

APPENDIX F

State of California
AIR RESOURCES BOARD

CALIFORNIA REFUELING EMISSION STANDARDS AND TEST PROCEDURES FOR 2001 AND SUBSEQUENT MODEL MOTOR VEHICLES

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Amended: March 22, 2012
Amended: [INSERT DATE OF AMENDMENT]

Note: Note: The proposed amendments to this document are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions compared to the test procedures as amended March 22, 2012. [No change] indicates proposed federal provisions that are also proposed for incorporation herein without change. Existing intervening text that is not amended in this rulemaking is indicated by “* * * *”.

NOTE: This document is incorporated by reference in section 1978(b), title 13, California Code of Regulations (CCR). Additional requirements necessary to complete an application for certification of motor vehicles are contained in other documents that are designed to be used in conjunction with this document. These other documents include:

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3. ~~"California Exhaust Emission Standards and Test Procedures for 2009 and Subsequent Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck, and Medium-Duty Vehicle Classes"~~ "California Exhaust Emission Standards and Test Procedures for 2009 through 2017 Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes" (incorporated by reference in section 1962.1(h), title 13, CCR).

4. "California Exhaust Emission Standards and Test Procedures for 2018 and Subsequent Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," (incorporated by reference in section 1962.2(h), title 13, CCR).

45. "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles" (incorporated by reference in section 1976(c), title 13, CCR).

56. "Malfunction and Diagnostic System Requirements for 1994 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines" (incorporated by reference in section 1968.1, title 13, CCR).

67. "Malfunction and Diagnostic System Requirements for 2004 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines" (incorporated by reference in section 1968.2, title 13, CCR).

78. "Specifications for Fill Pipes and Openings of Motor Vehicle Fuel Tanks" (incorporated by reference in section 2235, title 13, CCR).

CALIFORNIA REFUELING EMISSION STANDARDS AND TEST PROCEDURES FOR 2001 AND SUBSEQUENT MODEL MOTOR VEHICLES

The provisions of Title 40, Code of Federal Regulations (CFR), Part 86, Subparts B (as adopted or amended by the U.S. Environmental Protection Agency (U.S. EPA) on the date listed) and S (as adopted on May 4, 1999, or as last amended on such other date set forth next to the 40 CFR Part 86 section title listed below) to the extent they pertain to the testing and compliance of vehicle refueling emissions for passenger cars, light-duty trucks and medium-duty vehicles, are hereby adopted as the "California Refueling Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles," with the following exceptions and additions.

Subpart S Requirements

I. General Certification Requirements for Refueling Emissions

A. Applicability

1. These refueling standards and test procedures shall apply ~~are applicable~~ to all new 2001 and subsequent model gasoline-fueled, alcohol-fueled, diesel-fueled, liquefied petroleum gas-fueled, natural gas-fueled, and hybrid electric vehicles ~~passenger cars (including 2012 and subsequent model-year off-vehicle charge capable hybrid electric vehicles), light-duty trucks and medium-duty vehicles with a gross vehicle weight rating of less than 8,501 lbs., and to all new complete 2015 and subsequent model gasoline-fueled, alcohol-fueled, diesel-fueled, liquefied petroleum gas-fueled, natural gas-fueled, and hybrid electric (including 2012 and subsequent model-year off-vehicle charge capable hybrid electric vehicles) medium-duty vehicles with a gross vehicle weight rating of 8,501 through 14,000 lbs.~~ as provided in Table 1. A manufacturer may elect to certify 2009 through 2011 model-year off-vehicle charge capable hybrid electric vehicles using these provisions. In cases where a provision applies only to a certain vehicle group based on its model year, vehicle class, motor fuel, engine type, or other distinguishing characteristics, the limited applicability is cited in the appropriate section or paragraph.

Table 1: Applicability Table

<u>Vehicle Category</u>	<u>Model Years Subject to These Refueling Standards and Test Procedures</u>
<u>Passenger cars and light-duty trucks under 8,501 lbs. gross vehicle weight rating (GVWR), and medium-duty passenger vehicles.</u>	<u>2001 and subsequent</u>
<u>Complete medium-duty vehicles from 8,501 through 14,000 lbs. GVWR</u>	<u>2015 and subsequent</u>
<u>Complete heavy-duty vehicles greater than 14,000 lbs. GVWR</u>	<u>2022 and subsequent</u>

* * * *

8. The specifications for the fuel used in certification or in-use testing are set forth in Table 2 below. 40 CFR §86.113-94 [February 18, 2000]. Alternatively, California certification fuel specified in Part II, A.100.3.1.2 (test fuel with 10 percent ethanol) of the “California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles” may be used for 2015 and subsequent model vehicles for certification or in-use testing as long as California temperatures are applied as described in Subpart B, section II.B.5.2.

Table 2: Test Fuel

<u>Vehicle Model Year</u>	<u>Permissible Test Fuels⁽¹⁾</u>
<u>Up through 2016</u>	<u>Federal E0, Federal E10, or California E10⁽²⁾</u>
<u>2017 and subsequent</u>	<u>Federal E10 or California E10⁽²⁾ for vehicles that are required to use California E10 or Federal E10 for certification to the evaporative emission standards of “California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles .”</u> <u>Federal E0, Federal E10, or California E10⁽²⁾ for vehicles that are not required to use California E10 or Federal E10 for certification to the evaporative emission standards of “California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles.”</u>

- (1) For flex-fueled vehicles, the fuel blend set forth in 40 CFR §86.1810-17(h)(2) (April 28, 2014) may be used in lieu of the permissible test fuels set forth in Table 2.
- (2) When using California E10 test fuel, California temperatures shall be applied as described in Subpart B, section II.B.5.2.

B. Definitions, Acronyms, Terminology

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2. “California E10” means the test fuel set forth in Part II, A.100.3.1.2 of the “California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles.”

3. “Federal E0” means the test fuel set forth in 40 CFR § §1065.710(c) [April 28, 2014].

4. "Federal E10" means the test fuel set forth in 40 CFR §1065.710(b) [April 28, 2014].

C. Useful Life

1. Delete ~~§86.1805-01; §86.1805-04; §86.1805-17~~ and replace with:

"Useful life" shall have the same meaning as provided in title 13, CCR, §2112.

* * * *

E. General Standards, increase in emissions; unsafe conditions; waivers

1. Amend §86.1810-01 [~~July 12, 2001~~ April 28, 2014] as follows:

* * * *

1.4. (m) ~~Substitute compliance with applicable refueling emission standards set forth in section I.I.F. of these test procedures instead of with the standards set forth in §86.1811-04(e); §86.1812-01(e); §86.1813-01(e); and, §86.1816-05(e). [No change.]~~

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F. Emission Standards

1. Delete 40 CFR §§86.1811 through 86.1816 (all years).

2. The maximum refueling emissions for ~~2001 and subsequent model passenger cars, light-duty trucks and medium-duty vehicles with a gross vehicle weight rating less than 8,501 lbs., and 2015 and subsequent model complete medium-duty vehicles with a gross vehicle weight rating 8,501 through 14,000 lbs.~~ applicable vehicles for the full useful life are:

2.1. For gasoline-fueled, alcohol-fueled, diesel-fueled, fuel-flexible, and hybrid electric vehicles: 0.20 grams hydrocarbons per gallon of fuel dispensed. [For purposes of these test procedures, hydrocarbons shall mean organic material hydrocarbon equivalent for alcohol-fueled vehicles.] For liquefied petroleum gas-fueled vehicles: 0.15 grams hydrocarbons per gallon of fuel dispensed.

2.2. Vehicles powered by diesel fuel are not required to conduct testing to demonstrate compliance with the refueling emission standards set forth above, provided that all of the following provisions are met:

(A) The manufacturer ~~can attest that to the following evaluation: "Due to the low vapor pressure of diesel fuel and the vehicle tank temperatures, hydrocarbon vapor concentrations are low and the vehicle meets~~

~~the 0.20 grams/gallon refueling emission standard without a control system.~~ vehicle meets the 0.20 grams/gallon refueling emission standard; and

(B) The certification requirement described in section I.F.2.2.(A) is provided in writing and applies for the full useful life of the vehicle.

2.3. ~~Incomplete vehicles~~ Vehicles of 14,000 pounds gross vehicle weight rating or less that are certified as incomplete vehicles for the purposes of evaporative emissions testing as set forth in the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles," are not required to demonstrate compliance with the refueling emission standards set forth in 2.1.

G. Durability Demonstration procedures for refueling emissions.

1. §86.1825-01 Durability Demonstration procedures for refueling emissions [October 6, 2000] [No change.]

2. Amend §86.1829-15(e) Durability and emission testing requirements; waivers. [April 28, 2014] as follows:

2.1. (1) [No change.]

2.2. (2) [No change.]

2.3. (3) [No change.]

2.4. (4) See the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles."

2.5. (5) [No change.]

2.6. (6) See the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles."

2.7. (7) [Delete]

2.8. (8) [Delete]

2.9. (9) [No change.]

Subpart B - Emission Regulations for 1977 and Later Model Year New Light-Duty Vehicles and New Light-Duty Trucks; Test Procedures

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II. Refueling Emissions Test Procedures

A. Fuel Spitback Emissions

1. §86.146-96 Fuel dispensing spitback procedure [August 23, 1995] [No change.]

B. Refueling Emissions

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4. §86.153-98 Vehicle and canister preconditioning; refueling test [~~December 8, 2005~~] [April 28, 2014]

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4.1.1. Add subparagraph (a)(1): 2012 and subsequent model-year off-vehicle charge capable hybrid electric vehicles equipped with non-integrated refueling canister-only systems. Such vehicles and vapor storage canisters shall be preconditioned in accordance with the preconditioning procedures for the two-diurnal evaporative emissions test specified in 40 CFR 86.132-96(a) through (j) [April 28, 2014], with the following exceptions.

* * * *

4.1.3. After the second fuel drain and tank refill step is completed, the initial testing state of the canister shall be established by purging while performing vehicle driving, using either the chassis dynamometer procedure or the test track procedure, as described in subparagraphs (d)(1) and (d)(2) of 40 CFR 86.153-98 [April 28, 2014]. For vehicles equipped with dual fuel tanks that can be individually selected or isolated, the required volume of fuel shall be driven out of one tank, the second tank shall be selected as the fuel source, and the required volume of fuel shall be driven out of the second tank. A manufacturer shall plan for interruptions in the vehicle drivedowns due to factors such as work schedules, driver relief, and test equipment considerations, using good engineering practice.

4.1.3.1. The vehicle drivedown will consume 85%, or less as determined by the manufacturer, of the manufacturers' nominal fuel tank capacity,

4.1.3.2. In order to reduce the amount of time required to consume 85 percent of the fuel tank capacity, as required by either subparagraph (d)(1) or (d)(2) in 40 CFR 86.153-98 [April 28, 2014], as applicable, a manufacturer may elect to set the

battery state- of- charge at a level that maximizes the amount of engine operation, prior to conducting either the chassis dynamometer or the test track driving procedure, as applicable.

4.1.3.3. With advance Executive Officer approval, a manufacturer may optionally elect to bench purge the canister either during the initial soak period, specified in 40 CFR §86.132-96(c)(1) [April 28, 2014], or after the vehicle preconditioning drive step specified in section II.B.4.1., in lieu of performing the second fuel drain/fill and vehicle drivedown steps specified in sections II.B.4.1.2. and II.B.4.1.3. Approval by the Executive Officer shall be based upon assurance that the canister will be bench purged by an equivalent volume of air corresponding to a consumption of 85%, or less as determined by the manufacturer, of the manufacturers' nominal fuel tank capacity, and that the characteristics of the purge flow through the canister, such as flow rates, shall be representative of flow that occurs under the specified vehicle drivedown UDDS cycles. Within 60 minutes of completing the bench purging, the fuel drain and fill step specified in section II.B.4.1.4., shall be performed.

* * * *

4.4. Amend subparagraph (d) as follows: Canister purging: nonintegrated systems. For all vehicles, except for 2012 and subsequent model-year off-vehicle charge capable hybrid electric vehicles equipped with non-integrated refueling canister-only systems, within one hour of completion of canister loading to breakthrough, the fuel tank(s) shall be further filled to 95 percent of nominal tank capacity determined to the nearest one-tenth of a U.S. gallon (0.38 liter) with the fuel specified in Sec. 86.113-94. During this fueling operation, the refueling emissions canister(s) shall be disconnected, unless the manufacturer specifies that the canister(s) should not be disconnected. Following completion of refueling, the refueling emissions canister(s) shall be reconnected, if the canister was disconnected during refueling. Special care shall be taken during this step to avoid damage to the components and the integrity of the fuel system. For all vehicles, including 2012 and subsequent model-year off-vehicle charge capable hybrid electric vehicles equipped with non-integrated refueling canister-only systems, vehicle driving to purge the refueling canister(s) shall be performed using either the chassis dynamometer procedure or the test track procedure, as described in subparagraphs (d)(1) and (d)(2) of 40 CFR 86.153-98 [April 28, 2014]. The Executive Officer may choose to shorten the vehicle driving for a partial refueling test as described in subparagraph (d)(3) of 40 CFR 86.153-98 [April 28, 2014]. For vehicles equipped with dual fuel tanks that can be individually selected or isolated, the required volume of fuel shall be driven out of one tank, the second tank shall be selected as the fuel source, and the required volume of fuel shall be driven out of the second tank. A manufacturer shall plan for interruptions in the vehicle drivedowns due to factors such as work schedules, driver relief, and test equipment considerations, using good engineering practice.

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4.4.2.1. In order to reduce the amount of time required to consume 85 percent of the fuel tank capacity, as required by either subparagraph (d)(1) or (d)(2) in 40 CFR 86.153-98 [April 28, 2014], as applicable, a manufacturer may elect to set the battery state-of-charge at a level that is less than specified in section II.B.4.4.2., prior to conducting either the chassis dynamometer or the test track driving procedure, as applicable. Such an election shall be allowed by the Executive Officer unless information, such as in-use test results, or other applicable information that may become available, indicates that such an election compromises the stringency of the test procedures.

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4.4.10. When the optional canister bench purge specified in section II.B.4.4.8. is elected, the 10-percent fuel tank volume specified in 40 CFR 86.153-98(e) [April 28, 2014], may be established by using a measured drain of the fuel tank, within 60 minutes of completing the canister bench purge.

4.5. Subparagraph (e) [No change.]

5. §86.154-98 Measurement procedure; refueling test [August 23, 1995]
5.1. Subparagraphs (a) through (d) [No change.]
5.2. Amend subparagraph (e) (6) to include: If using California certification fuel, the fuel shall be dispensed at a temperature of 79 ± 1.5 °F (26.1 ± 0.8 °C) and at a dispensing rate of 9.8 ± 0.3 gal/min (37.1 ± 1.1 liter/min).

6. §86.155-98 Records required; refueling test [April 6, 1994] [No change].

7. Amend §86.156-98 Calculations [April 6, 1994] [No change.] as follows:

7.1 Amend subparagraph (a) to include: Ethanol in the emissions shall be accounted for via measurement as indicated in §86.143-96, or mass adjustment factor using the method described in section III.D.11 of the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles," for vehicles tested with California E10, Federal E10, or the test fuel specified in 40 CFR §86.1810-17(h)(2).

7.2 Subparagraph (b) [No change.]

7.3 Subparagraph (c) [No change.]