procedures are designed to accelerate the degradation and expose the carbon canister to condition it would be exposed to throughout its useful life.

Subsection 4.1.1

Purpose:

The purpose of this subsection is to specify the cycles and temperature profiles that the carbon canister must be exposed to for the thermal cycling portion of the durability procedures.

Rationale:

This subsection is necessary to expose the carbon canister to temperatures it would experience throughout its useful life. As the carbon canister can be located near the engine, the high temperature corresponds to values when the engine is hot. The cold temperature is designed for canisters that are exposed to extreme lower temps. The thermal cycling subjects the carbon canister to conditions through these two extreme temperatures for 100 cycles.

Subsection 4.1.2

Purpose:

The purpose of this subsection is to outline the vibrational exposure requirements for the carbon canister test.

Rationale:

This subsection is necessary to establish criteria that is representative of a carbon canister vibrating near an engine and the ability to still be effective after a representative number of cycles.

Subsection 4.2

Purpose:

The purpose of this subsection is to outline the durability procedures for vehicle that use pressure vent valves. This subsection also specifies durability test temperatures and leak criteria of this section.

Rationale:

This subsection is necessary to specify the requirements for exposure a pressure vent valve so that it remains effective at controlling emissions over its useful life.

Subsection 4.2.1

Purpose:

The purpose of this subsection is to outline the vibration criteria for the durability testing.

Rationale:

This subsection is necessary to specify the vibration frequency, acceleration, and vibration displacement for durability testing of a pressure vent valve. The vibration profile is designed to be representative of useful life exposure.

Subsection 4.2.2

Purpose:

The purpose of this subsection is to outline the dust exposure criteria for the durability testing.

Rationale:

This subsection is necessary to specify the dust type, concentration, open/close pressures, and pressure/vacuum cycles for durability testing of a pressure vent valve. The dust exposure profile is designed to be representative of useful life exposure.

Subsection 4.2.3

Purpose:

The purpose of this subsection is to outline the ozone exposure criteria for the durability testing.

Rationale:

This subsection is necessary to specify the ozone concentration, temperature range, and exposure time for durability testing of a pressure vent valve. The ozone exposure profile is designed to be representative of useful life exposure.

Subsection 4.2.4

Purpose:

The purpose of this subsection is to outline the UV exposure criteria for the durability testing.

Rationale:

This subsection is equivalent to the current test procedure and requirements of 40 CFR section 1051.515 (d)(2).

Subsection 4.3

Purpose:

The purpose of this subsection is to establish two options that a manufacturer may choose to demonstrate that the canister is protected from exposure to liquid fuel when the motorcycle is tipped. This subsection also specifies the amount of fuel to be placed in the fuel tank during the procedure.

Rationale:

This subsection is necessary to ensure that carbon canisters are not exposed to fuel when tipped over or in a configuration that is not level to the vehicle. If carbon canisters are exposed to fuel, they will not be effective and unable to control evaporative emissions.

Subsection 4.3.1**Purpose:**

The purpose of this section is to outline the first option, Option 1, that a manufacturer may choose to demonstrate that the canister is protected from exposure to liquid fuel when the motorcycle is tipped. Option 1 is the carbon canister tip protection test procedure for vehicles or test rigs that applies to the X axis tip portion of the test procedure.

Rationale:

This subsection is necessary to specify the time required to orient the vehicle in the X axis and hold at the specified angle for two-wheel and all other vehicles.

Subsection 4.3.1.1**Purpose:**

The purpose of this section is to establish the Option 1 carbon canister tip protection test procedure for vehicles or test rigs that applies to the X axis tip portion of the test procedure.

Rationale:

This subsection is necessary to specify the time required to orient the vehicle in the X axis and hold at the specified angle for two-wheel and all other vehicles.

Subsection 4.3.1.2**Purpose:**

The purpose of this section is to establish the Option 1 carbon canister tip protection test procedure for vehicles or test rigs that applies to the Y axis tip portion of the test procedure.

Rationale:

This subsection is necessary to specify the time required to orient the vehicle in the Y axis and hold at the specified angle for two-wheel and all other vehicles.

Subsection 4.3.1.3

Purpose:

The purpose of this section is to specify the weight of the vehicle's carbon canister must be measured before and after each Option 1 test to determine weight gain. If the weight gain is 10% of the butane working capacity or more, the vehicle fails the test.

Rationale:

This subsection is necessary to clearly establish the criterion for failure of the Option 1 test.

Subsection 4.3.1.4**Purpose:**

The purpose of this section is to allow a manufacturer to request use of an alternative carbon canister protection tip tests and established criteria CARB will use to evaluate and approve or disapprove that request.

Rationale:

This subsection is necessary to provide manufacturers with flexibility in complying with the Option 1 test. This provision could potentially enable a manufacturer to save money without sacrificing the emission reduction benefits of this requirement.

Subsection 4.3.2**Purpose:**

This subsection outlines the use and requirements of the Option 2 alternative carbon canister tip tests. Manufacturers can also provide an engineering strategy to control liquid exposure of the carbon canister during a tip event.

Rationale:

The alternative tip test procedure is necessary to provide manufacturers with flexibility in meeting tip test requirement if they can find an equivalent or more stringent test method and would like to use it.

This section is necessary to allow manufacturers an alternative to the tip test is they can provide an engineering analysis of fuel exposure during tip event preventative products such as rollover vales.

Subsection 4.4**Purpose:**

The purpose of this subsection is to outline the fuel cap durability for the durability testing.

Rationale:

This subsection is necessary to specify the number of times that a fuel cap is to be installed and tightened before it is emissions tested. Fuel cap leaking are one of the highest sources of evaporative emissions and this procedure is designed to ensure fuel caps do not leak after its useful life. These cycles are identical to the current test procedure outlined in "TP-901 - Test Procedure For Determining Permeation Emissions From Small Off-Road Engine Equipment Fuel Tanks (2019)."

Section 5 Evaporative Emissions System Preconditioning

Purpose:

The purpose of this section is to establish the evaporative emissions system preconditioning procedures for introducing fuel into the fuel system and evaporative components.

Rationale:

This section is necessary to ensure that all evaporative components are exposed to the test fuel. Evaporative emissions take time to permeate through fuel system components. Permeation emissions are low at first but increase in time until the emissions begin to stabilize. This stabilization period is representative of emissions on a vehicle that has been exposed to fuel for long periods of time. It is important to precondition the system to test a vehicle with emissions representative of real-world emissions.

Subsection 5.1

Purpose:

The purpose of this section is to establish the preconditioning requirements for fuel system components. This subsection specifies various temperature profiles and time for fuel soaking from ambient temperatures to higher accelerated soaking temperatures. This subsection also allows soaking of complete system, components, or a test rig. Quality control of evaporative system component soaking for equivalency is also outline in this section.

Rationale:

This subsection is necessary to specify the time and temperatures that a fuel system must be subject to reach stabilization of permeation emissions. Higher accelerated temperature soaking has been added to allow flexibility with fuel soaking. As ambient fuel soaking can months, accelerated soaking can take less time and provide

equivalent permeation stabilization. The preconditioning procedures are identical to the current test procedure outlined in "TP-901 - Test Procedure for Determining Permeation Emissions from Small Off-Road Engines and Equipment Fuel Tanks" (2017). Flexibility to meet the durability procedures is allowed for manufacturers who can demonstrate that the components have been exposed to similar conditions such as full useful life testing. Additional preconditioning procedures are identical to the current test procedure outlined in "TP-933 Test Procedure for Determining Evaporative Emissions from Off-Highway Recreational Vehicles" (2014).

Subsection 5.2

Purpose:

The purpose of this subsection is to establish the procedures for preconditioning a carbon canister to be used for evaporative emissions testing.

Rationale:

This subsection is necessary to specify the temperatures over a period that carbon canisters are subject to. The section also is necessary to specify the requirements for preconditioning vehicles with multiple carbon canisters.

Subsection 5.2.1

Purpose:

The purpose of this subsection is to set requirements for determining carbon canister's butane working capacity.

Rationale:

This subsection is identical to the current test procedure outlined in subsection III.D.3.3.4 in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976.

Subsection 5.2.2

Purpose:

The purpose of this subsection is to state the preparation of the carbon canister to be purged and loaded for determination of the butane working capacity.

Rationale:

This subsection is identical to the current test procedure outlined in subsection III.D.3.3.4.1 in "California Evaporative Emission Standards and Test Procedures for

2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976.

Subsection 5.2.3

Purpose:

The purpose of this subsection is to specify the air and flow purge requirements for the canister purge.

Rationale:

This subsection is identical to the current test procedure outlined in subsection III.D.3.3.4.1 in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976. The nominal flow rate has been modified to 10 L/min as it is more representative of motorcycles through internal CARB testing.

Subsection 5.2.4

Purpose:

The purpose of this subsection is to specify the amount of butane to be loaded into the carbon canister and the specifications of the loading procedure.

Rationale:

This subsection is identical to the current test procedure outlined in subsection III.D.3.3.4 in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976.

Section 6 Evaporative Emissions Test Procedures

Purpose:

This section outlines the steps of the evaporative emissions testing in a flow chart.

Rationale:

This section is necessary to clarify the process for testing evaporative emissions from ONMCs in the following sections.

Subsection 6.1 Preconditioning Drive

Purpose:

The subsection specifies the drive cycles required to complete the preconditioning drive. The subsection also states the soak and test temperatures to be used throughout this section. As noted, these are contained in the World harmonized Motorcycle Test Cycle (WMTC) chassis-dynamometer test cycle in European Union (EU) Commission Delegated Regulation 134/2014 *consolidated version 20/03/2018*, Annex II, Appendix 6, section (3), which is incorporated by reference.

Rationale:

This subsection is necessary to define the drive cycles for the preconditioning drive and to explicitly state the required test and soak temperature range.

Subsection 6.1.1**Purpose:**

The purpose of this subsection outlines the steps to be followed before the preconditioning drive.

Rationale:

This subsection is necessary to specify the requirements to be conducted before driving the preconditioning drive.

Subsection 6.1.1.1**Purpose:**

The purpose of this section outlines the fuel and drain requirements before the preconditioning drive.

Rationale:

This subsection is necessary to specify the requirements of filling the vehicle for repeatable evaporative emissions measurements.

Subsection 6.1.1.2**Purpose:**

This subsection outlines the soak requirements before the preconditioning drive. This subsection also outlines the first WMTC preconditioning driving cycle. The first preconditioning driving cycle can be omitted if within specified temperatures and time.

Rationale:

This subsection is necessary to allow the fuel system to stabilize and normalize to laboratory temperatures.

Subsection 6.1.1.3

Purpose:

This subsection outlines the fuel and drain requirements after the first soak and WMTC preconditioning drive cycle. The timing of the refueling, fuel cap installation, and parking after the completion of the preconditioning drive is also specified.

Rationale:

This subsection is necessary to explicitly specify the fuel tank fill requirements. The vehicle placement and parking are specified to ensure the vehicle remains in laboratory conditions and is stabilized before the next step.

Subsection 6.1.1.4

Purpose:

The purpose of this section is to outline the soak requirements following the first preconditioning drive.

Rationale:

This subsection is identical to the current test procedure outlined in subsection III.D.3.3.3 in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976.

Subsection 6.1.1.5

Purpose:

The purpose of this subsection is to require the purging and loading of the carbon canister procedure during the soak period. The subsection specifies the sections to load and purge the carbon canister.

Rationale:

This subsection is necessary to ensure the carbon canister is properly conditioned and prepared to test use during the hot soak test and diurnal test. This subsection is identical to the current test procedure outlined in subsection III.D.3.3.4.1 in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and

Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976.

Subsection 6.1.1.6

Purpose:

The purpose of this subsection is to specify the requirements of location and speed of the fan used to cool the vehicle.

Rationale:

This subsection is necessary to ensure proper cooling of the vehicle during the test procedure.

Subsection 6.1.1.7

Purpose:

The purpose of this subsection is to require an additional WMTC preconditioning drive cycle.

Rationale:

The final drive cycle is necessary to ensure that the carbon canister is purged by the vehicle as is representative of normal in use driving and then put into storage. Evaporative emissions are then measured by a hot soak and diurnal test.

Subsection 6.1.1.8

Purpose:

The purpose of this subsection is to simulate the real world condition of stopping a vehicle for one hour upon arrival to destination.

Rationale:

The test procedure is designed to simulate real world conditions on the fuel system and evaporative components. The first WMTC is designed to represent a drive to a destination, then a one hour rest period, followed by an additional WMTC drive back to the starting point.

Subsection 6.1.1.9

Purpose:

The purpose of this subsection is to require an additional WMTC preconditioning drive cycle.

Rationale:

The final drive cycle is necessary to ensure that the carbon canister is purged by the vehicle as is representative of normal in use driving and then put into storage. Evaporative emissions are then measured by a hot soak and diurnal test.

Subsection 6.2 Hot Soak Test

Purpose:

The purpose of this subsection is to specify the hot soak temperatures and the requirements of the cooling or heating system.

Rationale:

This subsection is identical to the current test procedure outlined in subsection IV.4.v and III.A.3.2 in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976.

Subsection 6.2.1

Purpose:

The purpose of this subsection to require that enclosure is purged before the preconditioning drive cycle.

Rationale:

This subsection is necessary to ensure that any emissions in the enclosure are removed before testing the vehicle.

Subsection 6.2.2

Purpose:

The purpose of this subsection is to zero and span the FID analyzer before the hot soak test.

Rationale:

This subsection is identical to the current test procedure outlined in subsection III.B.1.1.3.1 in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976 The fan speed has been reduced to 0.8 cfm to address the smaller volume of the vehicle in the enclosure.

Subsection 6.2.3

Purpose:

The purpose of this place fresh alcohol impingers in the sample system before the start of the test if applicable.

Rationale:

This subsection is necessary to ensure that measurement of the alcohol concentration is accurate to account for ethanol emissions in the enclosure.

Subsection 6.2.4**Purpose:**

The purpose of this section is to specify when to turn on the mixing fans and the requirements of the fan speed.

Rationale:

This subsection is identical to the current test procedure outlined in subsection III.A.2.1.3.2 in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976. The fan speed has been reduced to 0.8 cfm to address the smaller volume of the vehicle in the enclosure.

Subsection 6.2.5**Purpose:**

The purpose of this subsection is to analyze the enclosure for hydrocarbons and alcohol and record the information.

Rationale:

This subsection is identical to the current test procedure outlined in subsection III.D.9.3 in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976.

Subsection 6.2.6**Purpose:**

The purpose of this subsection is to specify the state of the vehicle when it is to be pushed into the enclosure.

Rationale:

This subsection is identical to the current test procedure outlined in subsection III.D.3.3.6.3 in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976.

Subsection 6.2.7**Purpose:**

The purpose of this subsection is to specify when the hot soak enclosure doors are to be closed after engine shutdown.

Rationale:

This subsection is identical to the current test procedure outlined in subsection III.D.9.5 in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976.

Subsection 6.2.8**Purpose:**

The purpose of this section is to state the beginning of the hot soak test and state the specified temperature of the test.

Rationale:

This subsection is identical to the current test procedure outlined in subsection III.D.9.6 and III.D.9.7 in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976.

Subsection 6.2.9**Purpose:**

The purpose of this subsection is to specify when to analyze and record the enclosure for hydrocarbons and alcohol.

Rationale:

This subsection is identical to the current test procedure outlined in subsection III.D.11 in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976.

Subsection 6.3 Diurnal Test

Purpose:

The purpose of this subsection is to establish the procedure for measuring diurnal emissions.

Rationale:

This subsection is necessary to specify the process for conducting the diurnal test over three consecutive 24-hour cycles following the hot soak test.

Subsection 6.3.1

Purpose:

The purpose of this subsection is to outline the 72-hour diurnal testing that is to be performed on the vehicle. This subsection specifies the temperatures of the enclosure to be stabilized between the hot soak and diurnal period. The subsection then specifies the diurnal test procedure and ambient temperature profiles to be used for testing.

Rationale:

This subsection is necessary to specify the temperatures that are required between the hot soak and diurnal portions of the test procedure. This subsection is also necessary to establish the test procedure and ambient temperature profile to be used for diurnal testing. This subsection is identical to the current test procedure outlined in section III.D.10.3.7 in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976 and 40 CFR section 1066.955 or 86.133-96.

Subsection 6.3.1.1

Purpose:

The purpose of this subsection is to define the term "methanol" as "ethanol" to be used through the diurnal test procedure.

Rationale:

This subsection is identical to the current test procedure outlined in subsection III.B.1 in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976. The fan speed has been reduced to 0.8 cfm to address the smaller volume of the vehicle in the enclosure.

Subsection 6.3.1.2

Purpose:

The purpose of this subsection is to clarify the references of hot soak in the federal regulations or CARB evaporative test procedure to refer to the hot soak test of section 6.2.

Rationale:

This subsection is necessary to ensure that manufacturers reference the hot soak test procedure of this document and not the hot soak procedure in the federal regulation when conducting the diurnal test.

Subsection 6.3.1.3

Purpose:

The purpose of this subsection is to clarify the calculations in the federal regulations or CARB evaporative test procedure are to be replaced with the calculations in Section 7 of this test procedure.

Rationale:

This subsection is necessary to ensure that manufacturers reference the hot soak test procedure of this document and not the hot soak procedure in the federal regulation when conducting the diurnal test.

Subsection 6.3.1.4

Purpose:

The purpose of this subsection is to omit specific language from the federal regulations or CARB evaporative test procedure that refer to alternative options for testing the diurnal test.

Rationale:

This subsection is necessary to ensure that manufacturers follow the protocol listed in this section and not the other diurnal testing as reference in the other procedures of this section.

Subsection 6.3.1.5

Purpose:

The purpose of this subsection is to omit specific language from the federal regulations or CARB evaporative test procedure that refer to alternative options for testing the diurnal test, adjust air/temp circulation, and specified diurnal test sequences.

Rationale:

This subsection is necessary to ensure that manufacturers follow the protocol listed in this section and not the other diurnal testing as reference in the other procedures of this section.

Subsection 6.3.1.6

Purpose:

The purpose of this section is to modify the language of the test procedures that change the initial diurnal temperatures from 72F to 65F.

Rationale:

This subsection is identical to the current test procedure outlined in subsection III.D.10.3.1 and III.D.1.1 in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976.

Subsection 6.3.1.7

Purpose:

The purpose of this section is to modify the language of the federal test procedure to change the ambient temperature profile.

Rationale:

This subsection is identical to the current test procedure outlined in subsection III.D.10.3.7 in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976.

Subsection 6.3.1.8

Purpose:

The purpose of this section is to omit language from the reference test procedures that refer to windows and luggage compartments.

Rationale:

This subsection is necessary to remove language that does not apply to on-road motorcycles.

Subsection 6.3.1.9**Purpose:**

The purpose of this add language to the test procedure that is consistent the current CARB evaporative test procedure is a testing lab is using the federal test procedures.

Rationale:

This subsection is identical to the current test procedure outlined in subsection III.D.10.3.5 in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976. This section is necessary to clarify the sampling of evaporative emissions and the timing.

Subsection 6.3.1.10**Purpose:**

The purpose of this section is to omit language from the reference test procedures that refer to windows and luggage compartments.

Rationale:

This subsection is necessary to remove language that does not apply to on-road motorcycles.

Section 7 Calculations: Evaporative Emissions**Purpose:**

The purpose of this section is to explain how manufacturers can calculate total mass emissions from the concentration measurements to be used for certification purposes. This section also includes an adjustment factor for ethanol measurements and a clarification of vehicle volume for Sealed Housing for Evaporative Determination (SHED) calculations.

Rationale:

This section is necessary to make explicit parameters for calculating evaporative emissions from on-road motorcycles. The ethanol adjustment factor is necessary to properly account for ethanol measurements in evaporative emissions calculations. The vehicle volume is identical to the current test procedure outlined in subsection IV.4.vi in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976.

Section 8 List of Terms

Purpose:

This section outlines a list of acronyms used throughout the test procedure.

Rationale:

This section is necessary to provide an accessible list of acronyms and their full description for manufacturers who are not familiar with the acronyms.

Section 9 Documents Incorporated by Reference

Purpose:

This section outlines the documents referenced throughout the test procedure.

Rationale:

This section is necessary to define the exact references so that manufacturers can find and review the documents used to support the test procedure.

Section 10 Appendices

Subsection 10.1

Purpose:

The purpose of this subsection is to specify the parameters and specifications of a variable speed cooling blower that is to be used for the test procedure.

Rationale:

Manufacturers must run the motorcycle through different speeds, conditions, and temperatures that can affect the heating of the engine. This heating can affect the performance of the on-road motorcycle and even cause it stall. Proper cooling is necessary to ensure a repeatable test procedure and performance of the vehicle being tested.

Subsection 10.2

Purpose:

The purpose of this subsection is to require the activated carbon in the canister to be effective in controlling emissions after a set amount of load /purge cycles.

Rationale:

This subsection is necessary to establish a performance criterion for the carbon after it has been purge and loaded a set amount of times. This ensures that the carbon is still effective at controlling emissions after it has been purged and loaded a set number of times. The cycle is identical to the current test procedure outlined in subsection III.D.12.3 and III.D.3.3.4 in "California Evaporative Emission Standards and Test Procedures for 2001 through 2025 Model Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Heavy-Duty Vehicles and 2001 through 2027 Model Year Motorcycles," incorporated by reference in title 13, CCR, section 1976.