

APPENDIX F

PROPOSED AMENDMENTS TO THE ON ROAD VAPOR RECOVERY TEST PROCEDURES

State of California
AIR RESOURCES BOARD

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

Adopted: August 5, 1999
Amended: September 5, 2003
Amended: June 22, 2006
Amended: October 17, 2007
Amended: [insert amended date]

Note: Proposed amendments to this document are shown in underline to indicate additions and ~~strikeouts~~ to indicate deletions compared to the test procedures as last amended October 17, 2007. Existing intervening text that is not amended is indicated by a row of asterisks (* * * *).

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:

1. “California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles” (incorporated by reference in section 1961(d), title 13, CCR);
2. “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” (incorporated by reference in section 1962.1(h), title 13, CCR);
3. “California Evaporative Emission Standards and Test Procedures For 2001 and Subsequent Model Motor Vehicles” (incorporated by reference in section 1976(c), title 13, CCR).
4. “Malfunction and Diagnostic System Requirements – 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).
5. “Malfunction and Diagnostic System Requirements – 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).
6. “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 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 passenger cars (including 2011 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. A manufacturer may elect to certify a 2009 or a 2010 model-year off-vehicle charge capable hybrid electric vehicle 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.

2. For general certification purposes, the requirements set forth in the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles;" the "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;" and the "California Evaporative Emission Standards and Test Procedures For 2001 and Subsequent Model Motor Vehicles," shall apply, except as otherwise noted in these test procedures.

3. Reference to vehicle sales throughout the United States shall mean vehicle sales in California, except when certifying to the refueling standards, in which case, vehicle sales shall mean throughout the United States.

4. A small volume manufacturer is defined as any vehicle manufacturer with California actual sales less than or equal to 4,500 new vehicles per model year based on the average number of vehicles sold by the manufacturer in the previous three consecutive years.

5. Regulations concerning U.S. EPA hearings, inspections, specific language on the Certificate of Conformity, alternative useful life, and selective enforcement audit shall not be applicable to these procedures, except where specifically noted.

6. In those instances where testing conditions or parameters are not practical or feasible for vehicles certified to the refueling standards, the manufacturer shall provide a test plan that provides equal or greater confidence in comparison to these test refueling procedures. The test plan must be approved in advance by the Executive Officer.

7. The term “[no change]” means that these test procedures do not modify the applicable federal requirement.

8. The specifications for the fuel used in testing are set forth in 40 CFR §86.113-94 ([February 18, 2000]). California certification fuel is not allowed for certification or in-use testing.

B. Definitions, Acronyms, Terminology

1. These test procedures incorporate by reference the definitions set forth in the Code of Federal Regulations; and, the definitions as set forth in the “California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles,” in the “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,” and in the “California Evaporative Emission Standards and Test Procedures For 2001 and Subsequent Model Motor Vehicles.”

C. Useful Life

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

“Useful life” shall have the same meaning as provided in Title 13, CCR, §2112.

D. On-Board Diagnostics

1. Delete §86.1806 and replace with:

The applicable sections of the “Malfunction and Diagnostic System Requirements for 1994 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines,” as set forth in Title 13, CCR, Section 1968.1 et seq., as applicable; and, the “Malfunction and Diagnostic System Requirements – 2004 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines,” as set forth in title 13, CCR, section 1968.2, are hereby incorporated by reference into this test procedure. For purposes of this test procedure, all references to evaporative system monitoring, malfunction criteria, and MIL illumination and fault code storage shall also apply to refueling systems.

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

1. Amend §86.1810-01 (July 12, 2001) as follows:
 - 1.1. (a) through (j). [See the “California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles,” adopted August 5, 1999, as last amended June 22, 2006; or the “California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles,” adopted August 5, 1999, as last amended June 22, 2006.]
 - 1.2. (k) [No change.]
 - 1.3. (l) Substitute certification to the 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).
 - 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).
 - 1.5. (n) [No change.]
 - 1.6. (o) and (p) [See the “California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles,” adopted August 5, 1999, as last amended June 22, 2006.]
 - 1.7. A manufacturer must demonstrate compliance with the fuel spillage test requirements in Title 13, California Code of Regulations, §2235, the “Specifications for Fill Pipes and Openings of Motor Vehicle Fuel Tanks,” as last amended January 22, 1990, which is hereby incorporated by reference herein.

2. In addition to the provisions set forth in these test procedures, the ARB reserves the authority to require testing to enforce compliance and to prevent noncompliance with the refueling emission standard.

3. Vehicles certified to the refueling emission standards set forth in Section I.F.2.2. below, shall not be counted in the phase-in sales percentage compliance determinations.

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. 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 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."

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

G. Durability Demonstration procedures for refueling emissions.

1. §86.1825-01 [October 6, 2000]: Amend as follows: Add the following sentences to the first paragraph:

2. Beginning with 2010 model-year vehicles or engines, at the time of certification manufacturers shall state, based on good engineering judgment and available information, that the emission control devices on their vehicles or engines are durable and are designed and will be manufactured to operate properly and in compliance with all applicable requirements for the full useful life (or allowable maintenance interval) of the vehicles or engines. Also, vehicles and engines tested for certification shall be, in all material respects, substantially the same as production vehicles and engines. If it is determined pursuant to title 13 CCR, Division 3, Chapter 2, Article 5, sections 2166 through 2174 that any emission control component or device experiences a systemic failure because valid failures for that component or device meet or exceed four percent or 50 vehicles (whichever is greater) in a California-certified

engine family or test group, it constitutes a violation of the foregoing test procedures and the Executive Officer of the Air Resources Board may require that the vehicles or engines be recalled or subjected to corrective action as set forth in title 13 CCR, Division 3, Chapter 2, Article 5, sections 2166 through 2174. Certification applications may not be denied based on the foregoing information provided that the manufacturer commits to correct the violation.

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

40 CFR §§ 86.101 through 86.145 and Appendix I (UDDS Schedule) of this Subpart B, as incorporated by reference and amended in the “California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles;” the “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;” and, the “California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles,” are hereby incorporated by reference herein.

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

1. §86.150-98 Refueling test procedure; ~~Overview; refueling test.~~
[September 21, 1994].

1.1. Revise subparagraph (a), first sentence, as follows: The refueling emissions test procedure described in this and subsequent sections is used to determine the conformity of vehicles with the refueling emissions standards set forth in section I.F. of these test procedures for all of the vehicles types specified in section I.A. subpart A of this part for light-duty vehicles and light-duty trucks.

2. §86.151-98 General requirements; refueling test. [April 6, 1994].

2.1. Revise subparagraph (a), first sentence, as follows: The refueling emissions procedure, shown in Figure B98-12, starts with the stabilizing of the vehicle and the loading of the refueling emissions canister(s) ~~to breakthrough~~, and continues with the vehicle drive for purging of the canister, followed by the refueling emissions measurement.

3. §86.152-98 Vehicle preparation; refueling test. [December 8, 2005]

3.1. Amend subparagraph (a) to include: For 2009 and subsequent off-vehicle charge capable hybrid electric vehicles equipped with non-integrated refueling canister-only systems, the refueling canister shall not be removed from the vehicle.

- 3.2. Subparagraph (b) [No change.]
- 3.3. Subparagraph (c) [No change.]

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

4.1. Amend subparagraph (a) to include: The vehicle preconditioning drive for 2011 and later model-year off-vehicle charge capable hybrid electric vehicles shall include at least one complete UDDS performed entirely under a charge-sustaining mode of operation. The battery state-of-charge net change tolerance provisions specified in section F.10., of the "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" shall not apply.

4.1.1. Add subparagraph (a)(1): 2011 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 Section 86.132-96(a) through (j), with the following exceptions.

4.1.2. Within 60 minutes of completing the vehicle preconditioning drive, a second fuel drain and fill step shall be performed. The fuel tank shall be filled to the prescribed tank fuel volume of 10 percent of the manufacturer's nominal fuel tank capacity, determined to the nearest one-tenth of a U.S. gallon (0.38 liter) with the specified fuel. In order to prevent any abnormal purging or loading of the refueling canister during this fill step, the refueling canister shall be isolated from its system. The manufacturer may isolate the canister using any method that does not compromise the integrity of the system. When the refueling canister is isolated from its system, fuel vapors shall be allowed to be vented from the fuel tank, as appropriate, during this fill step.

4.1.3. After the second fuel drain and tank refill step is completed, the canister shall be preconditioned and loaded according to the following steps. Prior to conducting these steps, the canister shall have already achieved a stabilized state, such as is accomplished using the stabilization method described in section III.D.3.3.4, of the "California Evaporative Emission Standards and Test Procedures For 2001 and Subsequent Model Motor Vehicles." Good engineering practice and safety considerations, such as, but not limited to, adequate ventilation and appropriate electrical groundings, shall apply.

4.1.4. Ambient temperature levels encountered by the test vehicle throughout these steps shall not be less than 68°F (20°C) or more than 86°F (30°C).

4.1.5. The test vehicle shall be approximately level, during the performance of these steps, to prevent abnormal fuel distribution.

4.1.6. In order to be moved, the test vehicle shall be pushed, as necessary, without starting its engine, throughout the performance of these steps.

4.1.7. The test vehicle shall be allowed to soak for a minimum of 6 hours and a maximum of 24 hours, at 80°F ±3°F (27°C ±1.7°C), prior to starting the fuel-tank-fill canister-loading step.

4.1.8. The refueling canister shall not be isolated from its system during the fuel-tank-refill canister-loading step.

4.1.9. The test vehicle's fuel fill pipe cap shall be removed

4.1.10. The dispensed fuel temperature recording system shall be started.

4.1.11. The fuel nozzle shall be inserted into the fill pipe neck of the test vehicle, to its maximum penetration, and the tank refueling operation shall start. The plane of the nozzle's handle shall be approximately perpendicular to the floor. The fuel shall be dispensed at a temperature of 67°F ±1.5°F (19.4°C ±0.8°C), and at a dispensing rate of 9.8 gal/min ±0.3 gal/min (37.1 liter/min ±1.1 liter/min). When this refueling operation is conducted by the Executive Officer, a dispensing rate that is not less than 4.0 gal/min (15.1 liter/min) may be used.

4.1.12. The fuel flow shall continue until the refueling nozzle automatic shut-off is activated. The amount of fuel dispensed must be at least 85 percent of the nominal fuel tank volume, determined to the nearest one-tenth of a U.S. gallon (0.38 liter). If an automatic nozzle shut-off occurs prior to this point, the dispensing shall be reactivated within 15 seconds, and fuel dispensing continued as needed. A minimum of 3 seconds shall elapse between any automatic nozzle shutoff and the subsequent resumption of fuel dispensing.

4.1.13. As soon as possible after completing the refilling step, remove the fuel nozzle from the fill pipe neck, and replace the test vehicle's fuel fill pipe cap.

4.1.14. The refueling canister shall be isolated from its system as soon as possible after completing the refilling step.

4.1.15. For vehicles equipped with more than one fuel tank, the steps described in this section shall be performed for each fuel tank.

4.1.16. When the fuel-tank-refill canister-loading operation is completed, the test vehicle shall proceed to the non-integrated system canister purging procedures specified in section III.D.4.4. The canister shall not be isolated from its system during these canister-purging procedures, and shall not be isolated from its system from this point onward in the test sequence.

4.1.17. The Executive Officer may approve minor modifications to this canister loading method when such modifications are supported by good engineering judgment, and do not reduce the stringency of the method.

4.2. Subparagraph (b) [No change.]

4.3. Subparagraph (c), amend subparagraph (c)(1) to include: A 2011 and later model-year off-vehicle charge capable hybrid electric vehicle that is tested either for exhaust emissions only or for refueling emissions, shall be processed

in accordance with the provisions of section F, of the “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,” with the following exceptions.

4.3.1. For such vehicles, the battery state-of-charge setting prior to the cold start exhaust test shall be at the highest level allowed by the manufacturer. This requirement shall be applicable regardless of a vehicle’s ability to allow, or not to allow, manual activation of the auxiliary power unit. If off-vehicle charging is required to increase the battery state-of-charge for the proper setting, then this charging shall occur during the canister preconditioning process.

4.3.2. The battery state-of-charge net change tolerance provisions specified in section F.10., of the “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” shall not apply.

4.4. Amend subparagraph (d) as follows: Canister purging: non-integrated systems. For all vehicles, except for 2011 and subsequent model-year charge capable hybrid electric vehicles equipped with non-integrated refueling canister-only systems, ~~W~~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 2011 and subsequent model-year charge capable hybrid electric vehicles equipped with non-integrated refueling canister-only systems, ~~V~~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 paragraphs (d)(1) and (d)(2) of this section. ~~The Executive Officer Administrator~~ may choose to shorten the vehicle driving for a partial refueling test as described in paragraph (d)(3) of this section. For vehicles equipped with dual fuel tanks, 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.

4.4.1. A 2011 and subsequent model-year off-vehicle charge capable hybrid electric vehicle shall be processed in accordance with the provisions of section F of the “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,” with the following exception.

4.4.2. For such vehicles, the battery state-of-charge setting prior to either the chassis dynamometer or the test track driving procedures, as applicable, shall be at the highest level allowed by the manufacturer. This requirement shall be applicable regardless of a vehicle's ability to allow, or not to allow, manual activation of the auxiliary power unit. If off-vehicle charging is required to increase the battery state-of-charge for the proper setting, then this charging shall occur during the canister preconditioning process.

4.4.3. The battery state-of-charge net change tolerance provisions specified in section F.10., of the "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" shall not apply.

4.4.4. 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 86.154-98, as applicable, a manufacturer may, with advance approval of the Executive Officer, 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.

4.4.5. The Executive Officer may use any of the following battery state-of-charge levels for purposes of either certification confirmatory or in-use compliance testing of such vehicles,

4.4.6. As specified in section II.B.4.4.2.

4.4.7. If applicable, at the level approved under section II.B.4.4.4.

4.4.8. If applicable, at any level in-between the levels indicated by sections II.B.4.4.2. and II.B.4.4.4.

4.5. Subparagraph (e) [No change.]

5. §86.154-98 Measurement procedure; refueling test- [August 23, 1995]- [No change].

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

7. §86.156-98 Calculations- [April 6, 1994]- [No change.]