California Environmental Protection Agency
AIR RESOURCES BOARD

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 2001 AND SUBSEQUENT MODEL PASSENGER CARS, LIGHT-DUTY TRUCKS, AND MEDIUM-DUTY VEHICLES

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NOTE: The amendments to this document are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions compared to the test procedures as amended July 30, 2002.

As Amended: September 5, 2003
Board Hearing: December 12, 2002

NOTE: This document is incorporated by reference in sections 1960.1(k) and 1961(d), title 13, California Code of Regulations (CCR). It contains the majority of the requirements necessary for certification of a passenger car, light-duty truck or medium-duty vehicle for sale in California, in addition to containing the exhaust emission standards and test procedures for these motor vehicles. However, reference is made in these test procedures to other ARB documents that contain additional requirements necessary to complete an application for certification. These other documents are designed to be used in conjunction with this document. They include:

1. "California Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes" (incorporated by reference in section 1962, title 13, CCR);

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

3. "California Refueling Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles" (incorporated by reference in section 1978(b), title 13, CCR);

4. OBD II (section 1968~~.1~~, et seq. title 13, CCR, as applicable);

5. "California ~~Motor Vehicle Emission Control and~~ Smog Index Label Specifications" (incorporated by reference in section 1965, title 13, CCR);

6. Warranty Requirements (sections 2037 and 2038, title 13, CCR);

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

8. Guidelines for Certification of Federally Certified Light-Duty Motor Vehicles for Sale in California (incorporated by section 1960.5, title 13, CCR); and

9. "California Non-Methane Organic Gas Test Procedures," (incorporated by reference in section 1961(d), title 13, CCR).

The section numbering conventions for this document are set forth in Part I, section A.3 on page A-2.

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CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 2001 AND SUBSEQUENT MODEL PASSENGER CARS, LIGHT-DUTY TRUCKS AND MEDIUM-DUTY VEHICLES

The provisions of Subparts B, C, and S, Part 86, Title 40, Code of Federal Regulations, as adopted or amended on May 4, 1999 ~~and~~ or as last amended ~~October 6, 2000 or~~ on such other date set forth next to the 40 CFR Part 86 section title listed below, and to the extent they pertain to exhaust emission standards and test procedures, are hereby adopted as the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," with the following exceptions and additions.

PART I: GENERAL PROVISIONS FOR CERTIFICATION AND IN-USE VERIFICATION OF EMISSIONS

A. General Applicability

1. §86.1801 Applicability.

1.1 §86.1801-01. October 6, 2000. Amend as follows:

1.1.1 Amend subparagraph (a) as follows: Except as otherwise indicated, the provisions of this subpart apply to new 2001 and later model year Otto-cycle and diesel-cycle passenger cars, light-duty trucks and medium-duty vehicles, including alternative fuel and hybrid electric vehicles. 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.

1.1.2 Subparagraph (b) *Aftermarket conversions*. [n/a]

1.1.3 Amend subparagraph (c) *Optional Applicability* as follows:

(a) Amend subparagraph (c)(1) as follows: A manufacturer must certify any heavy-duty complete Otto-cycle vehicle of 14,000 pounds Gross Vehicle Weight Rating (GVWR) or less in accordance with the medium-duty chassis-standards of Section E.1. of these test procedures. A manufacturer must certify all heavy-duty diesel engines or vehicles of 14,000 pounds GVWR or less to the medium-duty engine standards in title 13, CCR, section 1956.8(g) or (h). A manufacturer may request to certify heavy-duty complete diesel vehicles to the chassis-standards in Section E.1 of these test procedures. Heavy-duty engine or heavy-duty vehicle provisions of 40 CFR subpart A do not apply to such a vehicle or engine.

(b) Subparagraph (c)(2) [No change.]

(c) Subparagraph (c)(3) [No change.]

(d) Subparagraph (c)(4) [n/a]

(e) Subparagraph (c)(5) [n/a]

1.1.4 Amend subparagraph (d) as follows: Small volume manufacturers. Special certification procedures are available for any manufacturer whose projected or actual combined California sales of passenger cars, light-duty trucks, medium-duty vehicles, heavy-duty vehicles and heavy-duty engines in its product line are fewer than 4,500 units based on the average number of vehicles sold for the three previous consecutive model years for which a manufacturer seeks certification. For manufacturers certifying for the first time in California, model-year production volume shall be based on projected California sales. The small-volume manufacturer's light- and medium-duty vehicle and truck certification procedures are described in 40 CFR §86.1838.

1.1.5 Subparagraph (e). [n/a; NLEVs.]

1.1.6 Subparagraph (f) [n/a; Tier 2 phase-in provisions]

1.1.7 Subparagraph (g) [n/a; Tier 2 phase-in provisions]

1.1.8 Subparagraph (h) [No change.]

2. California Provisions.

2.1 References to "light-duty trucks" in 40 CFR 86 shall apply to both "light-duty trucks" and "medium-duty vehicles" in these procedures. References to "light-duty vehicles" shall apply to "passenger cars" in these procedures. References to dual fuel vehicles shall also mean bi-fuel vehicles.

2.2 Any reference to vehicle sales throughout the United States shall mean vehicle sales in California.

2.3 Regulations concerning U.S. EPA hearings, U.S. EPA inspections, specific language on the Certificate of Conformity, evaporative emissions, high-altitude vehicles and testing, particulate and oxides of nitrogen averaging and test group standards applicable in such averaging, alternative useful life, selective enforcement audit, Certification Short Test, and heavy-duty engines and vehicles shall not be applicable to these procedures, except where specifically noted.

2.4 Regulations both herein and in Title 40, CFR Part 86, Subparts B, C, and S, concerning Otto-cycle and diesel-cycle vehicles shall be applicable to ethanol vehicles, including dual fuel, bi-fuel and fuel-flexible vehicles, except where specifically noted otherwise.

2.5 For engines used in medium-duty vehicles that are not distinctly diesel engines nor derived from such, the Executive Officer shall determine whether the engines shall be subject to diesel or Otto-cycle engine regulations, in consideration of the relative similarity of the engines' torque-speed characteristics and vehicle applications with those of Otto-cycle and diesel engines.

2.6 Regulations concerning federal OBD system requirements shall mean the California OBD requirements, except where specifically noted otherwise.

3. §86.1802 Section Numbering; Construction.

3.1 §86.1802-01. [No change.]

3.2 The section numbering convention employed in these test procedures, in order of priority, is A.1.1.1. in order to distinguish California procedures and requirements from those of the U.S. EPA. References in these test procedures to specific sections of the Code of Federal Regulations maintain the same numbering system employed in the Code of Federal Regulations.

3.3 In cases where the entire CFR section is incorporated by reference with no modifications, the notation "[No change.]" is used. In cases where there are no changes to the CFR language but there are additional California requirements, the notation "[No change.]" is used and the additional California requirements are then noted in a separate subsection with the numbering convention set forth in subparagraph 3.2, above.

3.4 The notation "[n/a]" indicates that the subject matter of the federal regulation does not apply to California passenger cars, light-duty trucks or medium-duty vehicles. In some cases the subject of the federal regulation is indicated in the bracket for clarity.

B. Definitions, Acronyms and Abbreviations

1. §86.1803 Definitions.

1.1 §86.1803-01. ~~Definitions~~ January 18, 2001. [No change, except as otherwise noted below.]

2. California Definitions.

"**AB 965 vehicle**" means a vehicle certified pursuant to section 1960.5, title 13, CCR.

"**Administrator**" means the Executive Officer of the Air Resources Board (ARB).

"**Alcohol fuel**" means either methanol or ethanol as those terms are defined in these test procedures.

"**All-Electric Range Test**" means a test sequence used to determine the range of an electric or hybrid electric vehicle without the use of its auxiliary power unit. The All-Electric Range Test is described in the "California Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," as incorporated by reference in section 1962(e), title 13, CCR.

"**Battery assisted combustion engine vehicle**" means any vehicle that allows power to be delivered to the driven wheels solely by a combustion engine, but which uses a battery pack to store energy which may be derived through remote charging, regenerative braking, and/or a flywheel energy storage system or other means which will be used by an electric motor to assist in vehicle operation.

"**Bi-fuel vehicle**" is any motor vehicle that is engineered and designed to be capable of operating on two fuels wherein the two fuels are stored on board in separate fuel tanks and metered separately, but in operation the two fuels are combusted together.

"**Certificate of Conformity**" means Executive Order certifying vehicles for sale in California.

"**Certification**" means certification as defined in section 39018 of the Health and Safety Code.

"**Certification level**" means the official exhaust or evaporative emission result from an emission-data vehicle which has been adjusted by the applicable mass deterioration factor and is submitted to the Executive Officer for use in determining compliance with an emission standard for the purpose of certifying a particular test group. For those test groups that are certified using reactivity adjustment factors developed by the manufacturer pursuant to Part II, Section D of these test procedures, the exhaust NMOG certification level shall include adjustment by the ozone deterioration factor.

"**Conventional gasoline**" means any certification gasoline which meets the specifications of 40 CFR 86.113-94(a), but does not include gasoline that meets the specifications of California reformulated gasoline as set forth in Part II, section A.100.3.1. of these test procedures. For the purpose of determining the ozone-forming potential of conventional gasoline vehicle exhaust emissions, gasoline meeting the specifications of Part II, Section D of these test procedures shall be used.

"**Dedicated Ethanol Vehicle**" means any ethanol-fueled motor vehicle that is engineered and designed to be operated solely on ethanol.

"**Dedicated Methanol Vehicle**" means any methanol-fueled motor vehicle that is engineered and designed to be operated solely on methanol.

"**Diesel Engine**" means any engine powered with diesel fuel, gaseous fuel, or alcohol fuel for which diesel engine speed/torque characteristics and vehicle applications are retained.

"Dual-fuel vehicle" means any motor vehicle that is engineered and designed to be capable of operating on gasoline or diesel and on compressed natural gas or liquefied petroleum gas, with separate fuel tanks for each fuel on-board the vehicle. In operation, only one fuel is used at a time.

"**Ethanol**" means any fuel for motor vehicles and motor vehicle engines that is composed of either commercially available or chemically pure ethanol (CH_3CH_2OH) and gasoline as specified in Part II, section A.100.3 (Certification Fuel Specifications) of these test procedures. The required fuel blend is based on the type of ethanol-fueled vehicle being certified and the particular aspect of the certification procedure being conducted.

"**Ethanol vehicle**" means any motor vehicle that is engineered and designed to be operated using ethanol as a fuel.

"Fuel-fired heater" means a fuel burning device that creates heat for the purpose of warming the passenger compartment of a vehicle but does not contribute to the propulsion of the vehicle.

"**Fuel-Flexible Vehicle"** or "**FFV**" means any motor vehicle engineered and designed to be operated on a petroleum fuel and an alcohol fuel, or any mixture of the two. Alcohol-fueled vehicles that are only marginally functional when using gasoline (e.g., the engine has a drop in rated horsepower of more than 80 percent) are not flexible fuel vehicles.

"**Heavy-duty engine**" means an engine which is used to propel a heavy-duty vehicle.

"**Heavy-duty vehicle**" means any motor vehicle having a manufacturer's gross vehicle weight rating greater than 6,000 pounds for vehicles certifying to the standards in Section E.1.1.1 or any motor vehicle having a manufacturer's gross vehicle weight rating greater than 8,500 pounds for vehicles certifying to the standards in Section E.1.1.2, except passenger cars.

"**High-priced part**" means a part determined to be high-priced in accordance with section 2037(c), title 13, CCR.

"**Hybrid electric vehicle**" or "**HEV**" means any vehicle which is included in the definition of a "series hybrid electric vehicle," a "parallel hybrid electric vehicle," or a "battery assisted combustion engine vehicle."

"**Incomplete vehicle**" means any vehicle which does not have the primary load carrying device or container attached. In situations where individual marketing relationships makes the status of the vehicle questionable, the Executive Officer shall determine whether a specific model complies with the definition of incomplete vehicle.

"Independent Low Volume Manufacturer" means any manufacturer that meets the "independent low volume manufacturer" definition as set forth in section 1900, title 13, CCR.

"Large volume manufacturer" means a manufacturer that is not a small volume manufacturer or an independent low volume manufacturer.

"**LEV I**" refers to the low-emission vehicle standards that were initially adopted by the Board on July 12, 1991 and are set forth in Section E.1.1.1 of these test procedures.

"**LEV II**" refers to the standards that were initially adopted by the Board on August 5, 1999 and are set forth in Section E.1.1.2 of these test procedures.

"**Light-duty truck**" or "**LDT**" means any 2000 and subsequent model motor vehicle certified to the standards in Section E.1.1.2 rated at 8,500 pounds gross vehicle weight or less, and any other motor vehicle rated at 6,000 pounds gross vehicle weight or less, that is designed primarily for purposes of transportation of property or is a derivative of such a vehicle, or is available with special features enabling off-street or off-highway operation and use.

"**LDT1**" means a light-duty truck with a loaded vehicle weight of 0-3750 pounds.

"**LDT2**" means a "LEV II" light-duty truck with a loaded vehicle weight of 3751 to a gross vehicle weight of 8500 pounds or a "LEV I" light-duty truck with a loaded vehicle weight of 3751-5750 pounds.

"**Low-emission vehicle**" or "**LEV**" means any vehicle certified to low-emission standards.

"**Medium-duty vehicle**" or "**MDV**" means any pre-1995 model year heavy-duty vehicle having a manufacturer's gross vehicle weight rating of 8,500 pounds or less; any 1992 through 2006 model-year heavy-duty low-emission, ultra-low-emission, super-ultra-low-emission or zero-emission vehicle certified to the standards in Section E.1.1.1, or in title 13, CCR, section 1962, having a manufacturer's gross vehicle weight rating of 14,000 pounds or less; any 1995 through 2002 model year heavy-duty vehicle certified to the Tier 1 standards in Section E.1.1.1 having a manufacturer's gross vehicle weight rating of 14,000 pounds or less; and any 2000 and subsequent model heavy-duty low-emission, ultra-low-emission, super-ultra-low-emission or zero-emission vehicle certified to the standards in Section E.1.1.2, or in title 13, CCR, section 1962, having a manufacturer's gross vehicle weight rating between 8,501 and 14,000 pounds.

"**Methane Reactivity Adjustment Factor**" means a factor applied to the mass of methane emissions from natural gas fueled vehicles for the purpose of determining the gasoline equivalent ozone-forming potential of the methane emissions.

"**Methanol**" means any fuel for motor vehicles and motor vehicle engines that is composed of either commercially available or chemically pure methanol (CH_3OH) and gasoline as specified in Part II, section A.100.3.1 (Certification Fuel Specifications) of these procedures. The required fuel blend is based on the type of methanol-fueled vehicle being certified and the particular aspect of the certification procedure being conducted.

"**Natural gas vehicle**" means any motor vehicle that is engineered and designed to be operated using either compressed natural gas or liquefied natural gas.

"**Non-methane organic gas**" (or "**NMOG**") means the sum of non-oxygenated and oxygenated hydrocarbons contained in a gas sample as measured in accordance with the "California Non-Methane Organic Gas Test Procedures," as incorporated by reference in Part II, section A.100.5.4 of these test procedures.

"**Organic material non-methane hydrocarbon equivalent**" (or "**OMNMHCE**") for methanol-fueled vehicles means the sum of the carbon mass contribution of non-oxygenated hydrocarbons (excluding methane), methanol, and formaldehyde as contained in a gas sample, expressed as gasoline-fueled hydrocarbons. For ethanol-fueled vehicles, "organic material non-methane hydrocarbon equivalent" (or "OMNMHCE") means the sum of carbon mass contribution of non-oxygenated hydrocarbons (excluding methane), methanol, ethanol, formaldehyde and acetaldehyde as contained in a gas sample, expressed as gasoline-fueled hydrocarbons.

"**Ozone deterioration factor**" means a factor applied to the mass of NMOG emissions from TLEVs, LEVs, ULEVs or SULEVs which accounts for changes in the ozone-forming potential of the NMOG emissions from a vehicle as it accumulates mileage.

"**Parallel hybrid electric vehicle**" means any vehicle that allows power to be delivered to the driven wheels by either a combustion engine and/or by a battery powered electric motor.

"**Passenger car**" or "**PC**" means any motor vehicle designed primarily for transportation of persons and having a design capacity of 12 persons or less.

"**Reactivity adjustment factor**" or "**RAF**" means a fraction applied to the mass of NMOG emissions from a vehicle powered by a fuel other than conventional gasoline for the purpose of determining a gasoline-equivalent NMOG emission value. The reactivity adjustment factor is defined as the ozone-forming potential of the exhaust from a vehicle powered by a fuel other than conventional gasoline divided by the ozone-forming potential of conventional gasoline vehicle exhaust.

"**Series hybrid electric vehicle**" means any vehicle which allows power to be delivered to the driven wheels solely by a battery powered electric motor, but which also incorporates the use of a combustion engine to provide power to the battery and/or electric motor.

"**Small volume manufacturer**" means any manufacturer whose projected or combined California sales of passenger cars, light-duty trucks, medium-duty vehicles, heavy-duty vehicles and heavy-duty engines in its product line are fewer than 4,500 units based on the average number of vehicles sold for the three previous consecutive model years for which a manufacturer seeks certification. A manufacturer's California sales shall consist of all vehicles or engines produced by the manufacturer and delivered for sale in California, except that vehicles or engines produced by the manufacturer and marketed in California by another manufacturer under the other manufacturer's nameplate shall be treated as California sales of the marketing manufacturer.

"**Specific reactivity**" is defined as the grams of ozone created per gram of NMOG emitted. This term is also known as ozone-forming potential.

"**Super-Ultra-Low-Emission Vehicle"** or **"SULEV**" means any vehicle certified to super-ultra-low-emission standards.

"**Tier 1 vehicle**" means any passenger car and light-duty truck certified to the standards in section 1960.1(f)(2), title 13, CCR, and any medium-duty vehicle certified to the standards in section 1960.1(h)(1), title 13, CCR.

"**Transitional low-emission vehicle**" or "**TLEV**" means any vehicle certified to transitional low-emission standards.

"**Ultra-low-emission vehicle**" or "**ULEV**" means any vehicle certified to ultra-low emission standards.

"Unified Cycle" or **"UC"** means the driving schedule as set forth in Part II, section E of these test procedures.

"**Zero-emission vehicle**" or "**ZEV**" means any vehicle certified to the zero-emission standards set forth in the "California Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," as incorporated by reference in section 1962, title 13, CCR.

3. §86.1804 Acronyms and Abbreviations.

3.1 §86.1804.01 ~~Acronyms and Abbreviations~~. October 6, 2000. [No change.]

3.2 **California Acronyms and Abbreviations.**

"ALVW" means adjusted loaded vehicle weight, which is the average of a vehicle's curb weight and gross vehicle weight.

"CCR" means California Code of Regulations.

"CFR" means Code of Federal Regulations.

"HEV" means hybrid-electric vehicle.

"LDT" means light-duty truck.

"LDT1" means a light-duty truck with a loaded vehicle weight of 0-3750 pounds.

"LDT2" means a "LEV II" light-duty truck with a loaded vehicle weight of 3751 to a gross vehicle weight of 8500 pounds or a "LEV I" light-duty truck with a loaded vehicle weight of 3751-5750 pounds.

"LEV" means low-emission vehicle.

"LVW" means loaded vehicle weight.

"MDV" means medium-duty vehicle.

"n/a" means not applicable.

"Non-Methane Organic Gases" or "NMOG" means the total mass of oxygenated and non-oxygenated hydrocarbon emissions.

"OBD" means on-board diagnostic system.

"PC" means passenger car.

"SULEV" means super-ultra-low-emission vehicle.

"TLEV" means transitional low-emission vehicle.

"UC" means Unified Cycle.

"ULEV" means ultra-low-emission vehicle.

C. General Requirements for Certification

1. §86.1805 Useful Life.

1.1 ~~Amend~~ §86.1805-01 October 6, 2000. Amend as follows:

1.1.1 Subparagraph (a). [No change.]

1.1.2 Amend subparagraph (b) to add the following: For vehicles certified to the LEV II emission standards in Section E.1.1.2 of these test procedures, full useful life is as follows:

(a) For passenger cars, light-duty trucks, and medium-duty vehicles (including hybrid electric vehicles), the full useful life shall be 10 years or 120,000 miles, whichever occurs first.

(b) The full useful life of LEV, ULEV and SULEV passenger cars, light-duty trucks and medium-duty vehicles certified to the optional LEV II 150,000 mile standards in section E.1.1.2 shall be 15 years or 150,000 miles, whichever occurs first.

1.2 ~~Amend~~ §86.1805-04 October 6, 2000. Amend as follows:

1.2.1 Subparagraph (a). [No change.]

1.2.2 Amend subparagraph (b) as follows: The full useful life of LEV, ULEV and SULEV passenger cars, light-duty trucks and medium-duty vehicles certified to the optional LEV II 150,000 mile standards in section E.1.1.2 shall be 15 years or 150,000 miles, whichever occurs first.

1.2.3 Subparagraph (c) [No change.]

1.2.4 Subparagraph (d) [No change.]

1.2.5 Subparagraph (e) [n/a]

1.2.6 Subparagraph (f) [n/a]

2. §86.1806 On-Board Diagnostics.

2.1 §86.1806-01; §86.1806-05 Delete.

2.2 **California On-Board Diagnostic System Requirements.**

All vehicles shall be subject to the provisions of section 1968, et seq. ~~.1~~, title 13, CCR, as applicable. No vehicle shall be certified unless the Executive Officer finds that the vehicle complies with the requirements of section 1968, et seq. ~~.1~~, title 13, CCR, as applicable.

3. §86.1807 Vehicle Labeling.

3.1 §86.1807-01. ~~[No change.]~~ October 6, 2000. Amend as follows:]

3.1.1 Subparagraph (a). Add the following sentence to the introductory paragraph: The labeling requirements of this section shall apply to all new motor vehicles, and new motor vehicle engines certified according to the provisions of California Health and Safety Code Section 43100.

3.1.2 Subparagraphs (a)(1) through (c)(1)(i). [No change.]

3.1.3 Subparagraph (c)(1)(ii): Amend as follows: For passenger cars, light-duty trucks, and medium-duty vehicles, the statement: "This vehicle conforms to California regulations applicable to XXX-fueled 20XX model-year new (specify LEV, ULEV, SULEV, or ZEV, as applicable) (specify passenger cars, light-duty trucks, medium-duty vehicles)." For federally certified vehicles certified for sale in California the statement must include the phrase "conforms to U.S. EPA regulations and is certified for sale in California." Such statements shall not be used on labels placed on vehicles or engines which, in fact, do not comply with all applicable California regulations, including assembly-line test requirements, if any.

3.1.4 Subparagraphs (c)(1)(iii) through (c)(3): [No change.]

3.1.5 Subparagraph (d): Delete and replace with: Incomplete medium-duty vehicles shall have the following statement printed prominently on the label required by paragraph (a)(3)(v) of this section: "This vehicle conforms to California regulations applicable to new 20xx model-year (specify LEV, ULEV or SULEV, as applicable) medium-duty vehicles when it does not exceed XXX pounds in curb weight, XXX pounds in gross vehicle weight rating, and XXX square feet in frontal area."

3.1.6 Subparagraph (e): [No change.]

3.1.7 Subparagraph (f): [No change.]

3.1.8. Subparagraph (g): Add the following: The manufacturer shall obtain approval from the Executive Officer for all emission control label formats and locations prior to use. Approval of the specific tune-up settings is not required; however, the format for all such settings and tolerances, if any, is subject to review. If the Executive Officer finds that the information on the label is vague or subject to misinterpretation, or that the location does not comply with these specifications, he or she may require that the label or its location be modified accordingly. Samples of all actual production emission control labels used within a test group shall be submitted to the Executive Officer within thirty days after the start of production. The Executive Officer may approve alternate label locations or may, upon request, waive or modify the label content requirements provided that the intent of these requirements is met. If the Executive Officer finds any motor vehicle or motor vehicle engine manufacturer using emission control labels which are different from those approved or which do not substantially comply with the readability or durability requirements set forth in these labeling requirements, the Executive Officer may invoke §2109, title 13, CCR.

3.2 §86.1807-07. January 18, 2001. [No change, except that the amendments to §86.1807-01 still apply.]

3.3 ~~2~~ **California Labeling Requirements**.

3.3.1. In addition to the federal requirements set forth in §86.1807, labeling shall conform with the requirements specified in section 1965, title 13, CCR and the "California ~~Motor Vehicle Emission Control and~~ Smog Index Label Specifications" as incorporated by reference in section 1965, title 13, CCR. In cases where there is conflict with the federal label specifications, the California requirements shall apply.

3.3.2. For all 2004 and subsequent model-year vehicles (except zero-emission vehicles (ZEVs)), the tune-up label shall also contain the following information lettered in the English

language in block letters and numerals which shall be of a color that contrasts with the background of the label:

(a) "OBD II certified" or "OBD Exempt".

(b) Identification of the Exhaust Emission Control System, including but not limited to:

	ADSTWC	Adsorbing Three-Way Catalyst
	AFS	Air-Fuel Ratio Sensor
	AIR -	Secondary Air Injection (Pump);
	CAC -	Charge Air Cooler;
	CFI -	Continuous Fuel Injection;
	CTOX -	Continuous Trap Oxidizer;
	DFI -	Direct Fuel Injection;
	EGR -	Exhaust Gas Recirculation;
*	EHOC -	Electrically Heated Oxidation Catalyst;
*	EHTWC -	Electrically Heated Three-Way Catalyst;
	EM -	Engine Modification;
*	FFS -	Flexible Fuel Sensor;
	HO2S -	Heated Oxygen Sensor;
	IFI -	Indirect Diesel Injection;
	MFI -	Multiport (Electronic) Fuel Injection, (Central) Multiport Fuel Injection;
	OC -	Oxidation Catalyst Only;
	O2S -	Oxygen Sensor;
	PAIR -	Pulsed Secondary Air Injection;
	PTOX -	Periodic Trap Oxidizer;
	SC -	Supercharger;
	SFI -	Sequential Multipoint (Electronic) Fuel Injection; and
	SPL -	Smoke Puff Limiter;
	TBI -	Throttle Body (Electronic) Fuel Injection;
	TC -	Turbocharger;
	TWC -	Three-Way Catalyst;
	TWC+OC -	Three-Way Catalyst + Oxidation Catalyst;
	WU-TWC -	Warm-Up Catalyst with Three-Way Catalyst;
	WU-OC -	Warm-Up Catalyst with Oxidation Catalyst;

* Pending confirmation as SAE protocol

Abbreviations used shall be in accordance with SAE J1930, JUN 1993, including the above nomenclature unless the Executive Officer approves a more current version of

SAE J1930. The Executive Officer shall recommend abbreviations for components not listed in SAE J1930, JUN 1993.

3.3.3 Manufacturers may elect to use a supplemental label in addition to the original label if there is not sufficient space to include all the required information. The supplemental label must conform to all specifications as the original label. In the case that a supplemental label is used, the original label shall be numbered "1 of 2" and the supplemental label shall be numbered "2 of 2."

3.3.4 Statements shall not be used on labels placed on vehicles or engines which, in fact, do not comply with all applicable California regulations, including assembly-line test requirements, if any.

4. §86.1808 Maintenance Instructions.

4.1 §86.1808-01. October 6, 2000. [No change.]
4.2 §86.1808-07. January 18, 2001. [No change.]

5. §86.1809 Prohibition of Defeat Devices.

5.1 §86-1809-01. October 6, 2000. [No change except that subparagraph (e) shall apply to vehicles subject to the California TLEV, LEV, ULEV and SULEV standards.]

D. §86.1810 General standards; increase in emissions; unsafe conditions; waivers

1. §86.1810-01~~;~~. January 18, 2001. Amend §86.1810-01 as follows:

This section applies to model year 2001 and later light-duty vehicles, light-duty trucks, and medium-duty vehicles fueled by gasoline, diesel, methanol, ethanol, natural gas and liquefied petroleum gas fuels. Multi-fueled vehicles (including bi-fueled, dual-fueled and flexible-fueled vehicles) shall comply with all requirements established for each consumed fuel (or blend of fuels in the case of flexible-fueled vehicles). This section also applies to hybrid electric vehicles. The standards of this subpart apply to both certification and in-use vehicles unless otherwise indicated.

(a) through (d) [No change.]

(e) On-board diagnostics. Delete and replace with:

All passenger cars, light-duty trucks and medium-duty vehicles are subject to the ~~must have an~~ on-board diagnostic system requirements ~~as required~~ in section 1968~~.1,~~ et seq., title 13, CCR, as applicable.

(f) Altitude Requirements. Delete and replace with:

Altitude Requirements. Except for supplemental exhaust emission standards (which apply only at low altitude conditions), all emission standards apply at low altitude conditions and only CO emission standards apply at high altitude conditions.

(g) [No change.]

(h) [Delete; see D.1.1 below.]

(i) **Supplemental FTP general provisions**. [Delete; see D.2. below]

(j) **Evaporative emissions general provisions**. [Delete. (The provisions of this section are contained the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, Heavy-Duty Vehicles and Motorcycles.")]

(k) through (n) [Delete. (The provisions of these sections are contained the "California Refueling Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles.")]

(o) [Delete. See D.1.1 below]

(p) [No change, except that references to Tier 2 and interim non-Tier 2 vehicles shall mean California LEVs, ULEVs and SULEVs. A manufacturer shall not apply a reactivity adjustment factor to the exhaust NMHC mass emissions for the purpose of determining compliance with the NMOG standard pursuant to this subparagraph.]

1.1 Measurement of Hydrocarbon Emissions.

1.1.1 Except as otherwise indicated in these test procedures, for vehicles fueled by gasoline, methanol, ethanol, natural gas, or liquefied petroleum gas and certified to the Tier 1 standards, hydrocarbon emissions shall mean non-methane hydrocarbons (NMHC) and shall be measured in accordance with Part B (Determination of NMHC Emissions by Flame Ionization

Detection) of the "California Non-Methane Organic Gas Test Procedures," as incorporated by reference in Part II, section A.100.5.4 of these test procedures. For vehicles fueled by gasoline, methanol, ethanol, natural gas, or liquefied petroleum gas and certified to the TLEV, LEV, ULEV and SULEV standards, hydrocarbon emissions shall mean non-methane organic gases (NMOG) and shall be measured in accordance with the "California Non-Methane Organic Gas Test Procedures" as incorporated by reference in Part II, section A.100.5.4 of these test procedures.

1.1.2 For diesel vehicles, NMOG shall mean non-methane hydrocarbons and shall be measured in accordance with Part B of the "California Non-Methane Organic Gas Test Procedures," as incorporated by reference in Part II, section A.100.5.4 of these test procedures."

1.1.3 For vehicles certifying to the SFTP standards set forth in Section E.1.2.1 of these test procedures, hydrocarbon emissions shall be measured as follows: for PCs and LDTs certified to the Tier 1 exhaust standards, hydrocarbon emissions shall be measured in accordance with the "California Non-Methane Hydrocarbon Test Procedures," as last amended May 15, 1990, which is incorporated herein by reference. For PCs and LDTs certified to the TLEV exhaust standards hydrocarbon emissions shall be measured in accordance with Part B (Determination of Non-Methane Hydrocarbon Mass Emissions by Flame Ionization Detection) of the "California Non-Methane Organic Gas Test Procedures," as incorporated by reference in Part II, section A.100.5.4 of these test procedures. For alcohol-fueled vehicles certifying to the standards in Section E.1.2.1., "Non-Methane Hydrocarbons" shall mean "Organic Material Non-Methane Hydrocarbon Equivalent."

2. Supplemental FTP General Provisions for California.

2.1 Amend 40 CFR §86.1810-01(i) as follows:

2.1.1 Delete subparagraphs (1) through (3) [The implementation schedules for SFTP are set forth in Section E.2 of these test procedures.]

2.1.2 Subparagraph (4) [No change.]

2.1.3 Subparagraph (5) [No change.]

2.1.4 Delete subparagraph (6); replace with: **Air to Fuel Ratio Requirement.** With the exception of cold-start conditions, warm-up conditions and rapid-throttle motion conditions ("tip-in" or "tip-out" conditions), the air to fuel ratio shall not be richer at any time than, for a given engine operating condition (e.g., engine speed, manifold pressure, coolant temperature, air charge temperature, and any other parameters), the leanest air to fuel mixture required to obtain maximum torque (lean best torque) with a tolerance of six percent of the fuel consumption. The Executive Officer may approve a manufacturer's request for approval to use additional enrichment in subsequent testing if the manufacturer demonstrates that additional enrichment is needed to protect the vehicle, occupants, engine, or emission control hardware.

2.1.5 Delete subparagraph (7); replace with: **Single Roll Electric Dynamometer Requirement.** For all vehicles certified to the SFTP standards, a single-roll electric dynamometer or a dynamometer which produces equivalent results, as set forth in 40 CFR §86.108-00, must be used for all types of emission testing to determine compliance with the applicable emission standards.

2.1.6 Delete subparagraph (8); replace with: **Small Volume Provisions.** Small volume manufacturers of PCs, LDTs, and MDVs shall certify 100% of their PC and LDT fleet in 2004 and subsequent model years, and 100% of their MDV fleet in 2005 and subsequent model years under the supplemental FTP requirements.

2.1.7 Subparagraphs (9) through (12) [No change.]

2.1.8 Subparagraph (13) [No change, except that references to Tier 2 and non-Tier 2 vehicles shall mean California LEVs, ULEVs and SULEVs.]

2.1.9 Add the following sentence to subparagraph (14):

The above provisions shall not apply to vehicles powered by "lean-burn" engines or Diesel-cycle engines. A "lean-burn" engine is defined as an Otto-cycle engine designed to run at an air-fuel ratio significantly greater than stoichiometry during the large majority of its operation.

E. California Exhaust Emission Standards.

Delete 40 CFR §§86.1811 through 86.1819.

Introduction. The following Section E. contains the exhaust emission standards, phase-in requirements and reactivity adjustment factors applicable to California passenger cars, light-duty trucks and medium-duty vehicles. A manufacturer must demonstrate compliance with the exhaust standards applicable to specific test groups, and with the composite phase-in requirements applicable to the manufacturer's entire fleet.

A manufacturer has the option of certifying engines used in incomplete and diesel MDVs with a gross vehicle weight rating of greater than 8,500 lbs. to the heavy-duty engine standards and test procedures set forth in sections 1956.8(g) and (h), title 13, CCR, except when the federal vehicle is chassis-certified. If a federal vehicle with a gross vehicle weight rating of greater than 8,500 lbs. is certified to chassis standards, then the equivalent California vehicle must either be certified to the exhaust emission standards applicable to medium-duty vehicles as set forth in section 1961, title 13, CCR or to the federal Tier 2 standards, as per the requirements of section H.1.4 of these test procedures.

The procedures for meeting the ZEV phase-in requirements and for earning ZEV credits are contained in the "California Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," as incorporated by reference in section 1962, title 13, CCR.

1. Exhaust Emission Standards.

1.1 FTP Exhaust Emission Standards for Light- and Medium-Duty Vehicles.

The exhaust emission standards set forth in this section refer to the exhaust emitted over the driving schedule set forth in title 40, CFR, Subparts B and C, except as amended in these test procedures.

1.1.1 LEV I and Tier 1 Exhaust Standards. The following standards represent the maximum exhaust emissions for the intermediate and full useful life from new 2001 through 2003 model-year Tier 1 passenger cars, light-duty trucks and medium-duty vehicles, and from new 2001 through 2003 model year "LEV I" TLEV passenger cars and light-duty trucks, 2001 through 2006 model year "LEV I" LEVs and ULEVs in the light- and medium-duty vehicle classes and 2001 through 2006 model year "LEV I" SULEVs in the medium-duty vehicle classes, including bi-fuel, fuel-flexible and dual fuel vehicles when operating on the gaseous or alcohol fuel they are designed to use:

Exhaust Mass Emission Standards for New 2001 - 2003 Model Year Tier 1 Vehicles and TLEV Passenger Cars and Light-Duty Trucks; 2001 - 2006 Model Year LEV I LEV and ULEV Passenger Cars and Light-Duty Trucks; 2001-2003 Model Year Tier 1 Medium-Duty Vehicles; and 2001-2006 Model Year LEV I LEV, ULEV and SULEV Medium-Duty Vehicles

Vehicle Type	Durability Vehicle Basis (mi.)	Vehicle Emission Category	NMOG (g/mi)	Carbon Monoxide (g/mi)	Oxides of Nitrogen (g/mi)	Formaldehyde (mg/mi)	Particulate from diesel vehicles** (g/mi)
All PCs; LDTs (0-3750 lbs. LVW)	50,000	Tier 1	0.25*	3.4	0.4	n/a	0.08
		TLEV	0.125	3.4	0.4	15	n/a
		LEV	0.075	3.4	0.2	15	n/a
		ULEV	0.040	1.7	0.2	8	n/a
	100,000	Tier 1	0.31	4.2	0.6	n/a	n/a
		Tier 1 - diesel option	0.31	4.2	1.0	n/a	n/a
		TLEV	0.156	4.2	0.6	18	0.08
		LEV	0.090	4.2	0.3	18	0.08
		ULEV	0.055	2.1	0.3	11	0.04
LDTs (3751-5750 lbs. LVW)	50,000	Tier 1	0.32	4.4	0.7	n/a	0.08
		TLEV	0.160	4.4	0.7	18	n/a
		LEV	0.100	4.4	0.4	18	n/a
		ULEV	0.050	2.2	0.4	9	n/a
	100,000	Tier 1	0.40	5.5	0.97	n/a	n/a
		Tier 1 - diesel option	0.40	5.5	1.5	n/a	n/a
		TLEV	0.200	5.5	0.9	23	0.10
		LEV	0.130	5.5	0.5	23	0.10
		ULEV	0.070	2.8	0.5	13	0.05
MDVs (3751-5750 lbs. ALVW)	50,000	Tier 1	0.32	4.4	0.7	18	n/a
		LEV	0.160	4.4	0.4	18	n/a
		ULEV	0.100	4.4	0.4	9	n/a
		SULEV	0.050	2.2	0.2	4	n/a
	120,000	Tier 1	0.46	6.4	0.98	n/a	0.10
		LEV	0.230	6.4	0.6	27	0.10
		ULEV	0.143	6.4	0.6	13	0.05
		SULEV	0.072	3.2	0.3	13	0.05

Vehicle Type	Durability Vehicle Basis (mi.)	Vehicle Emission Category	NMOG (g/mi)	Carbon Monoxide (g/mi)	Oxides of Nitrogen (g/mi)	Formaldehyde (mg/mi)	Particulate from diesel vehicles** (g/mi)
MDVs (5751-8500 lbs. ALVW)	50,000	Tier 1	0.39	5.0	1.1	22	n/a
		LEV	0.195	5.0	0.6	22	n/a
		ULEV	0.117	5.0	0.6	11	n/a
		SULEV	0.059	2.5	0.3	6	n/a
	120,000	Tier 1	0.56	7.3	1.53	n/a	0.12
		LEV	0.280	7.3	0.9	32	0.12
		ULEV	0.167	7.3	0.9	16	0.06
		SULEV	0.084	3.7	0.45	8	0.06
MDVs 8501 -10,000 lbs. ALVW	50,000	Tier 1	0.46	5.5	1.3	28	n/a
		LEV	0.230	5.5	0.7	28	n/a
		ULEV	0.138	5.5	0.7	14	n/a
		SULEV	0.069	2.8	0.35	7	n/a
	120,000	Tier 1	0.66	8.1	1.81	n/a	0.12
		LEV	0.330	8.1	1.0	40	0.12
		ULEV	0.197	8.1	1.0	21	0.06
		SULEV	0.100	4.1	0.5	10	0.06
MDVs 10,001-14,000 lbs. ALVW	50,000	Tier 1	0.60	7.0	2.0	36	n/a
		LEV	0.300	7.0	1.0	36	n/a
		ULEV	0.180	7.0	1.0	18	n/a
		SULEV	0.09	3.5	0.5	9	n/a
	120,000	Tier 1	0.86	10.3	2.77	n/a	n/a
		LEV	0.430	10.3	1.5	52	0.12
		ULEV	0.257	10.3	1.5	26	0.06
		SULEV	0.130	5.2	0.7	13	0.06

* For Tier 1 vehicles, NMOG shall mean NMHC as set forth in Section I.D.1.1 of these test procedures.

** Particulate standards are determined on a 50,000 mile basis for Tier 1 passenger cars and light-duty trucks, on a 100,000 mile basis for all other passenger cars and light-duty trucks and on a 120,000 mile basis for medium-duty vehicles.

1.1.2 **LEV II Exhaust Standards.** The following LEV II standards represent the maximum exhaust emissions for the intermediate and full useful life from new 2004 and subsequent model-year LEVs, ULEVs, and SULEVs, including fuel-flexible, bi-fuel and dual fuel vehicles when operating on the gaseous or alcohol fuel they are designed to use. Prior to the 2004 model year, a manufacturer that produces vehicles meeting these standards has the option of certifying the vehicles to the standards, in which case the vehicles will be treated as LEV II vehicles for purposes of the fleet-wide phase-in requirements.

LEV II Exhaust Mass Emission Standards for New 2004 and Subsequent Model LEVs, ULEVs, and SULEVs in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes

Vehicle Type	Durability Vehicle Basis (mi)	Vehicle Emission Category	NMOG (g/mi)	Carbon Monoxide (g/mi)	Oxides of Nitrogen (g/mi)	Formaldehyde (mg/mi)	Particulates (g/mi)
All PCs; LDTs 8,500 lbs. GVW or less Vehicles in this category are tested at their loaded vehicle weight.	50,000	LEV	0.075	3.4	0.05	15	n/a
		LEV, Option 1	0.075	3.4	0.07	15	n/a
		ULEV	0.040	1.7	0.05	8	n/a
	120,000	LEV	0.090	4.2	0.07	18	0.01
		LEV, Option 1	0.090	4.2	0.10	18	0.01
		ULEV	0.055	2.1	0.07	11	0.01
		SULEV	0.010	1.0	0.02	4	0.01
	150,000 (optional)	LEV	0.090	4.2	0.07	18	0.01
		LEV, Option 1	0.090	4.2	0.10	18	0.01
		ULEV	0.055	2.1	0.07	11	0.01
		SULEV	0.010	1.0	0.02	4	0.01
MDVs 8,501 - 10,000 lbs. GVW Vehicles in this category are tested at their adjusted loaded vehicle weight.	120,000	LEV	0.195	6.4	0.2	32	0.12
		ULEV	0.143	6.4	0.2	16	0.06
		SULEV	0.100	3.2	0.1	8	0.06
	150,000 (Optional)	LEV	0.195	6.4	0.2	32	0.12
		ULEV	0.143	6.4	0.2	16	0.06
		SULEV	0.100	3.2	0.1	8	0.06

Vehicle Type	Durability Vehicle Basis (mi)	Vehicle Emission Category	NMOG (g/mi)	Carbon Monoxide (g/mi)	Oxides of Nitrogen (g/mi)	Formaldehyde (mg/mi)	Particulates (g/mi)
MDVs 10,001-14,000 lbs. GVW Vehicles in this category are tested at their adjusted loaded vehicle weight.	120,000	LEV	0.230	7.3	0.4	40	0.12
		ULEV	0.167	7.3	0.4	21	0.06
		SULEV	0.117	3.7	0.2	10	0.06
	150,000 (Optional)	LEV	0.230	7.3	0.4	40	0.12
		ULEV	0.167	7.3	0.4	21	0.06
		SULEV	0.117	3.7	0.2	10	0.06

1.2 Supplemental Federal Test Procedure ("SFTP") Exhaust Emission Standards for Light- and Medium-Duty Vehicles.

1.2.1 The following standards represent the maximum SFTP exhaust emissions for the intermediate and full useful life from new 2001 through 2003 model year Tier 1 and TLEV passenger cars and light-duty trucks:

SFTP EXHAUST EMISSION STANDARDS FOR 2001 THROUGH 2003 MODEL-YEAR TIER 1 AND TLEV PASSENGER CARS AND LIGHT-DUTY TRUCKS

(grams per mile)

Vehicle Type	Loaded Vehicle Weight (lbs.)	Durability Vehicle Basis (mi)	Fuel Type	NMHC + NOx Composite	CO		
					A/C Test	US06 Test	Composite Option
PC	All	50,000	Gasoline	0.65	3.0	9.0	3.4
			Diesel	1.48	n/a	9.0	3.4
		100,000	Gasoline	0.91	3.7	11.1	4.2
			Diesel	2.07	n/a	11.1	4.2
LDT	0-3750	50,000	Gasoline	0.65	3.0	9.0	3.4
			Diesel	1.48	n/a	9.0	3.4
		100,000	Gasoline	0.91	3.7	11.1	4.2
			Diesel	2.07	n/a	11.1	4.2
LDT	3751-5750	50,000	Gasoline	1.02	3.9	11.6	4.4
			Diesel	n/a	n/a	n/a	n/a
		100,000	Gasoline	1.37	4.9	14.6	5.5
			Diesel	n/a	n/a	n/a	n/a

1.2.2 The following standards represent the maximum SFTP exhaust emissions at 4,000 miles for new 2001 and subsequent model LEVs, ULEVs, and SULEVs in the passenger car and light-duty truck class, and new 2003 and subsequent model year LEV, ULEV and SULEV medium-duty vehicles less than 8,500 pounds gross vehicle weight rating:

SFTP EXHAUST EMISSION STANDARDS
FOR LEVS, ULEVS, AND SULEVS IN THE PASSENGER CAR, LIGHT-DUTY TRUCK, AND MEDIUM-DUTY VEHICLE CLASSES
(grams per mile)

Vehicle Type**	LVW/ALVW (lbs.)	US06 Test*		A/C Test*	
		NMHC + NOx	CO	NMHC + NOx	CO
PC	All	0.14	8.0	0.20	2.7
LDT	0-3750 lbs.(LVW)	0.14	8.0	0.20	2.7
LDT	3751-5750 lbs. (LVW)	0.25	10.5	0.27	3.5
MDV	3751-5750 lbs. (ALVW)	0.40	10.5	0.31	3.5
MDV	5751-8500 lbs. (ALVW)	0.60	11.8	0.44	4.0

* For certification purposes, testing shall be conducted at 4000 miles ±250 miles or at the mileage determined by the manufacturer for emission-data vehicles.

** The following definitions apply for purposes of this SFTP standards table only:

"LDT" (light-duty truck) is any motor vehicle rated at 6,000 pounds gross vehicle weight or less, which is designed primarily for purposes of transportation of property or is a derivative of such a vehicle, or is available with special features enabling off-street or off-highway operation and use.

"MDV" (medium-duty truck) is any motor vehicle having a manufacturer's gross vehicle weight rating of greater than 6,000 pounds and less than 14,001 pounds, except passenger cars.

1.3 NMOG Standards for Fuel-Flexible, Bi-Fuel and Dual-Fuel Vehicles Operating on Gasoline.

For fuel-flexible, bi-fuel and dual-fuel PCs, LDTs and MDVs, compliance with the NMOG exhaust mass emission standards shall be based on exhaust emission tests both when the vehicle is operated on the gaseous or alcohol fuel it is designed to use, and when the vehicle is operated on gasoline. A manufacturer must demonstrate compliance with the applicable exhaust mass emission standards for NMOG, CO, NOx and formaldehyde set forth in the tables in Section E.1.1 when certifying the vehicle for operation on the gaseous or alcohol fuel.

If the manufacturer elects to use them, the following standards may represent the maximum NMOG emissions when the vehicle is operating on gasoline. A manufacturer shall not apply a reactivity adjustment factor to the exhaust NMOG mass emission result when operating on gasoline. A manufacturer may measure NMHC in lieu of NMOG when fuel-flexible, bi-fuel and dual-fuel vehicles are operated on gasoline, subject to the requirements of Section D.1., subparagraph (p). Testing at 50^{o}F is not required for fuel-flexible, bi-fuel and dual-fuel vehicles when operating on gasoline. The applicable CO, NOx and formaldehyde standards are set forth in Section E.1.1 above.

1.3.1 **LEV I Standards for 2001 through 2006 Model Year Bi-Fuel, Fuel-Flexible and Dual Fuel Vehicles Operating on Gasoline.** The applicable exhaust mass emission standards for NMOG when certifying the vehicle for operation on gasoline (as specified in Part II, Section A. paragraph 100.3.1) are:

LEV I NMOG Standards for Bi-Fuel, Fuel-Flexible and Dual-Fuel Vehicles Operating on Gasoline
(g/mi)

Vehicle Type, LVW/ALVW	Emission Category	Durability Vehicle Basis	
		50,000 mi	100,000 mi
All PCs, LDTs, 0-3750 lbs. LVW (2001 through 2003 model years only, for TLEVs)	TLEV	0.25	0.31
	LEV	0.125	0.156
	ULEV	0.075	0.090
LDTs, 3751-5750 lbs. LVW (2001 through 2003 model years only, for TLEVs)	TLEV	0.32	0.40
	LEV	0.160	0.200
	ULEV	0.100	0.130
MDVs, 3751-5750 lbs. ALVW	LEV	0.32	0.46
	ULEV	0.160	0.230
	SULEV	0.100	0.143
MDVs, 5751-8500 lbs. ALVW	LEV	0.39	0.56
	ULEV	0.195	0.280
	SULEV	0.117	0.167
MDVs, 8501-10,000 lbs. ALVW	LEV	0.46	0.66
	ULEV	0.230	0.330
	SULEV	0.138	0.197
MDVs, 10,001-14,000 lbs. ALVW	LEV	0.60	0.86
	ULEV	0.300	0.430
	SULEV	0.180	0.257

1.3.2 **LEV II Standards for 2004 and Subsequent Model Year Bi-fuel, Fuel-Flexible and Dual Fuel Vehicles Operating on Gasoline.** The applicable exhaust mass emission standards for NMOG when certifying the vehicle for operation on gasoline (as specified in Part II, Section A. paragraph 100.3.1) are:

LEV II NMOG Standards for Bi-Fuel, Fuel-Flexible and Dual-Fuel Vehicles Operating on Gasoline (g/mi)

Vehicle Type	Vehicle Emission Category	Durability Vehicle Basis	
		50,000 mi	120,000 mi
All PCs; LDTs, 0-8500 lbs. GVW	LEV	0.125	0.156
	ULEV	0.075	0.090
	SULEV	0.010	0.040
MDVs, 8501-10,000 lbs. GVW	LEV	n/a	0.230
	ULEV	n/a	0.167
	SULEV	n/a	0.117
MDVs, 10,001-14,000 lbs. GVW	LEV	n/a	0.280
	ULEV	n/a	0.195
	SULEV	n/a	0.143

1.4 50°F Exhaust Emission Standards.

All light- and medium-duty TLEVs, LEVs, ULEVs and SULEVs must demonstrate compliance with the following exhaust emission standards for NMOG and formaldehyde measured on the FTP (40 CFR, Part 86, Subpart B) conducted at a nominal test temperature of 50°F, as modified by Part II, Section C of these test procedures. The NMOG mass emission result shall be multiplied by the applicable reactivity adjustment factor, if any, prior to comparing to the applicable adjusted 50,000 mile certification standards set forth in subparagraphs 1.4.1 and 1.4.2 below. A manufacturer may demonstrate compliance with the NMOG and HCHO certification standards contained in subparagraphs 1.4.1 and 1.4.2 by measuring NMHC exhaust emissions in accordance with Section D.1., subparagraph (p) and Section G.3.1.2, respectively, of these test procedures. Emissions of CO and NOx measured at 50°F shall not exceed the standards set forth in Section E.1.1 applicable to vehicles of the same emission category and vehicle type subject to a cold soak and emission test at 68° to 86°F. Natural gas and diesel-fueled vehicles are exempt from the 50° F test requirements.

1.4.1 **Standards for Vehicles Certified to the LEV I Standards.**

Vehicle Weight Class	Vehicle Emission Category (g/mi)							
	TLEV		LEV		ULEV		SULEV	
	NMOG	HCHO	NMOG	HCHO	NMOG	HCHO	NMOG	HCHO
PCs; LDTs 0-3750 lbs. LVW	0.250	0.030	0.150	0.030	0.080	0.016	n/a	n/a
LDTs 3751-5750 lbs. LVW	0.320	0.036	0.200	0.036	0.100	0.018	n/a	n/a
MDVs 3751-5750 lbs. TW	n/a	n/a	0.320	0.036	0.200	0.018	0.100	0.008
MDVs 5751-8500 lbs. TW	n/a	n/a	0.390	0.044	0.234	0.022	0.118	0.012
MDVs 8501-10,000 lbs. TW	n/a	n/a	0.460	0.056	0.276	0.028	0.138	0.014
MDVs 10,001-14,000 lbs. TW	n/a	n/a	0.600	0.072	0.360	0.036	0.180	0.018

1.4.2 **Standards for Vehicles Certified to the LEV II Standards**

Vehicle Weight Class	Vehicle Emission Category (g/mi)					
	LEV		ULEV		SULEV	
	NMOG	HCHO	NMOG	HCHO	NMOG	HCHO
PCs; LDTs 0-8500 lbs. GVW	0.150	0.030	0.080	0.016	0.020	0.008
MDVs 8501-10,000 lbs. GVW	0.390	0.064	0.286	0.032	0.200	0.016
MDVs 10,001-14,000 lbs. GVW	0.460	0.080	0.334	0.042	0.234	0.020

1.5 Cold CO Standards.

The following standards represent the 50,000 mile cold temperature exhaust carbon monoxide emission levels from new 2001 and subsequent model-year passenger cars, light-duty trucks, and medium-duty vehicles:

2001 AND SUBSEQUENT MODEL-YEAR COLD TEMPERATURE CARBON MONOXIDE EXHAUST EMISSIONS STANDARDS FOR PASSENGER CARS, LIGHT-DUTY TRUCKS, AND MEDIUM-DUTY VEHICLES

(grams per mile)

Vehicle Type	Carbon Monoxide
All PCs, LDTs 0-3750 lbs. LVW	10.0
LDTs 3751 lbs. LVW - 8500 lbs. GVW LEV I and Tier 1 MDVs 8,500 lbs. GVW and less	12.5

These standards are applicable to vehicles tested in accordance with 40 CFR Part 86 Subpart C, as modified in Part II, Section B of these test procedures at a nominal temperature of 20°F (-7°C). Natural gas vehicles, diesel-fueled vehicles, and medium-duty vehicles with a gross vehicle weight rating greater than 8,500 lbs. are exempt from these standards.

1.6 Highway NOx Standard.

The maximum emissions of oxides of nitrogen measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR 600 Subpart B, which is incorporated herein by reference) shall not be greater than 1.33 times the applicable PC and LDT standards or 2.0 times the applicable MDV standards set forth in section E.1.1. Both the projected emissions and the HWFET standard shall be rounded in accordance with ASTM E29-67 to the nearest 0.1 g/mi (or 0.01 g/mi for vehicles certified to the 0.05 or 0.02 g/mi NOx standards) before being compared.

1.7 Requirements for Vehicles Certified to the Optional 150,000 Mile Standards.

(a) Requirement to Generate Additional NMOG Fleet Average Credit. A vehicle that is certified to the 150,000 mile standards in section E.1.1.2 shall generate additional NMOG fleet average credit as set forth in section E.3.1 or additional vehicle equivalent credits as set forth in E.3.2, provided that the manufacturer extends the warranty on high-priced parts to 8 years or 100,000 miles, whichever occurs first, and agrees to extend the limit on high mileage in-use testing to ~~105,000~~ 112,500 miles.

(b) Requirement to Generate a Partial ZEV Allowance. A manufacturer that certifies to the 150,000 mile SULEV standards shall also generate a partial ZEV allocation according to the criteria set forth in section C.3 of the "California Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Zero-Emission Vehicles, and 2001 and

Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," as incorporated by reference in section 1962, title 13, CCR.

1.8 Optional LEV NOx Standard.

A manufacturer may certify up to 4% of its light-duty truck fleet from 3751 lbs. LVW - 8500 lbs. GVW with a maximum base payload of 2500 lbs. or more, to the LEV, option 1, standard set forth in Section E.1.1.2 based on projected sales of trucks in this category. Passenger cars and light-duty trucks 0-3750 lbs. LVW are not eligible for this option.

1.9 NMOG Credit for Vehicles with Zero-Evaporative Emissions.

In determining compliance of a vehicle with the applicable exhaust NMOG standard, a gram per mile NMOG factor, to be determined by the Executive Officer based on available data, shall be subtracted from the reactivity-adjusted NMOG exhaust emission results for any vehicle that has been certified to the "zero" evaporative emission standard set forth in title 13, CCR, section 1976(b)(1)(E). This credit shall not apply to a SULEV that generates a partial ZEV allowance.

1.10 NMOG Credit for Direct Ozone Reduction Technology.

A manufacturer that certifies vehicles equipped with direct ozone reduction technologies shall be eligible to receive NMOG credits that can be applied to the NMOG exhaust emissions of the vehicle when determining compliance with the standard. In order to receive credit, the manufacturer must submit the following information for each vehicle model, including, but not limited to:

(a) a demonstration of the airflow rate through the direct ozone reduction device and the ozone-reducing efficiency of the device over the range of speeds encountered in the ~~SFTP test cycle~~ UC as set forth in Part II, section E of these test procedures;

(b) an evaluation of the durability of the device for the full useful life of the vehicle; and

(c) a description of the on-board diagnostic strategy for monitoring the performance of the device in-use.

Using the above information, the Executive Officer shall determine the value of the NMOG credit based on the calculated change in the one-hour peak ozone level using an approved airshed model.

1.11 NOx Credits for Pre-2004 MDVs Certified to the LEV I LEV or ULEV Standards.

Prior to the 2004 model year, a manufacturer may earn a 0.02 g/mi per vehicle NOx credit for MDVs between 6,000-8500 lbs. GVW certified to the LEV I LEV or ULEV standards for PCs and LDTs set forth in section E.1.1.1 of these test procedures. The manufacturer may apply the credit on a per vehicle basis to the NOx emissions of LDTs between 6,000-8500 lbs. GVW certified to the PC/LDT LEV or ULEV standards in section E.1.1.2 for the 2004 through 2008 model years.

1.12 When a Federally-Certified Vehicle Model is Required in California.

1.12.1 **Basic Requirement.** Whenever a manufacturer federally-certifies a 2004 or subsequent model-year passenger car, light-duty truck or medium-duty vehicle model to the standards for a particular emissions bin that are more stringent than the standards for an applicable California vehicle emissions category, the equivalent California model may only be certified to (i) the California standards for a vehicle emissions category that are at least as stringent as the standards for the corresponding federal emissions bin, or (ii) the exhaust emission standards to which the federal model is certified. However, where the federal exhaust emission standards for the particular emissions bin and the California standards for a vehicle emissions category are equally stringent, the California model may only be certified to either the California standards for that vehicle emissions category or more stringent California standards. The federal emission bins are those contained Tables S04-1 and S04-2 of 40 CFR section 86.1811-04(c) as adopted February 10, 2000. The criteria for applying this requirement are set forth in Part I. Section H.1 of these test procedures.

1.12.2 **Exception for Clean Fuel Fleet Vehicles.** This requirement does not apply in the case of a federally-certified vehicle model that is only marketed to fleet operators for applications that are subject to clean fuel fleet requirements established pursuant to section 246 of the federal Clean Air Act (42 U.S.C. sec. 7586). In addition, the Executive Officer shall exclude from the requirements a federally-certified vehicle model where the manufacturer demonstrates to the Executive Officer's reasonable satisfaction that the model will primarily be sold or leased to clean fuel fleet operators for such applications, and that other sales or leases of the model will be incidental to marketing to those clean fuel fleet operators.

1.12.3 **Opt-in for 2003 or Prior Model-Year Vehicles.** A manufacturer may certify a passenger car, light-duty truck or medium-duty vehicle to federal exhaust emission standards pursuant to Section E.1.12.1 prior to the 2004 model year.

1.13 **Emission Standard for Fuel-Fired Heaters**. Whenever a manufacturer elects to utilize an on-board fuel-fired heater on any passenger car, light-duty truck or medium-duty vehicle, the heater must meet the LEV II ULEV standards for passenger cars and light-duty trucks less than 8,500 pounds GVW set forth in Section E.1.1.2 of these test procedures. The exhaust emissions from the fuel-fired heater shall be determined in accordance with the "California Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes". On-board fuel-fired heaters may not be operable at ambient temperatures above 40°F.

2. Emission Standards Phase-In Requirements for Manufacturers

2.1 Fleet Average NMOG Requirements for Passenger Cars and Light-Duty Trucks.

2.1.1 The fleet average non-methane organic gas exhaust mass emission values from the passenger cars and light-duty trucks produced and delivered for sale in California each model year by a manufacturer other than a small volume manufacturer or an independent low volume manufacturer shall not exceed:

FLEET AVERAGE NON-METHANE ORGANIC GAS EXHAUST MASS EMISSION REQUIREMENTS FOR LIGHT-DUTY VEHICLE WEIGHT CLASSES (50,000 mile Durability Vehicle Basis)		
Model Year	Fleet Average NMOG (g/mi)	
	All PCs; LDTs 0-3750 lbs. LVW	LDTs 3751 lbs. LVW - 8500 lbs. GVW
2001	0.070	0.098
2002	0.068	0.095
2003	0.062	0.093
2004	0.053	0.085
2005	0.049	0.076
2006	0.046	0.062
2007	0.043	0.055
2008	0.040	0.050
2009	0.038	0.047
2010+	0.035	0.043

2.1.2 **Calculation of Fleet Average NMOG Value**.

2.1.2.1 (a) Each manufacturer's PC and LDT1 fleet average NMOG value for the total number of PCs and LDT1s produced and delivered for sale in California shall be calculated as follows:

$$\frac{(\Sigma\ [\text{Number of vehicles in a test group} \times \text{applicable emission standard}] + \Sigma\ [\text{Number of hybrid electric vehicles in a test group} \times \text{HEV NMOG factor}])}{\text{Total Number of Vehicles Produced, Including ZEVs and HEVs}}$$

2.1.2.1 (b) Each manufacturer's LDT2 fleet average NMOG value for the total number of LDT2s produced and delivered for sale in California shall be calculated as follows:

(Σ [Number of vehicles in a test group x applicable emission standard] +
Σ [Number of hybrid electric vehicles in a test group x HEV NMOG factor]) ÷
Total Number of Vehicles Produced, Including ZEVs and HEVs

The applicable emission standards to be used in the above equations are as follows:

Model Year	**Emission Category**	**Emission Standard Value**	
		All PCs; LDTs 0-3750 lbs. LVW	**LDTs 3751-5750 lbs. LVW**
2001 and subsequent (AB 965 vehicles only)	All	Federal Emission Standard to which Vehicle is Certified	Federal Emission Standard to which Vehicle is Certified
2001 - 2003	Tier 1	0.25	0.32
2001 - 2006 model year vehicles certified to the "LEV I" standards in E.1.1.1 (For TLEVs, 2001 - 2003 model years only)	TLEVs	0.125	0.160
	LEVs	0.075	0.100
	ULEVs	0.040	0.050
Model Year	**Emission Category**	**All PCs; LDTs 0-3750 lbs. LVW**	**LDTs 3751 lbs. LVW - 8500 lbs. GVW**
2001 and subsequent model year vehicles certified to the "LEV II" standards in E.1.1.2	LEVs	0.075	0.075
	ULEVs	0.040	0.040
	SULEVs	0.01	0.01
2001 and subsequent model year vehicles certified to the optional 150,000 mile "LEV II" standards for PCs and LDTs in E.1.1.2	LEVs	0.064	0.064
	ULEVs	0.034	0.034
	SULEVs	0.0085	0.0085

2.1.2.2 **HEV NMOG Factor.** The HEV NMOG factor for light-duty vehicles is calculated as follows:

LEV HEV Contribution Factor = 0.075 - [(Zero-emission VMT Factor) x 0.035]
ULEV HEV Contribution Factor = 0.040 - [(Zero-emission VMT Factor) x 0.030]

where Zero-emission VMT Factor for HEVs is determined in accordance with Section C.3 of the "California Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent

Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," as incorporated by reference in section 1962, title 13, CCR.

2.1.2.3 **Federally-Certified Vehicles**. A vehicle certified to the standards for a federal exhaust emissions bin in accordance with Section H.1 of these test procedures shall use the corresponding NMOG emission category value set forth in the table in Section E.2.1.2 of these test procedures for the fleet average calculation. If a vehicle is certified to 150,000 mile standards for a federal exhaust emission bin and the corresponding California NMOG emission category is LEV I or LEV II LEV, it may use the emission standard value for the optional 150,000 mile LEV II LEV standards set forth in the Section E.2.1.2 table. If a vehicle is certified to 150,000 mile standards for a federal exhaust emission bin and the corresponding California NMOG emission category is LEV I or LEV II ULEV, it may use the emission standard value for the optional 150,000 mile LEV II ULEV standards set forth in the Section E.2.1.2 table.

2.1.3 **Phase-in Requirements for Small Volume Manufacturers.**

(a) In 2001 through 2006 model years, a small volume manufacturer shall not exceed a fleet average NMOG value of 0.075 g/mi for PCs and LDTs from 0-3750 lbs. LVW or 0.100 g/mi for LDTs from 3751-5750 lbs. LVW calculated in accordance with subsection E.2.1.2. In 2007 and subsequent model years, a small volume manufacturer shall not exceed a fleet average NMOG value of 0.075 for PCs and LDTs from 0-3750 lbs. LVW or 0.075 for LDTs from 3751 lbs. LVW - 8,500 lbs. GVW calculated in accordance with subsection E.2.1.2.

(b) If a manufacturer's average California sales exceeds 4500 units of new PCs, LDTs, MDVs and heavy duty engines based on the average number of vehicles sold for the three previous consecutive model years, the manufacturer shall no longer be treated as a small volume manufacturer and shall comply with the fleet average requirements applicable to larger manufacturers as specified in section E.2.1.2 beginning with the fourth model year after the last of the three consecutive model years.

(c) If a manufacturer's average California sales falls below 4500 units of new PCs, LDTs, MDVs and heavy duty engines based on the average number of vehicles sold for the three previous consecutive model years, the manufacturer shall be treated as a small volume manufacturer and shall be subject to the requirements for small volume manufacturers beginning with the next model year.

2.1.4 **Phase-in Requirements for Independent Low Volume Manufacturers**

In 2001 through 2006 model years, an independent low volume manufacturer shall not exceed a fleet average NMOG value of 0.075 g/mi for PCs and LDTs from 0-3750 lbs. LVW or 0.100 g/mi for LDTs from 3751-5750 lbs. LVW calculated in accordance with section E.2.1.2. In 2007 and subsequent model years, an independent low volume manufacturer shall not exceed a fleet average NMOG value of 0.060 for PCs and LDTs from 0-3750 lbs. LVW

or 0.065 g/mi for LDTs from 3751 lbs. LVW - 8500 lbs. GVW calculated in accordance with section E.2.1.2.

2.1.5 **Treatment of ZEVs** ZEVs classified as LDTs (>3750 lbs. LVW) that have been counted toward the ZEV requirement for PCs and LDTs (0-3750 lbs. LVW) as specified in Section C of the "California Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," as incorporated by reference in section 1962, title 13, CCR, shall be included in this equation.

2.2 LEV II Phase-In Requirement.

Beginning in the 2004 model year, a manufacturer, except a small volume manufacturer or an independent low volume manufacturer, shall certify a percentage of its PC and LDT fleet to the LEV II standards in section E.1.1.2 according to the following phase-in schedule:

Model Year	PC/LDT1 (%)	LDT2 (%)
2004	25	25
2005	50	50
2006	75	75
2007	100	100

In determining compliance with the phase-in schedule, the fleet shall consist of LEV I and LEV II PCs and LDT1s for the PC/LDT1 calculation, and LEV I and LEV II LDT2s for the LDT2 calculation. LEV I MDVs are not counted in the calculation until they are certified as LEV II LDT2s.

A manufacturer may use an alternative phase-in schedule to comply with these phase-in requirements as long as equivalent NOx emission reductions are achieved by the 2007 model year from each of the two categories – PC/LDT1 or LDT2. Model year emission reductions shall be calculated by multiplying the percent of either PC/LDT1 or LDT2 vehicles meeting the LEV II standards in a given model year (based on a manufacturer's projected sales volume of vehicles in each category) by 4 for the 2004 model year, 3 for the 2005 model year, 2 for the 2006 model year and 1 for the 2007 model year. The yearly results for PCs/LDT1s shall be summed together to determine a separate cumulative total for PCs/LDT1s and the yearly results for LDT2s shall be summed together to determine a cumulative total for LDT2s. The cumulative total for each category must be equal to or exceed 500 to be considered equivalent. A manufacturer may add vehicles introduced before the 2004 model year (e.g., the percent of vehicles introduced in 2003 would be multiplied by 5) to the cumulative total.

2.3 Medium-Duty Vehicle Phase-In Requirements.

2.3.1 (a) A manufacturer of MDVs, other than a small volume manufacturer, shall certify an equivalent percentage of its MDV fleet according to the following phase-in schedule:

Model Year	Vehicles Certified to Section E.1.1 (%)		Vehicles Certified to title 13 CCR Section 1956.8(g) or (h) (%)		
	LEV	ULEV	Tier 1	LEV	ULEV
2001	80	20	100	0	0
2002	70	30	0	100	0
2003	60	40	0	100	0
2004 +	40	60	0	0	100

(b) **Requirements for Small Volume Manufacturers.** In 2001 through 2003 model years, a small volume manufacturer shall certify, produce, and deliver for sale in California vehicles or engines certified to the MDV Tier 1 standards in a quantity equivalent to 100% of its MDV fleet. In 2004 through 2006 ~~and subsequent~~ model years, a small volume manufacturer shall certify, produce, and deliver for sale in California vehicles or engines certified to the MDV LEV standards in a quantity equivalent to 100% of its MDV fleet. Engines certified to these MDV LEV standards are not eligible for emissions averaging.

(c) **Phase-In Requirements for LEV II MDVs**. For the 2004 through 2006 model years, a manufacturer, other than a small volume manufacturer must phase-in at least one test group per model year to the MDV LEV II standards. All 2007 and subsequent model year MDVs, including those produced by a small volume manufacturer, are subject to the LEV II MDV standards. Beginning in the 2005 model year, all medium-duty engines certified to the optional medium-duty engine standards in title 13, CCR §1956.8(c) or (h), including those produced by a small volume manufacturer, must meet the standard set forth in title 13, CCR §1956.8(c) or (h), as applicable. A manufacturer that elects to certify to the Option 1 or Option 2 federal standards as set forth in 40 CFR §86.005-10(f) is not subject to these phase-in requirements.

2.3.2 **Identifying a Manufacturer's MDV Fleet**. For the 2001 and subsequent model years, each manufacturer's MDV fleet shall be defined as the total number of California-certified MDVs produced and delivered for sale in California. The percentages shall be applied to the manufacturer's total production of California-certified medium-duty vehicles delivered for sale in California. For the 2005 and subsequent model years, a manufacturer that elects to certify engines to the optional medium-duty engine standards in title 13, CCR, §1956.8(c), or (h) shall not count those engines in the manufacturer's total production of California-certified medium-duty vehicles for purposes of this subparagraph.

2.4 Implementation Schedules for SFTP Emission Standards

2.4.1 A manufacturer of PCs and of LDTs certified to the Tier 1 and TLEV standards as set forth in Section E.1 of these test procedures, except a small volume manufacturer, shall certify a minimum percentage of its PC and LDT fleet according to the following phase-in schedule.

Model Year	Percentage of PC and LDT Fleet
2001	25
2002	50
2003	85
2004 and subsequent	100

(a) For the purposes of the implementation schedule set forth in this subparagraph 2.4.1, each manufacturer's PC and LDT fleet shall be defined as the total projected number of Tier 1 and TLEV PCs and LDTs from 0-5750 lbs. LVW sold in California. As an option, a manufacturer may elect to have its total PC and LDT fleet defined, for the purposes of this implementation schedule only, as the total projected number of the manufacturer's PCs and LDTs, other than zero-emission vehicles, certified and sold in California.

(b) The phase-in requirements for small volume manufacturers are set forth in Section D.2.1.6 of these test procedures.

2.4.2 (a) A manufacturer of PCs, LDTs, and MDVs certified to the LEV, ULEV and SULEV standards as set forth in Section E.1 of these test procedures, except a small volume manufacturer, shall certify a minimum percentage of its PC and LDT fleet, and a minimum percentage of its MDV fleet, according to the following phase-in schedule.

Model Year	Percentage	
	PC, LDT	MDV
2001	25	NA
2002	50	NA
2003	85	25
2004	100	50
2005 and subsequent	100	100

(b) A manufacturer may use an “Alternative or Equivalent Phase-in Schedule” to comply with the phase-in requirements. An “Alternative Phase-in” is one that achieves at least

equivalent emission reductions by the end of the last model year of the scheduled phase-in. Model-year emission reductions shall be calculated by multiplying the percent of vehicles (based on the manufacturer's projected California sales volume of the applicable vehicle fleet) meeting the new requirements per model year by the number of model years implemented prior to and including the last model year of the scheduled phase-in. The "cumulative total" is the summation of the model-year emission reductions (e.g., a four model-year 25/50/85/100 percent phase-in schedule would be calculated as: (25%*4 years) + (50%*3 years) + (85%*2 years) + (100%*1 year) = 520). Any alternative phase-in that results in an equal or larger cumulative total than the required cumulative total by the end of the last model year of the scheduled phase-in shall be considered acceptable by the Executive Officer under the following conditions: 1) all vehicles subject to the phase-in shall comply with the respective requirements in the last model year of the required phase-in schedule and 2) if a manufacturer uses the optional phase-in percentage determination in Section 2.4.1(a) above, the cumulative total of model-year emission reductions as determined only for PCs and LDTs certified to this Section 2.4.2. must also be equal to or larger than the required cumulative total by end of the 2004 model year. A manufacturer shall be allowed to include vehicles introduced before the first model year of the scheduled phase-in (e.g., in the previous example, 10 percent introduced one year before the scheduled phase-in begins would be calculated as: (10%*5 years) and added to the cumulative total).

2.4.2.1 For the purposes of the implementation schedule set forth in this subparagraph 2.4.2, each manufacturer's PC and LDT fleet shall be defined as the total projected number of low-emission, ultra-low-emission and super-ultra-low-emission PCs and LDTs from 0-5750 pounds loaded vehicle weight sold in California. Each manufacturer's MDV fleet shall be defined as the total projected number of low-emission, ultra-low-emission, and super-ultra-low-emission MDVs less than 8501 pounds gross vehicle weight rating sold in California.

3. Calculation of NMOG Credits/Debits

3.1 Calculation of NMOG Credits for Passenger Cars and Light-Duty Trucks.

3.1.1 In 2001 and subsequent model years, a manufacturer that achieves fleet average NMOG values lower than the fleet average NMOG requirement for the corresponding model year shall receive credits in units of g/mi NMOG determined as:

> [(Fleet Average NMOG Requirement) - (Manufacturer's Fleet Average NMOG Value)]
> x
> (Total No. of Vehicles Produced and Delivered for Sale in California, Including ZEVs and HEVs).

A manufacturer with 2001 and subsequent model year fleet average NMOG values greater than the fleet average requirement for the corresponding model year shall receive debits in units of g/mi NMOG equal to the amount of negative credits determined by the aforementioned

equation. For the 2001 through 2006 model year, the total g/mi NMOG credits or debits earned for PCs and LDTs 0-3750 lbs. LVW and for LDTs 3751-5750 lbs. and LDTs 3751 lbs. LVW - 8500 lbs. GVW shall be summed together. For the 2007 and subsequent model years, the total g/mi NMOG credits or debits earned for PCs and LDTs 0-3750 lbs. LVW and for LDTs 3751 lbs. LVW - 8500 lbs. GVW shall be summed together. The resulting amount shall constitute the g/mi NMOG credits or debits accrued by the manufacturer for the model year.

3.2 Calculation of Vehicle Equivalent NMOG Credits for Medium-Duty Vehicles. In 2001 and subsequent model years, a manufacturer that produces and delivers for sale in California MDVs in excess of the equivalent requirements for LEVs, ULEVs and/or SULEVs certified to the exhaust emission standards set forth in section E.1 of these test procedures or to the exhaust emission standards set forth in section 1956.8(h), title 13, CCR shall receive "Vehicle-Equivalent Credits" (or "VECs") calculated in accordance with the following equation, where the term "produced" means produced and delivered for sale in California:

{[(No. of LEVs Produced excluding HEVs) +
(No. of LEV HEVs x HEV VEC factor for LEVs)] +
(1.20 x No. of LEVs certified to the 150,000 mile standards)} -
(Equivalent No. of LEVs Required to be Produced)} +

{[(1.4) x (No. of ULEVs Produced excluding HEVs) +
(No. of ULEV HEVs x HEV VEC factor for ULEVs)] +
(1.50 x No. of ULEVs certified to the 150,000 mile standards)} -
[(1.4) x (Equivalent No. of ULEVs Required to be Produced)]} +

{[(1.7) x (No. of SULEVs Produced excluding HEVs) +
(No. of SULEV HEVs x HEV VEC factor for SULEVs)] +
(1.75 x No. of SULEVs certified to the 150,000 mile standards)} -
[(1.7) x [(Equivalent No. of SULEVs Required to be Produced)]} +
[(2.0) x (No. of ZEVs Certified and Produced as MDVs)].

MDVs certified prior to the 2004 model year to the LEV I LEV or ULEV standards for PCs and LDTs 0-3750 lbs. LVW set forth in section E.1 of these test procedures shall receive VECs calculated in accordance with the following equation, where the term "produced" means produced and delivered for sale in California:

[(1.6) x (No. of MDVs meeting the LEV I LEV standards for PCs and LDTs 0-3750 lbs. LVW excluding HEVs) + (No. of HEVs meeting the LEV I LEV standards for PCs and LDTs 0-3750 lbs. LVW x HEV VEC factor for MDVs meeting the LEV I LEV standards for PCs and LDTs 0-3750 lbs. LVW)]+
[(1.65 x No. of MDVs certified to the 150,000 mile LEV I LEV standards for PCs and LDTs 0-3750 lbs.)] +

[(1.8) x (No. of MDVs meeting the LEV I ULEV standards for PCs and LDTs 0-3750 lbs. LVW excluding HEVs) + (No. of HEVs meeting the LEV I ULEV standards for PCs and LDTs 0-3750 lbs. LVW x HEV VEC factor for MDVs meeting the LEV I ULEV standards for PCs and LDTs 0-3750 lbs. LVW)]+
[(1.85 x No. of MDVs certified to the 150,000 mile LEV I ULEV standards for PCs and LDTs 0-3750 lbs.)].

3.2.1 The MDV HEV VEC allowance ~~factor~~ is calculated as follows:

1 + [(LEV standard - ULEV standard) x (Zero-emission VMT Allowance ~~Factor~~) ÷ LEV standard] for LEVs;
1 + [(ULEV standard - SULEV standard) x (Zero-emission VMT Allowance ~~Factor~~) ÷ ULEV standard] for ULEVs;
1 + [(SULEV standard - ZEV standard) x (Zero-emission VMT Allowance ~~Factor~~) ÷ SULEV standard] for SULEVs;

where "Zero-emission VMT Allowance ~~Factor~~" for an HEV is determined in accordance with Section C.3 of the "California Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes, as incorporated in section 1962, title 13, CCR."

The HEV VEC allowance ~~factor~~ for MDVs prior to model year 2004 meeting the LEV I LEV and ULEV standards for PCs and LDTs 0-3750 lbs. LVW is calculated as follows:

1 + [(MDV SULEV standard - PC LEV I LEV standard) x (Zero-emission VMT Allowance ~~Factor~~) ÷ PC LEV I LEV standard] for MDVs meeting the LEV I LEV standards for PCs and LDTs 0-3750 lbs. LVW;
1 + [(MDV SULEV standard - PC ULEV standard) x (Zero-emission VMT Allowance ~~Factor~~) ÷ PC LEV I ULEV standard] for MDVs meeting the ULEV I LEV standards for PCs and LDTs 0-3750 lbs. LVW.

3.2.2 A manufacturer that fails to produce and deliver for sale in California the equivalent quantity of MDVs certified to LEV, ULEV and/or SULEV exhaust emission standards, shall receive "Vehicle-Equivalent Debits" (or "VEDs") equal to the amount of negative VECs determined by the aforementioned equation.

3.2.3 Only ZEVs certified as MDVs and not used to meet the ZEV requirement shall be included in the calculation of VECs.

3.2.4 For a manufacturer that elects to certify engines to the optional medium-duty engine standards in title 13, CCR §1956.8(c) or (h), all such 2005 and subsequent model year engines used in MDVs, including those produced by a small volume manufacturer, shall be subject to the emissions averaging provisions applicable to heavy-duty diesel or Otto-cycle engines as set forth in the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Otto-Cycle Engines," or the "California Exhaust

Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines, incorporated by reference in title 13, CCR, §1956.8(b) or (d), as applicable.

3.3 Procedure for Offsetting Debits.

3.3.1 A manufacturer shall equalize emission debits by earning g/mi NMOG emission credits or VECs in an amount equal to the g/mi NMOG debits or VEDs, or by submitting a commensurate amount of g/mi NMOG credits or VECs to the Executive Officer that were earned previously or acquired from another manufacturer. For 2001 through 2003 and for 2007 and subsequent model years, manufacturers shall equalize emission debits by the end of the following model year. For 2004 through 2006 model years, a manufacturer shall equalize NMOG debits for PCs and LDTs and LEV II MDVs within three model years and prior to the end of the 2007 model year. If emission debits are not equalized within the specified time period, the manufacturer shall be subject to the Health and Safety Code §43211 civil penalty applicable to a manufacturer which sells a new motor vehicle that does not meet the applicable emission standards adopted by the state board. The cause of action shall be deemed to accrue when the emission debits are not equalized by the end of the specified time period. For the purposes of Health and Safety Code §43211, the number of passenger cars and light-duty trucks not meeting the state board's emission standards shall be determined by dividing the total amount of g/mi NMOG emission debits for the model year by the g/mi NMOG fleet average requirement for PCs and LDTs 0-3750 lbs. LVW and LDTs 3751 lbs. LVW - 8500 lbs. GVW applicable for the model year in which the debits were first incurred and the number of medium-duty vehicles not meeting the state board's emission standards shall be equal to the amount of VEDs incurred.

3.3.2 The emission credits earned in any given model year shall retain full value through the subsequent model year. The value of any credits not used to equalize the previous model-year's debit shall be discounted by 50% at the beginning of second model year after being earned, shall be discounted to 25% of its original value if not used by the beginning of the third model year after being earned, and will have no value if not used by the beginning of the fourth model year after being earned.

4. Intermediate In-Use Compliance Standards.

4.1 LEV I Intermediate In-Use Compliance Standards.

4.1.1 **LEV I ULEV Standards.** For 2001 and 2002 model year PCs and LDTs certified to the ULEV standards in Section E.1.1.1, including fuel-flexible, and dual-fuel vehicles when operating on an available fuel other than gasoline, the following intermediate in-use standards shall apply:

Vehicle Type	Durability Vehicle Basis (miles)	Intermediate In-Use Compliance Standards (g/mi)		
		NMOG	CO	NOx
PCs, 0-3750 lbs. LVW LDTs	50,000	0.055	2.1	0.3
	100,000	0.075	3.4	0.4
3751-5750 lb. LVW LDTs	50,000	0.070	2.8	0.5
	100,000	0.100	4.4	0.7

4.1.2 **LEV I Standards for MDVs.** The following intermediate in-use compliance standards for 50,000 miles and 120,000 miles for MDVs from 3751-14,000 lbs. ALVW certified to the LEV I standards in Section E.1.1.1, including fuel-flexible, bi-fuel and dual-fuel vehicles when operating on an available fuel other than gasoline, shall apply for the specified model years only. In-use compliance with standards beyond 50,000 miles shall be waived through the 2001 model year for SULEVs.

Intermediate In-Use Compliance Standards * (in grams per mile)										
Emission Category	Model Year	Durability Vehicle Basis (mi)	3751-5750 lbs.		5751 - 8500 lbs.		8501-10,000 lbs.		10,001-14,000 lbs.	
			NMOG	NOx	NMOG	NOx	NMOG	NOx	NMOG	NOx
ULEV	-2002	50,000	0.128	--	0.156	--	0.184	--	0.240	--
	-2002	120,000	0.160	--	0.195	--	0.230	--	0.300	--
SULEV	through 2002	50,000	0.072	0.3	0.084	0.45	0.100	0.5	0.130	0.7
	2002	120,000	0.100	0.4	0.117	0.6	0.138	0.65	0.180	1.0

* Dashes mean that the standards in Section E.1.1 apply.

4.1.3 **Intermediate In-Use Compliance Standards for Fuel-Flexible, Bi-Fuel and Dual-Fuel Medium-Duty LEV I SULEVs Operating on Gasoline.** For fuel-flexible, bi-fuel and dual-fuel 2001 model year MDV SULEVs operating on gasoline, the following intermediate in-use compliance standards for NMOG emissions at 50,000 miles, apply:

Fuel-Flexible, Bi-Fuel and Dual-Fuel MDVs Intermediate In-Use Compliance Standards		
Test Weight (lbs.)	Vehicle Emission Category	50,000 (g/mi)
3751-5750	SULEV	0.128
5751-8500	SULEV	0.156
8501-10,000	SULEV	0.184
10,001-14,000	SULEV	0.240

Compliance with the standards beyond 50,000 miles shall be waived for the 2001 model year for SULEVs.

4.2 Intermediate LEV II In-Use Compliance Standards.

For test groups certified prior to the 2007 model year, the following intermediate in-use compliance standards shall apply for the first two model years the test group is certified to the new standard. For SULEVs certified prior to the 2004 model year, the following intermediate in-use compliance SULEV standards shall apply through the 2006 model year.

Emission Category	Durability Vehicle Basis	LEV II PCs and LDTs		LEV II MDVs 8501 - 10,000 lbs. GVW
		NMOG	NOx	NOx
LEV/ULEV	50,000	n/a	0.07	n/a
	120,000	n/a	0.10	0.3
	150,000	n/a	0.10	0.3
LEV, Option 1	50,000	n/a	0.10	n/a
	120,000	n/a	0.14	n/a
	150,000	n/a	0.14	n/a
SULEV	120,000	0.020	0.03	0.15
	150,000	0.020	0.03	0.15

5. Reactivity Adjustment Factors.

A reactivity adjustment factor is the ratio of the specific reactivity of a low-emission vehicle designed to operate on a fuel other than conventional gasoline (including a fuel-flexible, bi-fuel or dual-fuel vehicle when operating on any fuel other than conventional gasoline) compared to the NMOG baseline specific reactivity of vehicles in the same vehicle emission category operating on conventional gasoline. The procedure for determining compliance with the standard is set forth in Section H.1.1 of these test procedures.

5.1 The following specific reactivity values and generic reactivity adjustment factors have been established pursuant to the criteria established in Part II.D. of these test procedures. A manufacturer requesting to certify to existing standards utilizing an adjustment factor unique to its vehicle/fuel system must follow the data requirements described in Part II, Section D of these test procedures.

5.1.1 The following reactivity adjustment factors apply:

	Passenger Cars and Light-Duty Trucks ~~Vehicles~~ ~~0-6000 lbs. GVW~~			**Medium-Duty Vehicles** ~~6001 - 14,000 lbs. GVW~~	
	TLEV	LEV	ULEV	LEV	ULEV
Fuel*	**Baseline Specific Reactivity** (grams ozone / gram NMOG)				
Conventional Gasoline	3.42	3.13	3.13	3.13	3.13
	Reactivity Adjustment Factors				
RFG (through the 2003 model year)	0.98	0.94	0.94	0.94	0.94
M85	0.41	0.41	0.41	0.41	0.41
Natural Gas	1.0	0.43	0.43	0.43	0.43
LPG	1.0	0.50	0.50	0.50	0.50
	Methane Reactivity Adjustment Factors				
Natural Gas	0.0043	0.0047	0.0047	0.0047	0.0047

* The fuel specifications are set forth in Part II. section A.100.3 (reformulated gasoline, M85, CNG and LPG) and Part I.D. (conventional gasoline specification) of these test procedures.

F. Requirements and Procedures for Durability Demonstration

1. §86.1820 Durability group determination.

1.1 §86.1820-01 [No change.]

2. §86.1821 Evaporative/refueling emission family determination.

[Delete. (The provisions of this section are set forth in the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, Heavy-Duty Vehicles and Motorcycles," and "California Refueling Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles.")]

3. §86.1822 Durability data vehicle selection. [No change.]

4. §86.1823 Durability demonstration procedures for exhaust emissions.

4.1 §86.1823-01 October 6, 2000. [No change.]

4.2 **SFTP**. These procedures are not applicable to vehicles certified to the SFTP standards set forth in Section E.1.2.2.

4.3 **HEVs**. A manufacturer shall consider expected customer usage as well as emissions deterioration when developing its durability demonstration for HEVs.

5. §86.1824 Durability demonstration procedures for evaporative emissions.

[Delete. (The provisions of this section are set forth in the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, Heavy-Duty Vehicles and Motorcycles.")]

6. §86.1825 Durability demonstration procedures for refueling emissions.

[Delete. (The provisions of this section are set forth in the "California Refueling Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles.")]

7. §86.1826 Assigned Deterioration Factors for Small Volume Manufacturers and Small Volume Test Groups.

7.1 §86.1826-01. October 6, 2000. [No change.]

G. Procedures for Demonstration of Compliance with Emission Standards

1. §86.1827 Test Group Determination. ~~[No change.]~~

1.1 §86.1827-01. October 6, 2000. [No change.]

2. §86.1828 Emission data vehicle selection

2.1 §86.1828-01. [No change.]

2.2 50°F Requirements.

2.2.1 Vehicle Selection. A manufacturer shall select at least three emission data and/or engineering development vehicles each year from PC or LDT test groups and at least three emission data and/or engineering development vehicles from MDV test groups.

2.2.2 The same test group shall not be selected in the succeeding two years unless the manufacturer produces fewer than three test groups. If the manufacturer produces more than three TLEV, LEV, ULEV or SULEV test groups per model year, the Executive Officer may request 50 F testing of specific test groups. If the manufacturer provides a list of the TLEV, LEV, ULEV and SULEV test groups that it will certify for a model year and provides a description of the technologies used on each test group (including the information in Section G.2.1.2(1)), the Executive Officer shall select the test groups subject to 50 F testing within a 30 day period after receiving such a list and description. The Executive Officer may revise the test groups selected after the 30 day period if the information provided by the manufacturer does not accurately reflect the test groups actually certified by the manufacturer.

3. §86.1829 Durability data and emission data testing requirements; waivers.

3.1 §86.1829-01. July 12, 2001. Amend as follows:

3.1.1 Delete (b)(1)(ii) and replace with: For Otto-cycle vehicles or hybrid vehicles that use Otto-cycle engines, evidence shall be supplied showing that the air/fuel metering system or secondary air injection system is capable of providing sufficient oxygen to theoretically allow enough oxidation to attain the CO emission standards at barometric pressures equivalent to those expected at altitudes ranging from sea level to an elevation of 6000 feet. For fuel injected vehicles or hybrid electric vehicles that use fuel-injected engines, compliance may be demonstrated upon a showing by the manufacturer that the fuel injection system distributes fuel based on mass air flow, rather than volume flow, and is therefore self-compensating. All submitted test proposals will be evaluated on their acceptability by the Executive Officer. As an alternative to the demonstration described above, a manufacturer may demonstrate compliance by testing California vehicle configurations as part of its federal high altitude certification requirements. Engine families that meet all the applicable California low altitude emission standards when tested at the EPA test elevation are deemed to be in compliance. The SFTP standards do not apply to testing at high altitude.

3.1.2 (b)(1)(iii)(E) [No change, except that references to Tier 2 or interim non-Tier 2 vehicles shall mean California LEVs, ULEVs or SULEVs.]

3.1.3 Amend (b)(4)(i) as follows: All 2001 and subsequent model-year emission-data vehicles shall be required to be tail-pipe tested at 4,000 miles or at the mileage at

which the vehicle is stabilized as determined in §86.1827-01 and demonstrate compliance with the California Inspection and Maintenance ("I/M") emission standards as specified in the "Mandatory Exhaust Emissions Inspection Standards and Test Procedures," title 16, California Code of Regulations, Section 3340.42. A manufacturer shall have the option of using the I/M test procedures in place at the time of certification or, if the I/M test procedures have been amended within two years of the time of certification, a manufacturer may use the preceding procedures. Test vehicles shall undergo preconditioning procedures prior to the tail-pipe test which consist of idle conditions for a minimum period of ten minutes after the thermostat is open. Preconditioning and test procedures shall be conducted at an ambient temperature from 68° to 86° F. The manufacturer shall, in accordance with good engineering practices, attest that such test vehicles will meet the requirements of this section when preconditioned and tested at ambient temperatures from 35° to 68° F.

3.1.4 Amend (b)(4)(ii) as follows: In lieu of testing vehicles according to the provisions of §86.1829(b)(4)(i), a manufacturer may provide a statement in its application for certification that, based on the manufacturer's engineering evaluation of such I/M testing as the manufacturer deems appropriate, all light-duty vehicles and light-duty trucks comply with the I/M emission standards.

3.1.5 Delete (b)(5). Idle CO Testing.

3.2 50°F Requirements.

A manufacturer shall demonstrate compliance with the 50°F requirement each year by testing at least three PC or LDT and three MDV emission data and/or engineering development vehicles (with at least 4000 miles) as determined under the provisions of Section G.2.2 of these test procedures. Only TLEVs, LEVs, ULEVs and SULEVs are to be considered for testing at 50°F. It is not necessary to apply deterioration factors (DFs) to the 50°F test results to comply with this requirement.

3.3 Highway Fuel Economy Test.

The exhaust emissions shall be measured from all exhaust emission data vehicles tested in accordance with the federal Highway Fuel Economy Test (HWFET; 40 CFR Part 600, Subpart B). The oxides of nitrogen emissions measured during such tests shall be multiplied by the oxides of nitrogen deterioration factor computed in accordance with 40 CFR §86.1823, and then rounded and compared with the standard as set forth in Section E.1.1 preceding. All data obtained pursuant to this paragraph shall be reported in accordance with procedures applicable to other exhaust emissions data required pursuant to these procedures. In the event that one or more of the manufacturer's emission data vehicles fail the HWFET standard listed in Section E of these test procedures, the manufacturer may submit to the Executive Officer engineering data or other evidence showing that the system is capable of complying with the standard. If the Executive Officer finds, on the basis of an engineering evaluation, that the system can comply with the HWFET standard, he or she may accept the information supplied by the manufacturer in lieu of vehicle test data.

4. §86.1830-01 Acceptance of Vehicles for Testing [No change.]

5. §86.1831-01 Mileage accumulation requirements for test vehicles. [No change.]

6. §86.1832-01 Optional equipment and air conditioning. [No change.]

7. §86.1833-01 Adjustable parameters. [No change.]

8. §86.1834 Allowable maintenance.

8.1 §86.1834-01. October 6, 2000. [No change except that the first allowable maintenance interval under subparagraphs (b)(3)(v) and (b)(4)(ii) shall be at the full useful life of the vehicle.]

8.2 HEVs.

(a) The manufacturer shall equip the vehicle with a maintenance indicator consisting of a light that shall activate automatically by illuminating the first time the minimum performance level is observed for all battery system components. Possible battery system components requiring monitoring are: (i) battery water level; (ii) temperature control; (iii) pressure control; and (iv) other parameters critical for determining battery condition.

(b) The manufacturer shall equip "off-vehicle charge capable HEVs" with a useful life indicator for the battery system consisting of a light that shall illuminate the first time the battery system is unable to achieve an all-electric operating range (starting from a full state-of-charge) which is at least 75% of the range determined for the vehicle in the Urban Driving Schedule portion of the All-Electric Range Test (see the "California Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," as incorporated by reference in section 1962, title 13, CCR).

9. §86.1835-01 Confirmatory certification testing. July 12, 2001. [No change.]

10. §86.1836-01 Manufacturer-supplied production vehicles for testing. [Delete.]

11. §86.1837 Rounding of emission measurements.

11.1 §86.1837-01 February 10, 2000. [No change.]

11.2 Fleet average NMOG value calculations shall be rounded, in accordance with ASTM E29-67, to four significant figures before comparing with fleet average NMOG requirements.

12. §86.1838 Small volume manufacturers certification procedures.

12.1 §86.1838-01. February 10, 2000. [No change, except that the reference to 15,000 units shall mean 4,500 units in California and the reference to 14,999 units shall mean 4,499 units in California.]

13. §86.1839-01 Carryover of certification data. [No change.]

14. §86.1840 Special test procedures.

14.1 §86.1840-01 October 6, 2000. [No change.]

H. Certification, Information and Reporting Requirements.

1. §86.1841 Compliance with emission standards for the purpose of certification

1.1 §86.1841-01. July 12, 2001.

1.1.1 Subparagraph (a) through (d) [No Change.]

1.1.2 Delete subparagraph (e) and replace with: **Reactivity Adjustment Factors.** The NMOG emission results from all TLEVs, LEVs, ULEVs and SULEVs certifying on a fuel other than conventional gasoline, shall be numerically adjusted to establish an NMOG exhaust mass emission value equivalent. A manufacturer shall multiply the NMOG exhaust emission result for each emission-data vehicle by the appropriate reactivity adjustment factor listed in Section E.5. of these test procedures or established by a manufacturer pursuant to Part II, Section D of these test procedures. This product shall be multiplied by, or added to in the case of additive DFs, the applicable deterioration factor to determine compliance with the standard. Reactivity adjustment factors may not be applied to determine compliance with applicable exhaust emission standards for gasoline vehicles certified pursuant to Section D.1.(p) of these test procedures.

1.1.3 For vehicles operating on natural gas, the product of the methane mass emission value and the methane reactivity adjustment factor shall be add to the result of subparagraph 1.1.2. This result shall be compared to the NMOG exhaust emission standards to determine compliance with the standards.

1.2 **Scope of Certification**. Certification, if granted, is effective only for the vehicle/test group described in the original manufacturer's certification application. Modifications by a secondary manufacturer to vehicles/engines shall be deemed not to increase emissions above the standards under which those vehicles/engines were certified and to be within the original certification if such modifications do not: (1) increase vehicle weight more than 10 percent above the curb weight, increase frontal area more than 10 percent, or result in a combination increase of weight plus frontal area of more than 14 percent; or (2) include changes in axle ratio, tire size, or tire type resulting in changes in the drive train ratio of more than 5 percent; or (3) include any modification to the emission control system. No originally certified vehicle/engine which is modified by a secondary manufacturer in a manner described in items (1) through (3) of the preceding sentence may be sold to an ultimate purchaser, offered or delivered for sale to an ultimate purchaser, or registered in California unless the modified vehicle/engine is certified by the state board in accordance with applicable test procedures to meet emission standards for the model year for which the vehicle/engine was originally certified. For the purposes of this subsection, "secondary manufacturer" means any person, other than the original manufacturer, who modifies a new motor vehicle prior to sale to the ultimate purchaser.

1.3 **SFTP.** For vehicles certified to the SFTP standards in Section E.1.2.2, full and intermediate useful life shall mean 4,000 miles.

1.4 **Certification of a Federal Vehicle in California.** Whenever a manufacturer federally-certifies a 2004 or subsequent model-year passenger car, light-duty truck or medium-duty vehicle model to the standards for a particular emissions bin that are more stringent than the standards for an applicable California vehicle emissions category, the equivalent California model may only be certified to (i) the California standards for a vehicle emissions category that are at least as stringent as

the standards for the corresponding federal emissions bin, or (ii) the exhaust emission standards to which the federal model is certified. However, where the federal exhaust emission standards for the particular emissions bin and the California standards for a vehicle emissions category are equally stringent, the California model may only be certified to either the California standards for that vehicle emissions category or more stringent California standards. The federal emission bins are those contained Tables S04-1 and S04-2 of 40 CFR section 86.1811-04(c) as adopted February 10, 2000. A California vehicle model is to be treated as equivalent to a federal vehicle model if all of the following characteristics are identical:

(a) Vehicle make and model;
(b) Cylinder block configuration (e.g., L-6, V-8);
(c) Displacement;
(d) Combustion cycle;
(e) Transmission class;
(f) Aspiration method (e.g., naturally aspirated, turbocharged); and
(g) Fuel (e.g., gasoline, natural gas, methanol).

The comparative stringency of the standards for the federal exhaust emissions bin and for the California vehicle emissions category shall be based on a comparison of the sum of the 100,000, 120,000, or 150,000 mile standards for NMOG and NOx.

1.4.1 If a federally-certified vehicle model is certified in California in accordance with subparagraph 1.4, the model shall be subject to the federal requirements for exhaust emissions, SFTP emissions, cold CO emissions and highway NOx. The vehicle model shall be subject to all other California requirements including evaporative emissions, OBD II, and emissions warranty, except that a 2004 or earlier model-year vehicle in the federal heavy light-duty truck or medium-duty passenger vehicle classes may at the manufacturer's option be subject to the federal requirements for evaporative emissions and OBD II.

1.4.2 Prior to certification of a 2004 or subsequent model-year vehicle, a manufacturer must submit information sufficient to enable the Executive Officer to determine whether there is a federally-certified vehicle model for that model year that is equivalent to the California vehicle model based on the criteria listed in subparagraph 1.4.

1.4.3 If the Executive Officer determines that there is a federally-certified vehicle model for that model year that is equivalent to the California vehicle model, the following information shall be submitted with the Part I or Part II Application for Certification as set forth below:

(a) Part I Application for Certification: (i) Evidence of federal certification including, but not limited to, federal certification exhaust emission levels and compliance with federal SFTP, cold CO and highway NOx emission levels; and (ii) evidence of compliance with California evaporative emission requirements and California OBD II requirements or, where permitted under Section 1.4.1 for a 2004 or earlier model-year vehicle, evidence of federal certification evaporative emission levels and compliance with federal OBD II requirements.

(b) Part II Application for Certification: evidence of a warranty on emission-related parts in accordance with sections 2035 et seq., title 13 CCR as they apply to vehicles certified under the primary California standard.

1.4.4 For purposes of meeting the California NMOG fleet average phase-in requirements or for determining vehicle equivalent credits, the applicable California NMOG value for passenger cars and light-duty trucks or vehicle equivalent credits for medium-duty vehicles shall be determined as follows:

(a) The sum of the federal full useful life (100,000, 120,000 or 150,000) NMOG and NOx value shall be compared with the next less stringent California full useful life NMOG plus NOx value to determine which emission category (e.g., LEV, ULEV or SULEV) is to be used for the fleet average value or vehicle equivalent credit calculation.

(b) For passenger cars and light-duty trucks, once the equivalent California emission category is determined (e.g., whether the vehicle is considered a LEV, ULEV or SULEV), the applicable NMOG value to be used in the fleet average calculation is set forth in the table in section E.2.1.2 of these test procedures for passenger cars and light-duty trucks. For example, if the full useful life (120,000 miles) NMOG plus NOx standard to which the federal vehicle is certified is 0.110 grams per mile, that vehicle would be considered a LEV II ULEV for fleet average purposes because the combined LEV full useful life NMOG plus NOx value is 0.125 and is the next less stringent emission category. The applicable emission standard to be used in the fleet average calculation would therefore be 0.040 grams per mile.

1.4.5 The vehicle shall be subject to the federal in-use requirements and the emission standard applicable for in-use compliance purposes shall be the federal standard to which the vehicle was federally-certified.

1.4.6 The tune up label shall meet the federal requirements applicable to such a vehicle with an additional sentence which reads: "This vehicle conforms to federal regulations and is certified for sale in California." The value used in the smog index label shall be the California emission category to which the vehicle was deemed certified for fleet average NMOG purposes.

1.4.7 The requirements in Section H ~~E~~.1.4 do not apply in the case of a federally-certified vehicle model that is only marketed to fleet operators for applications that are subject to clean fuel fleet requirements established pursuant to section 246 of the federal Clean Air Act (42 U.S.C. sec. 7586). In addition, the Executive Officer shall exclude from the requirements a federally-certified vehicle model where the manufacturer demonstrates to the Executive Officer's reasonable satisfaction that the model will primarily be sold or leased to clean fuel fleet operators for such applications, and that other sales or leases of the model will be incidental to marketing to those clean fuel fleet operators.

1.4.8 A manufacturer may certify a passenger car, light-duty truck or medium-duty vehicle to federal exhaust emission standards pursuant to Section H ~~E~~.1.4 prior to the 2004 model year.

2. §86.1842 Addition of a vehicle after certification; and changes to a vehicle covered by certification. ~~[No change.]~~

2.1 §86.1842-01. Amend as follows: Add the following sentence: Changes proposed by a manufacturer in accordance with this section shall be deemed "approved" after 30 days unless the

Executive Officer has requested additional information from the manufacturer or has denied the proposed changes.

3. §86.1843 General information requirements

3.1 §86.1843-01 [No change.]

3.2 **Alternative Fuel Information.**

For TLEVs, LEVs, ULEVs, and SULEVs not certified exclusively on gasoline or diesel, the manufacturer shall submit projected California sales and fuel economy data nineteen months prior to January 1 of the model year for which the vehicles are certified.

3.3 **Credit Reporting.**

In order to verify the status of a manufacturer's compliance with the fleet average or phase-in requirements for a given model year, and in order to confirm the accrual of credits or debits, each manufacturer shall submit an annual report to the Executive Officer which sets forth the production data used to establish compliance, by no later than March 1 of the calendar year following the close of the model year.

3.4 **SFTP.** Prior to 2003 model year, a manufacturer that introduces MDVs certified to the SFTP requirements set forth in E1.2.2 must submit the implementation information required for vehicles produced in subsequent model years.

4. §86.1844 Information Requirements: Application for Certification and Submittal of Information Upon Request.

4.1 §86.1844-01. October 6, 2000. Amend as follows:

4.1.1 Delete §86.1844-01(d)(9).

4.1.2 Add the following requirements to §86.1844-01(e):

(a) The information required in sections 2037, 2038 and 2039, title 13, CCR.

(b) The NMOG/NMHC and/or formaldehyde to NMHC ratios established according to Section I.1.4 of these test procedures

4.2 **OBD Requirements.**

For 2001 and subsequent model-year passenger cars, light-duty trucks and medium-duty vehicles, information shall be submitted in the application for certification according to the requirements of section 1968, et seq. ~~.1~~, title 13, CCR, as applicable.

4.3 **HEVs.**

For HEVs, the information required in the "California Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," as incorporated by reference in section 1962, title 13, CCR, must be supplied with the Part I application for certification.

4.4 **Fuel-Fired Heaters.**

For vehicles that use fuel-fired heaters, the manufacturer shall provide with the Part I application for certification:

(a) a description of the control system logic of the fuel-fired heater, including an evaluation of the conditions under which the fuel-fired heater can be operated and an evaluation of the possible operational modes and conditions under which evaporative emissions can exist;

(b) the exhaust emissions value per mile produced by the auxiliary fuel-fired heater operated between 68°F and 86°F; and

(c) the test plan which describes the procedure used to determine the mass emissions of the fuel-fired heater.

I. In-Use Compliance Requirements and Procedures

1. §86.1845 Manufacturer in-use verification testing requirements.

1.1 §86.1845-01. October 6, 2000. Amend as follows:

1.1.1 **Table S01-5 California Small Volume Manufacturers and Small Volume Test Groups**

California only test group annual sales[(1)]	1-1,500	1,501-4,500
High Mileage	voluntary	2

[(1)] Total annual production of groups eligible for testing under small volume sampling plan is capped at a maximum of 4,500 California-only production volume per model year, per large volume manufacturer. All other remaining large volume manufacturers small volume test groups shall meet the requirements in Table S01-06 below.

1.1.2 **Table S01-6 - California Large Volume Manufacturers**

California only test group - annual sales	4,500-15,000	15,001-25,000	>25,000
High Mileage	4	5	6

1.1.3 **High Mileage Testing.** Amend subparagraph (c)(2) of 40 CFR §86.1845-01 to read: All test vehicles must have a minimum odometer mileage of 50,000 miles. At least one vehicle of each test group certified to the emission standards in Section E.1.1.1 must have a minimum age and odometer mileage of 75,000 for light-duty vehicles and 90,000 miles for medium-duty vehicles. At least one vehicle of each test group certified to the 120,000-mile and 150,000-mile emission standards in Section E.1.1.2 must have a minimum age and odometer mileage of 90,000 miles and 112,500 miles, respectively. See §86.1838-01(c)(2) for small volume manufacturer mileage requirements.

1.1.4 **High Altitude Testing.** Amend subparagraph (c)(5)(i) of 40 CFR §86.1845-01 to read: Each test vehicle shall be tested in accordance with the Federal Test Procedure and the US06 portion of the Supplemental Federal Test Procedure (if applicable) as described in subpart B of this part, when such test vehicle is tested for compliance with the applicable exhaust emission standards under this subpart. High altitude testing shall not apply.

1.2 §86.1845-04. July 12, 2001. Amend as follows:

1.2.1 **Table S04-5 California Small Volume Manufacturers and Small Volume Test Groups**

California only test group annual sales[(1)]	1-1,500	1,501-4,500
Low Mileage	Voluntary	0
High Mileage	Voluntary	2

[(1)] Total annual production of groups eligible for testing under small volume sampling plan is capped at a maximum of 4,500 California-only production volume per model year, per large volume manufacturer. All other remaining large volume manufacturers small volume test groups shall meet the requirements in Table S04-06 below.

1.2.2 **Table S04-6 - California Large Volume Manufacturers**

California only test groups - annual sales	4,500-15,000	15,001-25,000	>25,000
Low Mileage	2	3	4
High Mileage	4	5	6

1.2.3 **High Mileage Testing.** Amend subparagraph (c)(2) of 40 CFR §86.1845-04 to read as follows: All test vehicles must have a minimum odometer mileage of 50,000 miles. At least one vehicle of each test group certified to the emission standards in Part I, Section E.1.1.1 of these procedures must have a minimum age and odometer mileage of 75,000 for light-duty vehicles and 90,000 miles for medium-duty vehicles. At least one vehicle of each test group certified to the emission standards in Part I, Section E.1.1.2 of these test procedures must have a minimum age and odometer mileage of 90,000 miles. See §86.1838-01(c)(2) for small volume manufacturer mileage requirements.

1.3 **SFTP.**

The manufacturer in-use verification testing requirements shall not apply to vehicles certified to the SFTP standards set forth in Section E.1.2.2 of these test procedures.

1.4 **Test Ratios.**

(a) As an alternative to measuring the NMOG content, the Executive Officer may approve, upon submission of supporting data by a manufacturer, the use of NMOG to NMHC ratios. To request the use of NMOG to NMHC ratios, a manufacturer shall establish during certification testing the ratio of measured NMOG exhaust emissions to measured NMHC exhaust emissions for each emission data vehicle for the applicable test group. The results shall be submitted to the Executive Officer in the Part II application for certification. A manufacturer

may conduct in-use testing on the test group by measuring NMHC exhaust emissions rather than NMOG exhaust emissions. After approval by the Executive Officer, the measured NMHC exhaust emissions shall be multiplied by the NMOG to NMHC ratio submitted in the application for certification for the test group to determine the equivalent NMOG exhaust emission values for the test vehicle. The equivalent NMOG exhaust emission value shall be used in place of the measured NMOG exhaust emission value in determining the reactivity adjusted exhaust NMOG results. The equivalent reactivity adjusted NMOG exhaust emission values shall be compared to the NMOG exhaust emission standard applicable to the vehicle emission category (TLEV, LEV, ULEV or SULEV) in which the test group was certified.

(b) For fuel-flexible vehicles certified to NMOG standards, the manufacturer may request from the Executive Officer the use of a methanol (M85) or ethanol (E85) NMOG exhaust emission to gasoline NMHC exhaust emission ratio which shall be established during certification testing for each emission data vehicle for the applicable test group. The results shall be submitted to the Executive Officer in the Part II application for certification. After approval by the Executive Officer, the measured gasoline NMHC exhaust emissions shall be multiplied by the M85 or E85 NMOG to gasoline NMHC ratio submitted in the application for certification for the test group to determine the equivalent NMOG exhaust emission values for the test vehicle. The equivalent NMOG exhaust emission value shall be used in place of the measured NMOG exhaust emission value in determining the reactivity adjusted exhaust NMOG results. The equivalent reactivity adjusted NMOG exhaust emission values shall be compared to the NMOG exhaust emission standard applicable to the vehicle emission category (TLEV, LEV, ULEV, or SULEV) in which the test group was certified.

(c) As an alternative to measuring the HCHO content, the Executive Officer may approve, upon submission of supporting data by a manufacturer, the use of HCHO to NMHC ratios. To request the use of HCHO to NMHC ratios, the manufacturer shall establish during certification testing the ratio of measured HCHO exhaust emissions to measured NMHC exhaust emissions for each emission data vehicle for the applicable test group. The results shall be submitted to the Executive Officer in the Part II application for certification. Following approval of the application for certification, the manufacturer may conduct in-use testing on the test group by measuring NMHC exhaust emissions rather than HCHO exhaust emissions. The measured NMHC exhaust emissions shall be multiplied by the HCHO to NMHC ratio submitted in the application for certification for the test group to determine the equivalent HCHO exhaust emission values for the test vehicle. The equivalent HCHO exhaust emission values shall be compared to the HCHO exhaust emission standard applicable to the test group.

2. §86.1846 Manufacturer in-use confirmatory testing requirements.

2.1 §86.1846-01 July 12, 2001. [No Change.]

2.2 If a gasoline vehicle test group that is certified according to the provisions of Section D.1 (p) fails in-use verification testing, as set forth in Section I, NMOG and formaldehyde exhaust emissions must be measured for that test group in accordance with Section D.1.1 for the purpose of in-use confirmatory testing.

2.3 **SFTP**.

The manufacturer in-use compliance testing requirements shall not apply to vehicles certified to the SFTP standards set forth in Section E.1.2.2 of these test procedures.

3. §86.1847 Manufacturer in-use verification and in-use confirmatory testing; submittal of information and maintenance of records. .

3.1 §86.1847-01 Amend as follows:

3.1.1 Amend subparagraph (a)(3) of 40 CFR §86.1847-01 to add: Procurement documentation. A description of the procurement area, a record of the source(s) of any list(s) of vehicles used as a basis for procurement, and a complete record of the number of vehicles rejected after positive vehicle owner response, reason(s) for manufacturer rejection of each rejected vehicles and the method used for random selection of positive owner response vehicles. A complete record of the number of vehicle owners/lessees in which attempt to contact was made and the number of vehicle owners/lessees actually contacted, the number of owners/lessees not contacted and the reasons and number of each for failure to contact, and the number of owners contacted who declined to participate.

3.1.2 Amend subparagraph (b)(1) of 40 CFR §86.1847-01 to read: A complete printout of each and every emission test performed, including, but not limited to, all test results, the date of each test, the full useful life emission standards to which the test group is certified, and the phase mass values for fuel economy, carbon dioxide and each pollutant measured by the Federal Test Procedure and Supplemental Test Procedure as prescribed by subpart B of this part.

3.1.3 Amend subparagraph (f)(1) of 40 CFR §86.1847-01 to read: A complete printout of each and every emission test performed, including, but not limited to, all test results, the date of each test, the full useful life emission standards to which the test group is certified, and the phase mass values for fuel economy, carbon dioxide and each pollutant measured by the Federal Test Procedure and Supplemental Test Procedure as prescribed by subpart B of this part.

Appendices I, II, and III to §86.1845-01 [No change.]

J. Procedural Requirements

1. §86.1848-01 Certification. October 6, 2000. [No change.]
2. §86.1849-01 Right of entry. [No change.]
3. §86.1850-01 Denial, Suspension or Revocation of Certificate of Conformity. [No change.]
4. §86.1851 Application of good engineering judgment to manufacturers' decisions. [No change.]
5. §86.1852 Waivers for good in-use emission performance. [No change.]
6. §86.1853 Certification hearings. [No change.]
7. §§86.1854 - 86.1859. [Reserved]
8. §86.1860-04 How to comply with the Tier 2 and interim Tier 2 fleet average NOx standards. [n/a]
9. §86.1861-04 How do the Tier 2 and interim Tier 2 NOx averaging, banking and trading programs work? [n/a]
10. §86.1862-04 Maintenance of records and submittal of information relevant to compliance with fleet average NOx standards. [n/a]
11. §86.1863-07 Optional Chassis Certification for Diesel Vehicles. January 18, 2001. [No change]

PART II: CALIFORNIA EXHAUST AND PARTICULATE EMISSION TEST PROCEDURES FOR PASSENGER CARS, LIGHT-DUTY TRUCKS AND MEDIUM-DUTY VEHICLES

This part describes the equipment required and the procedures necessary to perform gaseous and particulate exhaust emission tests (40 CFR Part 86, Subpart B); cold temperature test procedures (40 CFR Part 86, Subpart C); the California 50°F test procedure; the development of reactivity adjustment factors; and the supplemental federal test procedure (40 CFR Part 86, Subpart B) on passenger cars, light-duty trucks and medium-duty vehicles.

A. 40 CFR Part 86, Subpart B - Emission Regulations for 1977 and Later Model Year New Light-Duty Vehicles and New Light-Duty Trucks; Test Procedures.

100.1 General applicability.

86.101 General applicability. October 6, 2000.
86.102 Definitions. March 5, 1980.
86.103 Abbreviations. March 5, 1980.
86.104 Section numbering, construction. September 21, 1994.
86.105 Introduction; structure of subpart. September 21, 1994.

100.2 Equipment and Facility Requirements.

86.106-00 Equipment required; overview. October 22, 1996.
86.107-98 Sampling and analytical system, evaporative emissions. August 23, 1995.
86.108-00 Dynamometer. October 22, 1996.
86.109-94 Exhaust gas sampling system; Otto-cycle vehicles not requiring particulate emission measurements. June 30, 1995.
86.110-94 Exhaust gas sampling system; diesel-cycle vehicles, and Otto-cycle vehicles requiring particulate emissions measurements. June 30, 1995.
86.111-94 Exhaust gas analytical-system. September 30, 1994.
86.112-91 Weighing chamber (or room) and microgram balance specifications. June 5, 1991.

100.3 Certification Fuel Specifications.

86.113-94 Fuel Specifications. February 18, 2000. ~~June 30, 1995.~~
86.113-04 Fuel Specifications. February 10, 2000.
86.113-07 Fuel Specifications. January 18, 2001.

100.3.1 California Certification Gasoline Specification.

Add the following subparagraph which reads: Gasoline having the specifications listed below may be used in exhaust and evaporative emission testing as an option to the specifications referred to in §86.113-94(a)(1) and in §86.113-04(a)(1). If a manufacturer elects to utilize this option, both exhaust and evaporative emission testing shall be conducted by the manufacturer with gasoline

having the specifications listed below, and the Executive Officer shall conduct exhaust and evaporative emission testing with gasoline having the specifications listed below.

California Certification Gasoline Specifications		
Fuel Property[a]	**Limit**	**Test Method** [b]
Octane (R+M)/2	91 (min)	D 2699-88, D 2700-88
Sensitivity	7.5 (min)	D 2699-88, D 2700-88
Lead	0-0.01g/gal (max); no lead added	§2253.4(c), title 13 CCR
Distillation Range:		§2263, title 13 CCR[c]
10% point	130-150 °F	
50% point [d]	200-210 °F	
90% point [e]	290-300 °F	
EP, maximum	390 °F	
Residue	2.0 vol. % (max)	
Sulfur	30-40 ppm by wt.	§2263, title 13 CCR
Phosphorous	0.005 g/gal (max)	§2253.4(c), title 13 CCR
RVP	6.7-7.0 psi	§2263, title 13 CCR
Olefins	4.0-6.0 vol. %	§2263, title 13 CCR
Total Aromatic Hydrocarbons	22-25 vol. %	§2263, title 13 CCR
Benzene	0.8-1.0 vol. %[f]	§2263, title 13 CCR
Multi-substituted Alkyl Aromatic Hydrocarbons	12-14 vol. %[g]	
MTBE	10.8-11.2 vol. %	§2263, title 13 CCR
Additives	Sufficient to meet requirements of §2257, title 13 CCR	
Copper Corrosion	No. 1	D 130-88
Gum, washed	3.0 mg/100 mL (max)	D 381-86
Oxidation Stability	1000 minutes (min)	D 525-88
Specific Gravity	Report [h]	
Heat of Combustion	Report [h]	
Carbon	Report wt. % [h]	
Hydrogen	Report wt. % [h]	

[a] The gasoline must be blended from typical refinery feedstocks.

[b] ASTM specification unless otherwise noted. A test method other than that specified may be used following a determination by the Executive Officer that the other method produces results equivalent to the results with the specified method.

[c] Although §2263, title 13, CCR refers to the temperatures of the 50 and 90 percent points, this procedure can be extended to the 10 percent and end point temperatures, and to the determination of the residue content.

[d] The range for interlaboratory testing is 195-215° F.

[e] The range for interlaboratory testing is 285-305° F.

[f] The range for interlaboratory testing is 0.7-1.1 percent by volume.

[g] "Detailed Hydrocarbon Analysis of Petroleum Hydrocarbon Distillates, Reformates, and Gasoline by Single Column High Efficiency (Capillary) Column Gas Chromatography," by Neil Johansen, 1992, Boulder, CO.

[h] The fuel producer should report this fuel property to the fuel purchaser. Any generally accepted test method may be used and shall be identified in the report.

100.3.2 Certification Diesel Fuel Specifications.

Amend subparagraphs §86.113-94(b)(2) and (b)(3) and §86.113-07(b)(2) and (b)(3) as follows:

(b)(2) Except as noted below, petroleum fuel for diesel vehicles meeting the specifications referenced in 40 CFR §86.113-94(b)(2) and in §86.113-07(b)(2), or substantially equivalent specifications approved by the Executive Officer, shall be used in exhaust emission testing. The grade of petroleum fuel recommended by the engine manufacturer, commercially designated as "Type 2-D" grade diesel, shall be used. The petroleum fuel used in exhaust emission testing may meet the specifications listed below, or substantially equivalent specifications approved by the Executive Officer, as an option to the specifications in 40 CFR §86.113-94(b)(2) and in §86.113-07(b)(2). Where a manufacturer elects pursuant to this subparagraph to conduct exhaust emission testing using the specifications of 86.113-94(b)(2) and in §86.113-07(b)(2), or the specifications listed below, the Executive Officer shall conduct exhaust emission testing with the diesel fuel meeting the specifications elected by the manufacturer.

California Certification Diesel Fuel Specifications		
Fuel Property	**Limit**	**Test Method [(a)]**
Natural Cetane Number	47-55	D 613-86
Distillation Range		§2282(g)(3), title 13, CCR
IBP	340-420 °F	
10% point	400-490 °F	
50% point	470-560 °F	
90% point	550-610 °F	
EP	580-660 °F	
API Gravity	33-39°	D 287-82
Total Sulfur	0.01-0.05 wt. %	§2282(g)(3), title 13, CCR
Nitrogen Content	100-500 ppmw	§2282(g)(3), title 13, CCR
Total Aromatic Hydrocarbons	8-12 vol. %	§2282(g)(3), title 13, CCR
Polycyclic Aromatic Hydrocarbons	1.4 wt. % (max)	§2282(g)(3), title 13, CCR
Flashpoint	130 °F (max)	D 93-80
Viscosity @ 40°F	2.0-4.1 centistokes	D 445-83

[(a)] ASTM specifications unless otherwise noted. A reference to a subsection of §2282, title 13, CCR, means the test method identified in that subsection for the particular property. A test method other than that specified may be used following a determination by the Executive Officer that the other method produces results equivalent to the results of the specified method.

(b)(3) Diesel fuel representative of commercial diesel fuel which will be generally available through retail outlets shall be used in service accumulation.

100.3.3 Alcohol Fuels.

Amend §86.113-94(c) as follows:

1. Delete subparagraphs (c)(1) and (c)(2); replace with:

(c)(1) **Emission test fuel.** For Otto-cycle or diesel alcohol vehicles and hybrid electric vehicles which use Otto-cycle or diesel alcohol engines, methanol or ethanol fuel used for exhaust and evaporative emission testing shall meet the specifications set forth in section 2292.1, title 13, CCR, (Specifications for M-100 Fuel Methanol) or section 2292.3 (Specification for E-100 Fuel Ethanol) as modified by the following:

Specification	Limit
M-100 Fuel Methanol	
Methanol	98.0 ± 0.5 vol. percent
Ethanol	1.0 vol. percent max.
Petroleum fuel meeting the specifications of section 100.3.1	1.0 ± 0.1 vol. percent
E-100 Fuel Ethanol	
Ethanol	98.0 ± 0.5 vol. percent
Methanol	1.0 vol. percent max.
Petroleum fuel meeting the specifications of section 100.3.1	1.0 ± 0.1 vol. percent

(c)(2) **Mileage accumulation fuel.** For Otto-cycle or diesel alcohol vehicles and hybrid electric vehicles which use Otto-cycle or diesel alcohol engines, methanol or ethanol fuel used for service accumulation shall meet the applicable specifications set forth in section 2292.1, title 13, CCR, (Specifications for M-100 Fuel Methanol) or section 2292.3 (Specification for E-100 Fuel Ethanol).

2. Subparagraph (c)(3) [No Change.]

3. Add the following subparagraph. Fuel additives and ignition improvers intended for use in alcohol test fuels shall be subject to the approval of the Executive Officer. In order for such approval to be granted, a manufacturer must demonstrate that emissions will not be adversely affected by the use of the fuel additive or ignition improver.

100.3.4 Mixtures of Petroleum and Alcohol Fuels for Flexible Fuel Vehicles.

Amend §86.113-94(d) as follows:

1. Delete subparagraphs (d)(1) and (d)(2); replace with:

(d)(1) **Exhaust emission test fuel for emission-data and durability-data vehicles.** For Otto-cycle or diesel alcohol vehicles and hybrid electric vehicles which use Otto-cycle or diesel alcohol engines, methanol or ethanol fuel used for exhaust emission testing shall meet the applicable specifications set forth in section 2292.2, title 13, CCR, (Specifications for M-85 Fuel Methanol) or section 2292.4 (Specifications for E-85 Fuel Ethanol) as modified by the following:

Specification	Limit
M-85 Fuel Methanol	
Petroleum fuel meeting the specifications of section 100.3.1.	13-16 vol. percent
Reid vapor pressure	8.0-8.5 psi, using common blending components from the gasoline stream.
E-85 Fuel Ethanol	
Petroleum fuel meeting the specifications of section 100.3.1.	15-21 vol. percent
Reid vapor pressure	8.0-8.5 psi, using common blending components from the gasoline stream.

(d)(2) **Mileage accumulation fuel.** For flexible fuel Otto-cycle or diesel alcohol vehicles and hybrid electric vehicles that use Otto-cycle or diesel alcohol engines, petroleum fuel shall meet the applicable specifications in Part II, Sections A.100.3.1 or 100.3.2 and methanol or ethanol fuel shall meet the applicable specifications set forth in section 2292.2, title 13, CCR, (Specifications for M-85 Fuel Methanol) or section 2292.4 (Specification for E-85 Fuel Ethanol). Mileage accumulation procedures shall be subject to the requirements set forth in 40 CFR §86.1831-01(a) and (b) and are subject to the prior approval of the Executive Officer. A manufacturer shall consider expected customer fuel usage as well as emissions deterioration when developing its durability demonstration.

2. Subparagraph (d)(3) [No Change.]

3. Add the following subparagraphs. **Evaporative emission test fuel for emission-data and durability-data vehicles.** For Otto-cycle or diesel alcohol vehicles and hybrid electric vehicles which use Otto-cycle or diesel alcohol engines, a blend of methanol or ethanol fuel used for evaporative emission testing shall meet the applicable specifications set forth in section 2292.2, title 13, CCR, (Specifications for M-85 Fuel Methanol) or section 2292.4 (Specifications for E-85 Fuel Ethanol) and gasoline meeting the specifications of Part II section A.100.3.1 of these test procedures such that the final blend is composed of either 35 volume percent methanol (± 1.0 volume percent of total blend) for methanol-fueled vehicles or 10 volume percent ethanol (± 1.0 volume percent of total blend) for ethanol-fueled vehicles. Alternative alcohol-gasoline blends may be used in place of M35 or E10 if demonstrated to result in equivalent or higher evaporative emissions, subject to prior approval of the Executive Officer.

~~(d)(4)~~ **Additive requirements.** Fuel additives and ignition improvers intended for use in alcohol test fuels shall be subject to the approval of the Executive Officer. In order for such approval to be granted, a manufacturer must demonstrate that emissions will not be adversely affected by the use of the fuel additive or ignition improver.

100.3.5 Natural Gas Fuels.

Amend §86.113-94(e) as follows:

1. Delete subparagraphs (e)(1), (e)(2) and (e)(3); replace with:

(e)(1) **Exhaust emission test fuel.** For dedicated, dual-fueled or hybrid electric vehicles which use natural gas, fuel used for exhaust and evaporative emission testing shall meet the

specifications listed in section 2292.5, title 13, CCR, (Specifications for Compressed Natural Gas) as modified by the following:

Specification	Limit
Compressed Natural Gas Certification Test Fuel	
Methane	90.0 ± 1.0 mole percent
Ethane	4.0 ± 0.5 mole percent
C_3 and higher hydrocarbon content	2.0 ± 0.3 mole percent
Oxygen	0.5 mole percent maximum
Inert gases ($CO_2 + N_2$)	3.5 ± 0.5 vol. percent

(e)(2) **Mileage accumulation fuel.** For dedicated, dual-fueled or hybrid electric vehicles which use natural gas, fuel used for service accumulation shall meet the specifications listed in section 2292.5, title 13, CCR, (Specifications for Compressed Natural Gas).

100.3.6 Liquefied Petroleum Gas Fuels.

Amend §86.113-94(f) as follows:

1. Delete subparagraphs (f)(1) and (f)(2); replace with:

(f)(1) **Evaporative and exhaust emission test fuel.** For dedicated, dual-fueled or hybrid electric vehicles which use liquefied petroleum gas, fuel used for exhaust and evaporative emission testing shall meet the specifications listed in section 2292.6, title 13, CCR, (Specifications for Liquefied Petroleum Gas) as modified by the following:

Specification	Limit
Liquefied Petroleum Gas Certification Test Fuel	
Propane	93.5 ± 1.0 volume percent
Propene	3.8 ± 0.5 volume percent
Butane and heavier components	1.9 ± 0.3 volume percent

(f)(2) **Mileage accumulation fuel.** For dedicated, dual-fueled or hybrid electric vehicles which use liquefied petroleum gas, fuel used for service accumulation shall meet the specifications listed in section 2292.6, title 13, CCR, (Specifications for Liquefied Petroleum Gas).

2. Subparagraph (f)(3). [No Change.]

100.3.7 §86.113-94(g). [No Change.]

100.3.8 §86.113-07(h). [No Change.]

100.3.9~~7~~ Identification of New Clean Fuels to be Used in Certification Testing.

Any person may petition the state board to establish by regulation certification testing specifications for a new clean fuel for which specifications for a new clean fuel are not specifically set forth in paragraph 86.113-94 as amended herein. Prior to adopting such specifications, the state board shall consider the relative cost-effectiveness of use of the fuel in reducing emissions compared to the use of other fuels. Whenever the state board adopts specifications for a new clean fuel for certification testing, it shall also establish by regulation specifications for the fuel as it is sold commercially to the public.

(a) If the proposed new clean fuel may be used to fuel existing motor vehicles, the state board shall not establish certification specifications for the fuel unless the petitioner has demonstrated that:

(1) Use of the new clean fuel in such existing motor vehicles would not increase emissions of NMOG (on a reactivity-adjusted basis), NOx, CO, and the potential risk associated with toxic air contaminants, as determined pursuant to the procedures set forth in "California Test Procedures for Evaluating Substitute Fuels and New Clean Fuels," as adopted September 17, 1993. In the case of fuel-flexible vehicles or dual-fuel vehicles which were not certified on the new clean fuel but are capable of being operated on it, emissions during operation with the new clean fuel shall not increase compared to emissions during vehicle operation on gasoline.

(2) Use of the new clean fuel in such existing motor vehicles would not result in increased deterioration of the vehicle and would not void the warranties of any such vehicles.

(b) Whenever the state board designates a new clean fuel pursuant to this section, the state board shall also establish by regulation required specifications for the new clean fuel sold commercially in California.

86.114-94 Analytical gases. June 30, 1995.
86.115-00 EPA urban dynamometer driving schedules. October 22, 1996.

100.4 Calibration methods and frequency.

86.116-94 Calibrations, frequency and overview. June 30, 1995.
86.117-96 Evaporative emission enclosure calibrations. August 23, 1995.
86.118-00 Dynamometer calibrations. October 22, 1996.
86.119-90 CVS calibration. February 18, 2000. ~~May 4, 1998.~~
86.120-94 Gas meter or flow instrumentation calibration, particulate, methanol and formaldehyde measurement. June 30, 1995.
86.121-90 Hydrocarbon analyzer calibration. June 30, 1995.
86.122-78 Carbon monoxide analyzer calibration. June 28, 1977.
86.123-78 Oxides of nitrogen analyzer calibration. June 30, 1995.

86.124-78 Carbon dioxide analyzer calibration. June 28, 1977.
86.125-94 Methane analyzer calibration. June 5, 1991.
86.126-90 Calibration of other equipment. April 11, 1989.

100.5 Test Procedures and Data Requirements.

86.127-00 Test procedures; overview. May 4, 1999.
86.128-00 Transmissions. October 22, 1996.
86.129-00 Road load power, test weight, inertia weight class determination, and fuel temperature profile. October 6, 2000.

100.5.1 California Road Load Power, Test Weight and Inertia Weight Class Determination.

100.5.1.1 Amend §86.129-00(b) to add the following specifications for medium-duty vehicles:
Power absorption unit adjustment- medium-duty vehicles.

(1) The power absorption unit shall be adjusted to reproduce road load power at 50 miles per hour true speed. The dynamometer power absorption shall take into account the dynamometer friction, as discussed in paragraph 86.118-78.

(2) The dynamometer road load setting is determined from the loaded test weight, the reference frontal area, vehicle protuberances, and an aerodynamic drag coefficient as determined appropriate by the Executive Officer. The vehicle manufacturer shall submit the procedure by which the aerodynamic drag coefficient was determined in the test vehicle information section in the certification application. The dynamometer road load setting shall be determined by the following equation.

(i) For medium-duty vehicles to be tested on twin or single large roll dynamometers:

$$Hp = (0.00182)V((0.015)(W)+(0.0375)(Cd)(A)(V^2)/(32.2 ft/s^2))+P$$

where:
Hp = the dynamometer power absorber setting at 50 mph (horsepower).
0.00182 = conversion factor to horsepower.
V = velocity in feet/sec.
0.015 = coefficient of rolling resistance.
W = loaded vehicle weight in pounds.
0.0375 = air density in lbm/cubic ft.
Cd = aerodynamic drag coefficient.
A = reference frontal area in square ft.
32.2 ft/s^2 = gravitational acceleration
P = protuberance power (horsepower)

(ii) The protuberance power, P shall be determined per subparagraph 86.129-80(c)(2)(i).

(iii) The dynamometer power absorber setting for medium-duty vehicles shall be rounded to the nearest 0.1 horsepower.

(3) The road load power calculated above shall be used or the vehicle manufacturer may determine the road load power by an alternate procedure requested by the manufacturer and approved in advance by the Executive Officer.

(4) Where it is expected that more than 33 percent of a vehicle line within an engine-system combination will be equipped with air conditioning, per §86.1828-01, the road load power as determined in paragraph (2) or (3) of this section shall be increased by 10 percent up to a maximum increment of 1.4 horsepower, for testing all test vehicles of that vehicle line within that engine-system combination if those vehicles are intended to be offered with air conditioning in production. This power increment shall be added to the indicated dynamometer power absorption setting prior to rounding off this value.

86.130-00 Test sequence; general requirements. October 22, 1996.

100.5.2 California test sequence; general requirements.

100.5.2.1 Delete subparagraph (a) of §86.130-00 and replace with:

For purposes of determining conformity with 50°F test requirements, the procedures set forth in Part II, Section C. For all hybrid electric vehicles and all 2001 and subsequent model-year vehicles certifying to running loss and useful life evaporative emission standards, the test sequence specified in "California Evaporative Emission Standards and Test Procedures for 1978 and Subsequent Model Motor Vehicles" as incorporated by reference in section 1976, title 13, CCR shall apply.

100.5.2.2 Add the following:

A manufacturer has the option of simulating air conditioning operation during testing at other ambient test conditions provided it can demonstrate that the vehicle tailpipe exhaust emissions are representative of the emissions that would result from the SC03 cycle test procedure and the ambient conditions of paragraph 86.161-00. The Executive Officer has approved two optional air conditioning test simulation procedures, AC1 and AC2, for the 2001 to 2003 model years only. If a manufacturer desires to conduct an alternative SC03 test simulation other than AC1 and AC2, or the AC1 and AC2 simulations for the 2004 and subsequent model years, the simulation test procedure must be approved in advance by the Executive Officer (see paragraphs 86.162-00 and 86.162-03).

86.131-00 Vehicle preparation. October 22, 1996.

86.132-00 Vehicle preconditioning. October 22, 1996.

100.5.3 California Vehicle Preconditioning Requirements.

100.5.3.1 Add the following subparagraph: For all hybrid electric vehicles and all 2000 and subsequent model-year vehicles subject to running loss and useful life evaporative emission standards, the preconditioning sequence for the Federal Test Procedure specified in "California Evaporative Emission Standards and Test Procedures for 1978 and Subsequent Model Motor Vehicles" as incorporated by reference in section 1976, title 13, CCR shall apply. In addition, the preconditioning sequence for the SFTP described in subparagraphs (n) and (o) of paragraph 86.132-00 shall apply.

86.133-96 Diurnal breathing loss test. August 23, 1995.

86.134-96 Running loss test. August 23, 1995.

86.135-00 Dynamometer procedure. October 22, 1996.
86.136-90 Engine starting and restarting. September 21, 1994.
86.137-96 Dynamometer test run, gaseous and particulate emissions. March 24, 1993.
86.138-96 Hot soak test. August 23, 1995.
86.139-90 Diesel particulate filter handling and weighing. April 11, 1989.
86.140-94 Exhaust sample analysis. June 30, 1995.
86.142-90 Records required. June 30, 1995.
86.143-96 Calculations; evaporative emissions. August 23, 1995.
86.144-94 Calculations; exhaust emissions. September 5, 1997.

100.5.4 Calculations; exhaust emissions.

100.5.4.1 The exhaust emission calculations for California are set forth in the "California Non-Methane Organic Gas Test Procedures," which is incorporated by reference in section 1961(d), title 13, CCR.

100.5.4.2 Add the following calculation:

Organic material non-methane hydrocarbon equivalent mass for ethanol vehicles:

$$OMNMHCE_{mass} = NMHC_{mass} + (13.8756/32.042) \times (CH_3OH)_{mass} + (13.8756/23.035) \times (CH_3CH_2OH)_{mass} + (13.8756/30.0262) \times (HCHO)_{mass} + (13.8756/22.027) \times (CH_3CHO)_{mass}$$

86.145-82 Calculations; particulate emissions. November 2, 1982.
86.146-96 to 85.157-98 [n/a; (ORVR)]
86.158-00 Supplemental Federal Test Procedures; overview. October 22, 1996.
86.159-00 Exhaust emission test procedures for US06 emissions. October 22, 1996.
86.160-00 Exhaust emission test procedure for SC03 emissions. October 22, 1996.
86.161-00 Air conditioning environmental test facility ambient requirements. October 22, 1996.
86.162-00 Approval of alternative air conditioning test simulations and descriptions of AC1 and AC2. October 22, 1996.
86.162-03 Approval of alternative air conditioning test simulations. October 22, 1996.
86.163-00 Spot check correlation procedures for vehicles tested using a simulation of the environmental test cell for air conditioning emission testing. October 22, 1996.
86.164-00 Supplemental federal test procedure calculations. October 22, 1996.

B. Subpart C - Emission Regulations for 1994 and Later Model Year Gasoline-Fueled New Light-Duty Vehicles and New Light-Duty Trucks; Cold Temperature Test Procedures

86.201-94 General applicability. July 17, 1992.

200.1 California applicability.

Amend subparagraph 86.201-94(a) as follows: This subpart describes procedures for determining the cold temperature carbon monoxide (CO) emissions from 2000 and later model year new passenger cars, light-duty trucks, and medium-duty vehicles (excluding natural gas, diesel-fueled, and zero-emission vehicles).

86.202-94 Definitions. July 17, 1992.
86.203-94 Abbreviations. July 17, 1992.
86.204-94 Section number construction. July 17, 1992.
86.205-94 Introduction; structure of subpart. July 17, 1992.
86.206-94 Equipment required; overview. July 17, 1992.

200.2 California Equipment Required; Overview.

Amend §86.206-94, as follows:

This subpart contains procedures for exhaust emission tests on passenger cars, light-duty trucks, and medium-duty vehicles (excluding natural gas, diesel-fueled, and zero-emission vehicles.) Equipment required and specifications are as follows:

(a)(1) **Exhaust emission tests**. Exhaust from vehicles (excluding natural gas, diesel-fueled, and zero-emission vehicles) is tested for gaseous emissions using the Constant Volume Sampler (CVS) concept (§86.209). Equipment necessary and specifications appear in 40 CFR Part 86, §§86.208 through 86.214.

(a)(2) **Fuel, analytical gas, and driving schedule specifications**. Fuel specifications for exhaust emission testing for gasoline-fueled vehicles are specified in 40 CFR Part 86, §86.213. As an option, a manufacturer may utilize the fuel specified in §86.213 with the sulfur content limited to 30-40 ppm by weight. Fuel specifications for exhaust emission testing for alcohol-fueled vehicles and liquefied petroleum gas vehicles are specified in Part II, Section A.100.3 of these test procedures. Analytical gases are specified in 40 CFR Part 86, §86.214. The EPA Urban Dynamometer Driving Schedule (UDDS) for use in emission tests is specified in 40 CFR Part 86, §86.215 and appendix I to this part.

86.208-94 Dynamometer. July 17, 1992.
86.209-94 Exhaust gas sampling system; gasoline-fueled vehicles. July 17, 1992.
86.211-94 Exhaust gas analytical system. July 17, 1992.
86.213-04 Fuel specifications. February 10, 2000.
86.214-94 Analytical gases. July 17, 1992.
86.215-94 EPA urban dynamometer driving schedule. July 17, 1992.
86.216-94 Calibrations, frequency and overview. July 17, 1992.
86.218-94 Dynamometer calibration. July 17, 1992.

86.219-94 CVS calibration. July 17, 1992.
86.221-94 Hydrocarbon analyzer calibration. July 17, 1992.
86.222-94 Carbon monoxide analyzer calibration. July 17, 1992.
86.223-94 Oxides of nitrogen analyzer calibration. July 17, 1992.
86.224-94 Carbon dioxide analyzer calibration. July 17, 1992.
86.226-94 Calibration of other equipment. July 17, 1992.
86.227-94 Test procedures; overview. July 17, 1992.
86.228-94 Transmissions. July 17, 1992.
86.229-94 Road load force, test weight, and inertia weight class determination. July 17, 1992.
86.230-94 Test Sequence; general requirements. July 17, 1992.
86.231-94 Vehicle Preparation. July 17, 1992.
86.232-94 Vehicle Preconditioning. July 17, 1992.
86.235-94 Dynamometer procedure. July 17, 1992.
86.236-94 Engine starting and restarting. July 17, 1992.
86.237-94 Dynamometer test run, gaseous emissions. July 17, 1992.
86.240-94 Exhaust sample analysis. July 17, 1992.
86.242-94 Records required. July 17, 1992.
86.244-94 Calculations; exhaust emissions. July 17, 1992.
86.246-94 Intermediate temperature testing. July 17, 1992.

Appendix I to Part 86 -- Urban Dynamometer Schedules. April 29, 1998.

C. 50ºF Emission Test Procedure.

The NMOG, CO, NOx and formaldehyde emissions from all light- and medium-duty TLEVs, LEVs, ULEVs and SULEVs shall be measured according to the Federal Test Procedure as set forth in Subpart B, 40 CFR Part 86 at a nominal temperature of 50°F with the following modifications:

(1) **Test Procedure.**

(a) The test vehicles shall not be subject to a diurnal heat build prior to the cold start exhaust test or evaporative emission testing.

(b) Following a 12 to 36 hour cold soak at a nominal temperature of 50°F, the nominal preconditioning, soak, and test temperatures shall be maintained within 3°F of the nominal temperature on an average basis and within 5°F of the nominal temperature on a continuous basis. The temperature shall be sampled at least once every 15 seconds during the preconditioning and test periods and at least once each 5 minutes during the soak period. A continuous strip chart recording of the temperature with these minimum time resolutions is an acceptable alternative to employing a data acquisition system.

(c) The test site temperature shall be measured at the inlet of the vehicle cooling fan used for testing.

(d) The test vehicle may be fueled before the preconditioning procedure in a fueling area maintained within a temperature range of 68 to 86°F. The requirement to saturate the evaporative control canister(s) shall not apply.

(e) If a soak area remote from the test site is used, the vehicle may pass through an area maintained within a temperature range of 68 to 86°F during a time interval not to exceed 10 minutes. In such cases, the vehicle shall be restabilized to 50°F by soaking the vehicle in the nominal 50°F test area for six times as long as the exposure time to the higher temperature area, prior to starting the emission test.

(f) The vehicle shall be approximately level during all phases of the test sequence to prevent abnormal fuel distribution.

D. Procedure for Determining Specific Reactivity.

The following procedure shall be used by the Executive Officer to establish reactivity adjustment factors for exhaust emissions of non-methane organic gases (NMOG) for the purpose of certifying a vehicle of specific emission category and fuel for sale in California.

1. Procedure for Determining Specific Reactivity.

(a) A representative speciated NMOG exhaust emission profile for light- and medium-duty low-emission vehicles shall be established according to the following conditions:

i. Speciated NMOG profiles shall be obtained from a statistically valid number of vehicles in each vehicle emission category and fuel type. The maximum incremental reactivities to be used are provided in the "California Non-Methane Organic Gas Test Procedures," incorporated by reference in Part II, section A.100.5.4 of these test procedures.

ii. The speciated NMOG profiles shall identify and quantify, in units of grams per mile or milligrams per mile, all compounds above the specified laboratory limit of detection as measured in accordance with the procedures specified in the "California Non-Methane Organic Gas Test Procedures."

(b) The "grams ozone per mile" value of each organic compound identified in the speciated profile shall be determined by multiplying the "grams per mile NMOG" emission value of each compound by the applicable maximum incremental reactivity value as specified in the "California Non-Methane Organic Gas Test Procedures."

(c) The "total grams ozone per mile" of NMOG exhaust emissions from each vehicle emission category and fuel type shall be the sum of all the organic compounds values calculated in step (b).

(d) The specific reactivity of each vehicle emission category and fuel type shall be determined by dividing the "total grams ozone per mile" value calculated in step (c) by the "total grams per mile of NMOG emissions."

2. Procedure for Determining Reactivity Adjustment Factors.

(a) The baseline specific reactivity of vehicle emission categories operating on conventional gasoline shall be determined by the Executive Officer in accordance with the procedure outlined in subparagraph 1., above.

i. Gasoline meeting the specifications listed below shall be used to determine the baseline specific reactivity low-emission vehicles operating on conventional gasoline:

Specifications for Conventional Gasoline	
Fuel Property	**Limit**
Sulfur	300 ± 50 ppm by weight
Benzene	1.6 ± 0.3 volume percent
Reid vapor pressure	8.7 ± 0.3 psi
Distillation, D-86, ^{o}F	
10%	115-135
50%, maximum	240
90%,	323-333
EP, maximum	420
Hydrocarbons	
Total Aromatics	32 ± 3.0 volume percent
Multi-substituted alkyl aromatics	21 ± 3.0 volume percent
Olefins	12 ± 3.0 volume percent
Saturates	Remainder

(The test methods used for each fuel property shall be the same as the test method for the identical fuel property listed in Part II, Section A.100.3 of these test procedures.)

(b) The generic specific reactivity of vehicle emission categories operating on clean fuels shall also be determined by the Executive Officer according to the procedure outlined in subparagraph 1. above.

(c) The candidate vehicle/fuel "reactivity adjustment factor" shall be determined by dividing the specific reactivity of a candidate fuel and vehicle by the baseline specific reactivity of vehicles in the same vehicle emission category using the procedure outline in subparagraph 1. above.

(d) For a candidate vehicle/fuel system operating on natural gas, a "methane reactivity adjustment factor" shall be calculated by dividing the maximum incremental reactivity value for methane given in the California Non-Methane Organic Gas Test Procedures by the specific reactivity for the vehicle in the same emission control technology category operated on conventional gasoline as listed in subparagraph (a)i. above or established by the Executive Officer pursuant to paragraph 4 and 5 below. The current methane reactivity adjustment factors are listed in Part I.E.4 of these test procedures.

3. Procedures for Establishing Test Group Specific Reactivity Adjustment Factors.

A manufacturer may request the use of a unique specific reactivity for a specific vehicle test group category and fuel only if a baseline specific reactivity factor for the applicable test group class and emission category is provided in section E.5.1.1 of these test procedures. The Executive Officer shall approve such a request provided the criteria outlined below are met.

(a) The manufacturer submits speciated NMOG exhaust emission profiles to the Executive Officer obtained from emission testing a minimum of four different vehicles representative of vehicles that will be certified in the test group. The test vehicles shall include the official emission-data vehicle(s) for the engine family, and the mileage accumulation of each vehicle shall be at or greater than 4000 miles. One speciated profile shall be submitted for each test vehicle. Emission levels of each constituent NMOG shall be measured according to the "California Non-Methane Organic Gas Test Procedures." For the emission-data vehicle(s), the speciated profile(s) shall be obtained from the same test used to obtain the official exhaust emission test results for the emission-data vehicle at the 4,000 mile test point. The manufacturer shall calculate specific reactivity for each speciated NMOG exhaust emission profile in accordance with the procedures specified in paragraph 2. above. By using these specific reactivity values, the manufacturer shall calculate a "reactivity adjustment factor" for each test vehicle in accordance with the procedure specified in paragraph 3. above. A "reactivity adjustment factor" for the test group shall be calculated by taking the arithmetic mean of the "reactivity adjustment factor"" obtained for each test vehicle. The 95 percent upper confidence bound (95% UCB) shall be calculated according to the equation:

$$95\%\ UCB = RAF + 1.96 \times \left[\sum_{I=1}^{n} (RAF_i - RAF_m)^2 / (n-1) \right]^{1/2}$$

where:

RAF_m = mean "reactivity adjustment factor" calculated for the test group

RAF_i = "reactivity adjustment factor" calculated for the i'th test vehicle

n = number of test vehicles

The 95 percent upper confidence bound of the "reactivity adjustment factor" for the test group shall be less than or equal to 115 percent of the test group "reactivity adjustment factor."

(b) The manufacturer submits an "ozone deterioration factor" for the test group. To determine the "ozone deterioration factor," the manufacturer shall perform two tests at each mileage interval for one or more durability vehicle(s) tested in accordance with the procedures and conditions for calculating mass deterioration factors specified in Part I, Section F.3 (40 CFR §86.1819) of these test procedures. The Executive Officer shall approve the use of other mileage intervals and procedures if the manufacturer can demonstrate that equivalently representative "ozone deterioration factors" are obtained. One speciated profile shall be submitted for each test. Emission levels of each constituent NMOG shall be measured according to the "California Non-Methane Organic Gas Test Procedures." A mean gram per mile NMOG mass value and a mean specific reactivity value shall be calculated by taking the arithmetic mean of each measurement from the speciated profiles. These results shall be

multiplied together to obtain a mean "total grams ozone per mile" value at each mileage interval. A mean "ozone deterioration factor" shall be calculated in accordance with the procedures in Part I Section F.3 (40 CFR §86.1819) of these test procedures except that the mean total "grams ozone per mile" value determined at each mileage interval shall be used in place of measured mass emissions. If the "ozone deterioration factor" is determined to be less than 1.00, the "ozone deterioration factor" shall be assigned a value of 1.00. The "ozone deterioration factor" shall be multiplied by the product of the official exhaust NMOG mass emission results at the 4,000 mile test point and the mean "reactivity adjustment factor" for the test group to obtain the NMOG certification levels used to determine compliance with the NMOG emission standards.

(c) The speciated profiles, mean "reactivity adjustment factor" for the test group, and "ozone deterioration factor" are provided to the Executive Officer with the certification application for the engine family.

(d) The maximum incremental reactivities to be used are provided in the "California Non-Methane Organic Gas Test Procedures." Any manufacturer which intends to use the table shall submit to the Executive Officer a list which provides the specific organic gases measured by the manufacturer and the maximum incremental reactivity value assigned to each organic gas prior to or with the submittal of a request for the use of a reactivity adjustment factor unique to a specific test group. The Executive Officer may deny such requests if he or she determines that the maximum incremental reactivity value assignments are made incorrectly.

(e) Methanol and LPG Requirements. For a candidate vehicle/fuel system powered by methanol or liquefied petroleum gas, the reactivity adjustment factor determined by the manufacturer shall be multiplied by 1.1. The resulting value shall constitute the "reactivity adjustment factor" for the methanol or liquefied petroleum gas-powered vehicle/fuel system.

4. Procedure for Establishing A New Reactivity Adjustment Factor.

The Executive Officer may establish by executive order new reactivity adjustment factor pursuant to the procedures set forth above. The Executive Officer shall notify manufacturers in writing of a new reactivity adjustment factor within 30 days of their establishment.

5. Procedure for Revising Reactivity Adjustment Factors.

The Executive Officer may revise any reactivity adjustment factor listed in Part I.E.5 of these test procedures or established by the Executive Officer pursuant to the above criteria if he or she determines that the revised reactivity adjustment factor is more representative of the ozone-forming potential of vehicle NMOG emissions based on the best available scientific knowledge and sound engineering judgment. The Executive Officer shall notify manufacturers in writing of any such reactivity adjustment factor at least 3 years prior to January 1 of the calendar year which has the same numerical designation as the model year for which the revised reactivity adjustment factor first becomes effective. However, a manufacturer may use the revised reactivity adjustment factor in certifying any new test group whose certification application is submitted following such notification, if it so chooses. A manufacturer may also continue to use the original reactivity adjustment factor for any existing test group previously certified with that reactivity adjustment factor until a new durability-data vehicle is tested for that test group.

E. Unified Cycle Driving Schedule.

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Unified Test Cycle
(Speed vs Time Sequence)

Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)
1	0	74	12.3	147	20	220	0	293	0	366	45.3	439	60.3	512	28
2	0	75	8.1	148	23	221	0	294	0	367	46.5	440	60.3	513	26.5
3	0	76	6.1	149	25.7	222	0	295	0	368	48	441	60.3	514	24.2
4	0	77	9.6	150	28	223	0	296	0	369	48.8	442	59.5	515	22.7
5	0	78	12.7	151	30.7	224	0	297	0	370	49.5	443	58.8	516	20.4
6	0	79	15.7	152	32.6	225	0	298	0	371	49.9	444	59.1	517	17.7
7	0	80	18	153	34.2	226	0	299	0	372	49.9	445	58.8	518	15.7
8	0	81	20.4	154	35.3	227	0	300	0	373	49.9	446	58.8	519	13.1
9	0	82	21.9	155	36.9	228	0	301	0	374	49.5	447	58.8	520	10.8
10	0	83	23.4	156	36.9	229	0	302	0	375	49.5	448	58.4	521	8.4
11	0	84	23.8	157	37.2	230	0	303	0	376	48.8	449	58	522	7.3
12	0	85	24.6	158	37.6	231	0	304	0	377	48.8	450	58	523	5
13	0	86	25	159	37.6	232	0	305	0	378	48.8	451	58	524	3.8
14	0	87	26.1	160	37.6	233	0	306	0	379	48.4	452	58.4	525	3.5
15	0	88	26.1	161	37.2	234	0	307	0	380	48.8	453	59.1	526	1.9
16	0	89	26.9	162	37.2	235	0	308	0	381	49.5	454	59.5	527	0.8
17	0	90	26.9	163	36.9	236	0	309	0	382	50.3	455	59.9	528	0
18	0	91	26.9	164	36.5	237	0	310	0	383	50.7	456	59.9	529	0
19	0	92	26.5	165	36.5	238	1.5	311	0	384	51.8	457	60.3	530	0
20	0	93	25.7	166	34.9	239	5	312	0	385	52.6	458	61.1	531	0.8
21	1.2	94	21.9	167	33.4	240	8.8	313	0.4	386	53.4	459	61.1	532	1.9
22	4.2	95	16.5	168	31.9	241	11.5	314	2.7	387	54.1	460	61.1	533	3.8
23	7.3	96	10	169	29.2	242	14.2	315	7.3	388	55.3	461	61.4	534	6.9
24	8.8	97	4.6	170	25	243	15.4	316	11.5	389	55.3	462	61.4	535	9.6
25	10.8	98	1.5	171	25	244	16.1	317	15.4	390	56.1	463	61.1	536	11.1
26	12.3	99	0.4	172	26.1	245	16.1	318	18.4	391	56.4	464	60.7	537	11.1
27	13.1	100	0	173	27.6	246	16.9	319	20.7	392	56.4	465	59.9	538	10.4
28	12.3	101	0	174	29.2	247	16.5	320	24.2	393	56.4	466	59.1	539	8.8
29	12.3	102	0	175	31.1	248	16.9	321	26.9	394	57.2	467	59.1	540	9.2
30	11.5	103	0	176	32.3	249	18	322	29.6	395	56.8	468	59.1	541	10
31	11.5	104	0	177	34.2	250	19.2	323	31.1	396	57.6	469	59.9	542	10.4
32	11.1	105	0	178	34.9	251	20.4	324	32.6	397	57.6	470	59.5	543	10.4
33	11.1	106	0	179	35.7	252	20.4	325	33.8	398	57.6	471	59.9	544	5.4
34	11.1	107	0	180	36.5	253	21.1	326	34.9	399	58	472	58.8	545	1.9
35	13.1	108	0.4	181	36.9	254	21.1	327	36.9	400	58	473	58	546	0
36	15	109	1.2	182	36.9	255	22.3	328	39.2	401	58.4	474	57.6	547	0
37	16.9	110	1.9	183	37.2	256	23	329	41.1	402	58.4	475	56.8	548	0
38	16.9	111	3.8	184	37.6	257	23.8	330	43	403	58.8	476	56.1	549	0
39	16.1	112	7.7	185	37.2	258	24.2	331	43.8	404	59.1	477	55.3	550	0
40	15.7	113	11.5	186	37.6	259	24.6	332	44.5	405	58.8	478	54.1	551	0
41	15.4	114	14.6	187	38	260	25	333	45.3	406	58.8	479	52.6	552	0
42	15	115	18	188	38.4	261	25.7	334	45.3	407	58	480	49.2	553	0
43	13.8	116	21.5	189	39.2	262	25.7	335	44.9	408	58	481	46.1	554	0
44	10.8	117	25	190	39.6	263	26.5	336	44.5	409	57.6	482	43	555	0
45	8.4	118	28.4	191	39.9	264	27.6	337	43.8	410	57.6	483	37.2	556	0
46	6.1	119	30.7	192	40.7	265	28.4	338	43.4	411	57.6	484	29.6	557	0
47	4.2	120	31.9	193	40.3	266	29.2	339	42.6	412	57.6	485	21.5	558	0
48	3.5	121	32.3	194	41.1	267	30.3	340	41.9	413	57.6	486	16.5	559	0
49	3.5	122	32.3	195	41.1	268	31.1	341	41.5	414	59.1	487	15.7	560	0
50	1.5	123	31.9	196	40.7	269	31.1	342	40.7	415	59.5	488	18.4	561	0
51	0	124	30.3	197	31.9	270	30.7	343	40.3	416	59.9	489	21.5	562	0
52	0	125	28	198	23.9	271	31.1	344	41.1	417	60.3	490	25	563	0
53	0	126	24.2	199	15.9	272	29.6	345	41.5	418	60.3	491	27.3	564	0
54	0	127	20	200	7.9	273	29.2	346	42.6	419	61.1	492	29.2	565	0
55	0	128	16.1	201	2.7	274	29.2	347	43.4	420	60.3	493	30.7	566	0
56	0	129	11.5	202	0.4	275	28.8	348	44.2	421	59.9	494	31.5	567	0
57	0	130	8.1	203	0.4	276	28	349	44.9	422	59.5	495	31.1	568	0
58	0	131	5	204	2.7	277	23	350	45.7	423	59.1	496	31.1	569	0
59	0	132	3.5	205	3.8	278	21.1	351	46.5	424	59.1	497	30.3	570	0
60	0	133	1.9	206	3.8	279	21.5	352	46.8	425	59.5	498	30	571	0
61	0	134	0	207	1.5	280	20.7	353	47.2	426	59.5	499	30	572	0.4
62	0	135	0	208	0	281	20.7	354	48	427	59.5	500	29.6	573	1.5
63	1.2	136	0	209	0	282	19.6	355	47.6	428	59.9	501	30	574	3.5
64	3.5	137	0	210	0	283	16.5	356	48.4	429	60.3	502	28.8	575	6.1
65	7.7	138	0	211	0	284	13.1	357	48	430	60.7	503	28.8	576	10.4

66	11.1	139	0	212	0	285	9.6	358	47.2	431	60.7	504	28	577	14.2
67	13.8	140	0	213	0	286	7.3	359	46.1	432	61.4	505	28.4	578	16.9
68	16.5	141	0	214	0	287	3.8	360	45.7	433	61.8	506	28	579	19.2
69	18.4	142	0	215	0	288	0.8	361	44.9	434	61.8	507	28.4	580	20
70	20.4	143	1.5	216	0	289	0	362	44.2	435	61.8	508	28.4	581	21.5
71	20.7	144	6.9	217	0	290	0	363	43.8	436	61.8	509	28.8	582	23.4
72	19.6	145	12.7	218	0	291	0	364	44.5	437	61.1	510	28.4	583	24.6
73	17.3	146	16.5	219	0	292	0	365	44.9	438	60.7	511	28.4	584	24.2

Unified Test Cycle

(Speed vs Time Sequence)

Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)
585	20	658	33	731	4.2	804	20.4	877	62.2	950	16.5	1023	0.4	1096	9.6
586	16.9	659	34.2	732	1.2	805	18.8	878	62.2	951	15	1024	2.7	1097	8.8
587	13.4	660	34.6	733	0	806	17.3	879	62.6	952	11.9	1025	6.1	1098	10.8
588	13.4	661	35.3	734	0	807	15	880	63.7	953	9.6	1026	9.2	1099	12.7
589	15.7	662	36.1	735	0	808	13.1	881	64.5	954	8.4	1027	11.5	1100	14.2
590	18.4	663	36.1	736	0	809	9.2	882	64.9	955	5.8	1028	14.2	1101	14.6
591	21.1	664	36.9	737	0	810	6.9	883	66	956	1.2	1029	16.1	1102	13.1
592	23.4	665	36.9	738	0	811	4.6	884	66	957	0	1030	18	1103	11.1
593	25.3	666	37.6	739	0	812	4.6	885	66.8	958	0	1031	20	1104	11.1
594	27.6	667	37.6	740	0	813	4.6	886	66.4	959	0	1032	21.5	1105	11.1
595	28.8	668	38.4	741	0	814	4.2	887	66.8	960	1.2	1033	23	1106	13.1
596	30.3	669	38	742	0	815	5.4	888	67.2	961	3.1	1034	24.2	1107	15.7
597	30.7	670	37.6	743	0	816	4.6	889	66.4	962	5	1035	25	1108	18.4
598	31.5	671	37.6	744	0	817	3.5	890	66.4	963	8.4	1036	25.7	1109	20.7
599	31.1	672	37.2	745	0	818	2.3	891	66	964	11.5	1037	26.9	1110	23.8
600	31.1	673	36.9	746	0	819	2.3	892	65.7	965	14.6	1038	27.6	1111	25.7
601	30.3	674	36.1	747	0	820	1.9	893	65.7	966	16.9	1039	27.6	1112	28
602	30.3	675	35.7	748	0	821	3.1	894	66.4	967	18.8	1040	28.4	1113	30
603	30.3	676	36.1	749	0	822	6.1	895	66	968	21.1	1041	29.2	1114	31.1
604	30.7	677	35.7	750	0	823	4.6	896	65.7	969	23.8	1042	29.2	1115	32.3
605	31.1	678	35.7	751	0	824	2.7	897	65.3	970	26.5	1043	30	1116	34.2
606	32.3	679	35.7	752	0	825	2.3	898	65.3	971	28	1044	29.6	1117	35.7
607	32.6	680	36.1	753	0	826	2.3	899	64.5	972	29.6	1045	29.6	1118	36.9
608	32.6	681	36.1	754	0	827	3.1	900	64.5	973	30.7	1046	28.8	1119	38.8
609	32.6	682	35.7	755	0	828	4.2	901	64.1	974	32.6	1047	28	1120	40.3
610	31.1	683	35.7	756	0	829	3.5	902	63.7	975	34.2	1048	23.8	1121	41.5
611	26.9	684	34.9	757	0	830	3.8	903	63.7	976	35.3	1049	18.8	1122	42.2
612	22.3	685	34.6	758	0	831	4.2	904	63.7	977	36.1	1050	11.9	1123	43
613	18	686	34.2	759	0	832	3.5	905	64.5	978	36.9	1051	6.1	1124	43.8
614	13.8	687	33.8	760	0	833	3.5	906	64.5	979	38	1052	1.5	1125	43.8
615	9.6	688	33.4	761	0	834	3.5	907	64.9	980	38	1053	1.5	1126	43.4
616	4.6	689	33	762	0	835	4.6	908	64.5	981	38	1054	4.2	1127	43
617	6.1	690	30.3	763	1.5	836	5.8	909	64.1	982	38	1055	8.1	1128	42.2
618	10	691	29.2	764	5.4	837	3.5	910	64.9	983	38	1056	10.4	1129	41.9
619	14.2	692	28.4	765	9.2	838	0.8	911	65.3	984	37.2	1057	13.1	1130	41.5
620	17.3	693	25	766	11.5	839	3.5	912	65.3	985	36.9	1058	15.4	1131	41.9
621	20	694	21.1	767	14.6	840	3.8	913	65.3	986	36.1	1059	18	1132	41.9
622	21.5	695	16.9	768	17.3	841	2.3	914	64.1	987	35.7	1060	20.4	1133	41.9
623	22.3	696	13.4	769	19.2	842	0	915	63.4	988	34.9	1061	23	1134	42.2
624	22.3	697	13.1	770	21.1	843	1.2	916	63	989	34.9	1062	25.3	1135	42.6
625	22.3	698	12.3	771	20.7	844	6.9	917	63.4	990	33.8	1063	27.3	1136	42.6
626	22.3	699	12.7	772	20.7	845	13.8	918	64.1	991	31.5	1064	28.8	1137	42.6
627	23	700	15.7	773	19.6	846	18.8	919	64.9	992	28.8	1065	30.3	1138	42.6
628	23	701	19.2	774	18.4	847	23.8	920	65.3	993	25.7	1066	31.1	1139	42.6
629	22.7	702	22.3	775	16.9	848	27.3	921	64.5	994	24.6	1067	32.3	1140	42.6
630	22.3	703	24.6	776	16.9	849	30.7	922	64.1	995	23.4	1068	31.9	1141	42.6
631	21.9	704	25.7	777	16.5	850	33.8	923	63.4	996	22.3	1069	32.3	1142	42.2
632	22.7	705	26.5	778	16.9	851	37.6	924	63.7	997	21.5	1070	31.9	1143	43
633	23.8	706	26.5	779	16.9	852	40.7	925	63.4	998	20	1071	31.1	1144	43.4
634	25	707	26.9	780	16.9	853	43.8	926	63.4	999	20	1072	28.8	1145	43
635	25.3	708	27.3	781	17.3	854	46.1	927	63.4	1000	19.2	1073	25	1146	42.6
636	25.7	709	27.3	782	19.2	855	48	928	63.4	1001	19.2	1074	22.7	1147	41.9
637	26.5	710	27.6	783	20.4	856	49.5	929	63.7	1002	18	1075	18.8	1148	40.7
638	26.9	711	28.4	784	21.1	857	51.5	930	64.5	1003	11.9	1076	15.4	1149	36.9
639	27.3	712	28.8	785	22.3	858	53	931	65.3	1004	6.9	1077	13.4	1150	32.6

640	28	713	28.8	786	22.3	859	54.5	932	64.9	1005	2.7	1078	11.9	1151	28
641	29.2	714	29.2	787	22.7	860	55.7	933	63.7	1006	0.8	1079	8.8	1152	23.4
642	30	715	28.8	788	22.3	861	56.8	934	63	1007	0.4	1080	5	1153	18.4
643	30	716	28.8	789	22.7	862	58	935	59.9	1008	0	1081	1.9	1154	14.6
644	29.6	717	28	790	22.3	863	59.1	936	55.3	1009	0	1082	2.3	1155	12.3
645	29.6	718	28	791	23.8	864	60.3	937	50.7	1010	0	1083	2.7	1156	9.2
646	28.8	719	27.6	792	25.7	865	61.1	938	49.2	1011	0	1084	3.5	1157	5.8
647	28.4	720	26.5	793	27.6	866	61.8	939	48	1012	0	1085	6.5	1158	1.9
648	28	721	24.6	794	29.6	867	61.8	940	46.1	1013	0	1086	10.8	1159	0.4
649	27.3	722	20.7	795	30	868	61.8	941	44.2	1014	0	1087	13.8	1160	0
650	25.7	723	16.5	796	29.2	869	61.8	942	41.1	1015	0	1088	16.1	1161	0
651	24.6	724	15	797	27.6	870	62.6	943	39.9	1016	0	1089	18.4	1162	0
652	25	725	14.2	798	25	871	63.4	944	36.1	1017	0	1090	20.4	1163	0
653	26.5	726	14.2	799	23.8	872	63	945	32.6	1018	0	1091	21.9	1164	0
654	28	727	13.8	800	23.4	873	63	946	29.2	1019	0	1092	21.9	1165	0.4
655	29.6	728	13.8	801	24.2	874	62.6	947	24.6	1020	0	1093	20.7	1166	4.2
656	30.7	729	11.9	802	23.4	875	61.8	948	20.7	1021	0	1094	17.3	1167	9.2
657	32.3	730	8.4	803	23	876	61.8	949	19.2	1022	0	1095	13.1	1168	11.9

Unified Test Cycle

(Speed vs Time Sequence)

Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)	Time (sec.)	Speed (mph)
1169	14.2	1240	3.5	1311	40.7	1382	2.7	1453	0	1524	26.9	1595	37.6	1666	0
1170	15.7	1241	10.4	1312	40.3	1383	2.3	1454	0	1525	26.9	1596	37.2	1667	0
1171	15	1242	15.4	1313	39.6	1384	1.5	1455	0	1526	26.9	1597	37.2	1668	0
1172	14.2	1243	17.3	1314	39.2	1385	1.2	1456	1.2	1527	26.5	1598	36.9	1669	0
1173	13.4	1244	17.3	1315	38.8	1386	0	1457	4.2	1528	25.7	1599	36.5	1670	0
1174	13.8	1245	18.4	1316	38	1387	1.2	1458	7.3	1529	21.9	1600	36.5	1671	0
1175	14.6	1246	21.5	1317	37.6	1388	4.2	1459	8.8	1530	16.5	1601	34.9	1672	0
1176	14.6	1247	24.6	1318	37.2	1389	7.3	1460	10.8	1531	10	1602	33.4	1673	1.5
1177	14.2	1248	27.3	1319	36.5	1390	8.8	1461	12.3	1532	4.6	1603	31.9	1674	5
1178	16.1	1249	30	1320	34.6	1391	10.8	1462	13.1	1533	1.5	1604	29.2	1675	8.8
1179	15.7	1250	31.5	1321	31.5	1392	12.3	1463	12.3	1534	0.4	1605	25	1676	11.5
1180	15.7	1251	31.9	1322	29.6	1393	13.1	1464	12.3	1535	0	1606	25	1677	14.2
1181	14.6	1252	32.6	1323	29.2	1394	12.3	1465	11.5	1536	0	1607	26.1	1678	15.4
1182	13.1	1253	33.4	1324	28.8	1395	12.3	1466	11.5	1537	0	1608	27.6	1679	16.1
1183	10	1254	34.9	1325	28.8	1396	11.5	1467	11.1	1538	0	1609	29.2	1680	16.1
1184	7.3	1255	36.5	1326	28	1397	11.5	1468	11.1	1539	0	1610	31.1	1681	16.9
1185	3.5	1256	37.6	1327	28	1398	11.1	1469	11.1	1540	0	1611	32.3	1682	16.5
1186	0.8	1257	39.2	1328	28.4	1399	11.1	1470	13.1	1541	0	1612	34.2	1683	16.9
1187	0	1258	40.3	1329	29.6	1400	11.1	1471	15	1542	0	1613	34.9	1684	18
1188	0	1259	40.7	1330	30	1401	13.1	1472	16.9	1543	0.4	1614	35.7	1685	19.2
1189	0	1260	41.1	1331	30.3	1402	15	1473	16.9	1544	1.2	1615	36.5	1686	20.4
1190	0	1261	40.7	1332	29.2	1403	16.9	1474	16.1	1545	1.9	1616	36.9	1687	20.4
1191	0.4	1262	40.7	1333	26.5	1404	16.9	1475	15.7	1546	3.8	1617	36.9	1688	21.1
1192	2.7	1263	40.7	1334	25.3	1405	16.1	1476	15.4	1547	7.7	1618	37.2	1689	21.1
1193	7.3	1264	41.5	1335	25	1406	15.7	1477	15	1548	11.5	1619	37.6	1690	22.3
1194	11.5	1265	42.6	1336	24.6	1407	15.4	1478	13.8	1549	14.6	1620	37.2	1691	23
1195	15.4	1266	43	1337	24.6	1408	15	1479	10.8	1550	18	1621	37.6	1692	23.8
1196	19.2	1267	44.5	1338	25.3	1409	13.8	1480	8.4	1551	21.5	1622	38	1693	24.2
1197	21.9	1268	45.3	1339	26.1	1410	10.8	1481	6.1	1552	25	1623	38.4	1694	24.6
1198	23.8	1269	45.3	1340	27.3	1411	8.4	1482	4.2	1553	28.4	1624	39.2	1695	25
1199	25	1270	44.9	1341	28.4	1412	6.1	1483	3.5	1554	30.7	1625	39.6	1696	25.7
1200	26.1	1271	43.4	1342	29.2	1413	4.2	1484	3.5	1555	31.9	1626	39.9	1697	25.7
1201	27.3	1272	40.3	1343	29.2	1414	3.5	1485	1.5	1556	32.3	1627	40.7	1698	26.5
1202	28.8	1273	38	1344	29.6	1415	3.5	1486	0	1557	32.3	1628	40.3	1699	27.6
1203	30	1274	36.1	1345	30	1416	1.5	1487	0	1558	31.9	1629	41.1	1700	28.4
1204	29.6	1275	36.5	1346	31.1	1417	0	1488	0	1559	30.3	1630	41.1	1701	29.2
1205	29.6	1276	38	1347	32.6	1418	0	1489	0	1560	28	1631	40.7	1702	30.3
1206	28.8	1277	39.2	1348	33.8	1419	0	1490	0	1561	24.2	1632	31.9	1703	31.1
1207	26.1	1278	40.7	1349	34.6	1420	0	1491	0	1562	20	1633	23.9	1704	31.1
1208	22.3	1279	42.2	1350	34.9	1421	0	1492	0	1563	16.1	1634	15.9	1705	30.7
1209	19.2	1280	43.4	1351	34.6	1422	0	1493	0	1564	11.5	1635	7.9	1706	31.1
1210	16.5	1281	44.9	1352	34.9	1423	0	1494	0	1565	8.1	1636	2.7	1707	29.6
1211	12.7	1282	45.7	1353	34.6	1424	0	1495	0	1566	5	1637	0.4	1708	29.2
1212	9.6	1283	46.1	1354	34.9	1425	0	1496	0	1567	3.5	1638	0.4	1709	29.2
1213	6.9	1284	46.8	1355	34.9	1426	0	1497	0	1568	1.9	1639	2.7	1710	28.8
1214	4.2	1285	46.5	1356	34.9	1427	0	1498	1.2	1569	0	1640	3.8	1711	28
1215	2.3	1286	46.5	1357	34.2	1428	0	1499	3.5	1570	0	1641	3.8	1712	23
1216	0.8	1287	46.5	1358	33.8	1429	0	1500	7.7	1571	0	1642	1.5	1713	21.1
1217	0	1288	46.1	1359	32.6	1430	0	1501	11.1	1572	0	1643	0	1714	21.5
1218	0	1289	46.1	1360	31.5	1431	0	1502	13.8	1573	0	1644	0	1715	20.7
1219	0	1290	46.1	1361	30	1432	0	1503	16.5	1574	0	1645	0	1716	20.7
1220	0	1291	46.8	1362	28.8	1433	0	1504	18.4	1575	0	1646	0	1717	19.6
1221	0	1292	47.6	1363	27.3	1434	0	1505	20.4	1576	0	1647	0	1718	16.5
1222	0	1293	48	1364	23.8	1435	0	1506	20.7	1577	0	1648	0	1719	13.1
1223	0	1294	48.4	1365	23	1436	0	1507	19.6	1578	1.5	1649	0	1720	9.6
1224	0	1295	48	1366	23	1437	0	1508	17.3	1579	6.9	1650	0	1721	7.3
1225	0	1296	48	1367	22.3	1438	0	1509	12.3	1580	12.7	1651	0	1722	3.8
1226	0	1297	47.2	1368	20.4	1439	0	1510	8.1	1581	16.5	1652	0	1723	0.8
1227	0	1298	46.5	1369	18.8	1440	0	1511	6.1	1582	20	1653	0	1724	0
1228	0	1299	46.8	1370	17.7	1441	0	1512	9.6	1583	23	1654	0	1725	0
1229	0	1300	47.2	1371	16.1	1442	0	1513	12.7	1584	25.7	1655	0	1726	0
1230	0	1301	48.4	1372	14.6	1443	0	1514	15.7	1585	28	1656	0	1727	0
1231	0	1302	48.4	1373	12.7	1444	0	1515	18	1586	30.7	1657	0	1728	0
1232	0	1303	48.8	1374	11.1	1445	0	1516	20.4	1587	32.6	1658	0	1729	0

1233	0	1304	48.4	1375	9.2	1446	0	1517	21.9	1588	34.2	1659	0	1730	0
1234	0	1305	47.6	1376	8.8	1447	0	1518	23.4	1589	35.3	1660	0	1731	0
1235	0	1306	46.5	1377	7.3	1448	0	1519	23.8	1590	36.9	1661	0	1732	0
1236	0	1307	44.2	1378	6.1	1449	0	1520	24.6	1591	36.9	1662	0	1733	0
1237	0	1308	42.2	1379	5	1450	0	1521	25	1592	37.2	1663	0	1734	0
1238	0	1309	41.5	1380	4.2	1451	0	1522	26.1	1593	37.6	1664	0	1735	0
1239	0	1310	41.1	1381	3.5	1452	0	1523	26.1	1594	37.6	1665	0		

State of California
AIR RESOURCES BOARD

CALIFORNIA MOTOR VEHICLE EMISSION CONTROL AND SMOG INDEX LABEL SPECIFICATIONS FOR 1978 THROUGH 2003 MODEL YEAR MOTORCYCLES, LIGHT-, MEDIUM- AND HEAVY-DUTY ENGINES AND VEHICLES

Adopted:	March 1, 1978
Amended:	June 16, 1982
Amended:	April 26, 1984
Amended:	April 8, 1985
Amended:	April 25, 1986
Amended:	June 2, 1988
Amended:	July 21, 1988
Amended:	January 22, 1990
Amended:	May 15, 1990
Amended:	July 12, 1991
Amended	March 24, 1994
Amended:	June 29, 1995
Amended:	June 24, 1996, (as corrected September 20, 1996)
Amended:	February 26, 1999
Amended:	August 5, 1999
Amended:	October 22, 1999
Amended:	November 22, 2000
Amended:	September 5, 2003

Note: The amendments to this document are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions compared to the test procedures adopted November 22, 2000.

As Amended: September 5, 2003
Board Hearing: December 12, 2002

State of California
AIR RESOURCES BOARD

California Motor Vehicle Emission Control and
Smog Index Label Specifications

1. Purpose. The Air Resources Board recognizes that certain emissions-critical or emissions-related parts must be properly identified and maintained in order for vehicles and engines to meet the applicable emission standards. The purpose of these specifications is: (1) to require motor vehicle or motor vehicle engine manufacturers to affix a label (or labels) on each production vehicle in order to provide the vehicle owner and service mechanic with information necessary for the proper maintenance of these parts in customer use and (2) to require that smog index labels be affixed to motor vehicle windows. These Emission Control and Smog Index Label Specifications are incorporated by reference in Section 1965, Title 13, California Code of Regulations.

2. Applicability.

(a) The specifications for tune-up labels, vehicle emission configuration bar-code labels, and vehicle identification number bar-code labels shall apply to all new 1979 through 2003 ~~and subsequent~~ model-year passenger cars, light-duty trucks, medium-duty vehicles, heavy-duty engines, and to all new 1982 through 2003 ~~and subsequent~~ model year motorcycles and motorcycle engines certified to the applicable emission standards pursuant to California Health and Safety Code Sections 43100 and 43107. The "unleaded gasoline only" labeling requirements in section 3.(d) do not apply to 1997 through 2003 ~~and subsequent~~ model year vehicles.

(b) The specifications for smog index labels shall apply to all new passenger cars and light-duty trucks 0-8500 pounds gross vehicle weight. This labeling requirement shall be effective starting with the 1998 model year.

(c) Any vehicles or classes of vehicles exempt from exhaust emission standards pursuant to Title 13 of the California Code of Regulations shall also be exempt from the requirements of these specifications except Zero-Emission Vehicles (ZEVs) certified by the Air Resources Board for use in California.

(d) The responsibility for compliance with these specifications shall rest with the motorcycle, motorcycle engine, light-duty vehicle, medium-duty vehicle, or heavy-duty engine manufacturer who certified such vehicles or engines.

3. Emission Control Labels. A plastic or metal tune-up label, and in accordance with Section b, a machine-readable vehicle emission configuration (VEC) bar-code label made of paper, plastic, metal, or other permanent material, shall be welded, riveted or otherwise permanently attached to an area within the engine compartment (if any) or to the engine in such a

As Amended: September 5, 2003
Board Hearing: December 12, 2002

way that it will be readily visible to the average person after installation of the engine in a vehicle. In accordance with Section b, a machine-readable vehicle identification number (VIN) bar-code label made of paper, plastic, metal, or other permanent material shall be affixed in a readily visible location to either the door-latch post next to the driver's seating position, the door edge that meets this door-latch post, or above the instrument panel in a location clearly visible through the lower left corner of the windshield.

In selecting an acceptable location, the manufacturer shall consider the possibility of accidental damage (e.g., possibility of tools or sharp instruments coming in contact with the label) and accessibility for a bar-code scanner, as applicable. Each label shall be affixed in such a manner that it cannot be removed without destroying or defacing the label, and shall not be affixed to any part which is likely to be replaced during the vehicle's useful life. For motorcycles and motorcycle engines, passenger cars, light-duty trucks, and medium-duty vehicles, the label(s) shall not be affixed to any equipment, which is easily detached from the vehicle.

(a) The tune-up label shall contain the following information lettered in the English language in block letters and numerals which shall be of a color that contrasts with the background of the label:

i. The label heading shall read: “Vehicle Emission Control Information” for passenger cars, light-duty trucks, medium-duty vehicles, motorcycles and motorcycle engines, and “Important Engine Information” for heavy-duty engines.

ii. Full corporate name and trademark of the manufacturer.

iii. For 1993 and subsequent model-year vehicles and engines designed to be capable of operating on fuels other than gasoline, the statement "This _____ _ (specify vehicle or engine, as applicable) is certified to operate on _____ (specify operating fuel[s])."

iv. Engine family or test group identification, model designation, engine displacement (in cubic centimeters or liters), and for all 1993 and subsequent model-year vehicles the statement, "_____ (specify OBD I or OBD II, as applicable) certified" or "OBD Exempt" for all 1990 and subsequent model-year vehicles which do not have an Air Resources Board approved on-board diagnostic system. Motorcycles, motorcycle engines, and ZEVs are exempt from these requirements.

v. Identification of the Exhaust Emission Control System: Abbreviations used shall be in accordance with SAE J1930, JUN 1993, including the following nomenclature unless the Executive Officer approves a more current version of SAE J1930 (ZEVs are exempt from these requirements):

OC - Oxidation Catalyst Only;

	TWC -	Three-Way Catalyst;
	TWC+OC -	Three-Way Catalyst + Oxidation Catalyst;
*	EHOC -	Electrically Heated Oxidation Catalyst;
*	EHTWC -	Electrically Heated Three-Way Catalyst;
	WU-TWC -	Warm-Up Catalyst with Three-Way Catalyst;
	WU-OC -	Warm-Up Catalyst with Oxidation Catalyst;
	AIR -	Secondary Air Injection (Pump);
	PAIR -	Pulsed Secondary Air Injection;
	CAC -	Charge Air Cooler;
	SC -	Supercharger;
	TC -	Turbocharger;
	DFI -	Direct Fuel Injection;
	IFI -	Indirect Diesel Injection;
	CTOX -	Continuous Trap Oxidizer;
	PTOX -	Periodic Trap Oxidizer;
*	FFS -	Flexible Fuel Sensor;
	O2S -	Oxygen Sensor;
	HO2S -	Heated Oxygen Sensor;
	EGR -	Exhaust Gas Recirculation;
	EM -	Engine Modification;
	CFI -	Continuous Fuel Injection;
	MFI -	Multiport (Electronic) Fuel Injection, (Central) Multiport Fuel Injection;
	TBI -	Throttle Body (Electronic) Fuel Injection;
	SFI -	Sequential Multipoint (Electronic) Fuel Injection; and
	SPL -	Smoke Puff Limiter;

* Pending confirmation as SAE protocol

The Executive Officer shall recommend abbreviations for components not listed in SAE J1930, JUN 1993.

vi. For Otto-cycle engines the tune-up specifications and adjustments recommended by the manufacturer, including, if applicable: valve lash, ignition timing, idle air fuel mixture setting procedure and value (e.g., idle CO, idle speed drop), and high idle speed. For diesel engines the specifications and adjustments recommended by the manufacturer, including, if applicable: initial injection timing, and fuel rate (in mm^3/stroke) at advertised horsepower. For the specifications listed above, which are not recommended by the manufacturer for adjustment, the manufacturer shall include in lieu of the "specifications" the single statement "no other adjustments needed." These specifications shall indicate the proper transmission position during tune-up and what accessories, if any (e.g., air conditioner), should be in operation, and what systems, if any (e.g., vacuum advance, air pump), should be disconnected during the tune-up. For all vehicles except ZEVs, the instructions for tune-up adjustments shall be sufficiently clear on the label so as to preclude the need for a mechanic or vehicle owner to refer to another document in order to correctly perform the adjustments. For heavy-duty engines certified under the requirements of Title 13 California Code of Regulations, § 1956.8 (a)(3), the requirements of this subsection (3)(a)(vi) shall be repeated for each of the two fueling modes of operation.

vii. For motorcycles and motorcycle engines only, any specific fuel or engine lubricant requirements (e.g., lead content, research octane number, engine lubricant type).

viii. For heavy-duty engines, the date of engine manufacture (month and year). A manufacturer may, in lieu of printing the month of manufacture on the engine label, maintain a record of the month of engine manufacture. The manufacturer shall submit this record to the Executive Officer upon request.

ix. An unconditional statement of compliance with the appropriate model-year California regulations; for example, "This vehicle (or engine, as applicable) conforms to California regulations applicable to ___ model-year new ____ (for 1992 through 2003 ~~and subsequent~~ model years, specify TLEV, LEV, ULEV, SULEV, or ZEV, as applicable) (specify motorcycles, motorcycle engines, passenger cars, light-duty trucks, medium-duty vehicles, heavy-duty Otto-cycle engines, or heavy-duty diesel engines, as applicable)." For federally certified vehicles certified for sale in California the statement must include the phrase "conforms to U.S. EPA regulations and is certified for sale in California." For Class III motorcycles and motorcycle engines for sale in California, the statement must include the phrase "is certified to ___ HC engine family exhaust emission standard in California." In addition, for Class III motorcycle and motorcycle engines for sale in California that meet the requirements of Section 1958(g) “Early Compliance Credits” (Title 13, CCR), the statement must also include the phrase “is certified to ____ (actual certified engine family exhaust emissions level) gram per kilometer HC+NOx engine family exhaust emissions level.” For incomplete

light-duty truck and incomplete medium-duty vehicles the label shall contain the following statement in lieu of the above:

> "This vehicle conforms to California regulations applicable to ___ model-year new ___ (for 1992 through 2003 ~~and subsequent~~ model years specify LEV, ULEV or SULEV, as applicable) vehicles when completed at a maximum curb weight of ___ pounds and a maximum frontal area of ___ square feet."

For 1994 through 2002 model year heavy heavy-duty diesel engines produced before October 1, 2002, to be used in urban buses that are certified to the optional reduced-emission standards, the label shall contain the following statement in lieu of the above:

> "This engine conforms to California regulations applicable to ___ model year new urban bus engines and is certified to a NOx emission standard of ___ g/bhp-hr (for optional reduced-emission standards specify between 0.5 and 3.5 at 0.5 g/bhp-hr increments for 1994 and 1995 model years and between 0.5 and 2.5 at 0.5 g/bhp-hr increments for 1996 through 2002 model years produced before October 1, 2002)."

For 2002 through 2003 model year heavy heavy-duty diesel-fueled, dual-fuel, and bi-fuel engines, produced beginning October 1, 2002, to be used in urban buses that are certified to the optional reduced-emission standards, the label shall contain the following statement in lieu of the above:

> “This engine conforms to California regulations applicable to ____ model year new urban bus engines and is certified to a NOx plus NMHC optional reduced-emission standard of ____ g/bhp-hr (for optional reduced-emission standards specify between 0.3 and 1.8, inclusive, at 0.3 g/bhp-hr increments, and a particulate matter standard of 0.01 g/bhp-hr).”

~~This statement shall also be used on 2004 through 2006 model year heavy heavy-duty diesel-fueled, dual-fuel, and bi-fuel engines to be used in urban buses that are certified to the optional reduced-emission standards and are sold to any transit agency exempted under paragraphs (c)(8) and (d)(7), section 1956.2, Title 13, CCR, from the requirements of paragraphs (c)(5) and (d)(4), section 1956.2, Title 13, CCR.~~

For 2002 through 2003 ~~2006~~ model year heavy heavy-duty diesel cycle engines produced beginning October 1, 2002, other than diesel-fueled, dual-fuel, and bi-fuel engines, to be used in urban buses that are certified to

the optional reduced-emission standards, the label shall contain the following statement in lieu of the above:

> "This engine conforms to California regulations applicable to____ model year new urban bus engines and is certified to a NOx plus NMHC optional reduced-emission standard of ___ g/bhp-hr (for optional reduced-emission standards specify between 0.3 and 1.8, inclusive, at 0.3 g/bhp-hr increments, and a particulate matter standard 0.03 g/bhp-hr, 0.02 g/bhp-hr, or 0.01 g/bhp-hr)."

For 1995 through 2002 model year heavy-duty engines produced before October 1, 2002,, other than those for use in urban buses, that are certified to the optional reduced-emission standards, the label shall contain the following statement in lieu of the above:

> "This engine conforms to California regulations applicable to ___ model-year new heavy-duty engines, other than those for use in urban buses, and is certified to a NOx emission standard of ___ g/bhp-hr (for optional reduced-emission standards specify between 0.5 and 3.5 at 0.5 g/bhp-hr increments for 1995 through 1997 model-year diesel engines, between 0.5 and 2.5 at 0.5 g/bhp-hr increments for 1998 through 2002 model-year diesel engines produced before October 1, 2002, between 0.5 and 2.5 at 0.5 g/bhp-hr increments for 1995 through 1997 model-year Otto-cycle engines, and between 0.5 and 1.5 at 0.5 g/bhp-hr increments for 1998 and later model year Otto-cycle engines)."

For 2002 through 2003 ~~and later~~ model year heavy-duty diesel engines produced beginning October 1, 2002, other than those for use in urban buses, that are certified to the optional reduced-emission standards, the label shall contain the following statement in lieu of the above:

> "This engine conforms to California regulations applicable to __ model-year new heavy-duty engines and is certified to a NOx plus NMHC optional reduced-emission standard of ___ g/bhp-hr (for optional reduced-emission standards specify between 0.3 and 1.8, inclusive, at 0.3 g/bhp-hr increments, and a particulate matter standards of 0.03 g/bhp-hr, 0.02 g/bhp-hr, or 0.01 g/bhp-hr)."

For heavy-duty diesel engines certified under the requirements of Title 13 California Code of Regulations, § 1956.8 (a)(3), the statement of compliance requirements of this subsection (3)(a)(ix) shall be repeated for each of the two fueling modes of operation. Appended to the statement for the lower emitting fueling model of operation shall be the following sentence:

"This certification is valid only while operating on ___ (indicate the fuel or fuel combination under which this mode of operation was certified) fuel. Operation using any other fueling mode will result in significant increases in exhaust emissions and significantly reduce engine performance."

Manufacturers may elect to use a supplemental label in addition to the original label if there is not sufficient space to include all the required information. The supplemental label must conform to all specifications as the original label. In the case that a supplemental label is used, the original label shall be number "1 of 2" and the supplemental label shall be numbered "2 of 2."

x. For 1985 through 2003 ~~and subsequent~~ model year heavy-duty diesel engines and 1987 through 2003 ~~and subsequent~~ model year heavy-duty Otto-cycle engines, if the manufacturer is provided an alternate useful life period under the provisions of 40 CFR 86.085-21(f), 86.087-21(f), 86.088-21(f), 86.090-21(f), or 86.091-21(f) the prominent statement: "This engine has been certified to meet California standards for a useful life period of ___ years or ___ miles of operation, whichever occurs first. This engine's actual life may vary depending on its service application." The manufacturer may alter this statement only to express the assigned alternate useful life in terms other than years or miles (e.g., hours, or miles only).

xi. For 1985 through 2003 ~~and subsequent~~ model year heavy-duty diesel engines, the prominent statement: "This engine has a primary intended service application as a heavy-duty engine." (The primary intended service applications are light, medium, and heavy, as defined in 40 CFR 86.085-2.)

xii. For 1987 through 2003 ~~and subsequent~~ model year heavy-duty Otto-cycle engines, one of the following prominent statements as applicable:

(1) For engines certified to the emission standards under 40 CFR 86.087-10(a)(1)(I), 86.088-10(a)(1)(I), 86.090- 10(a)(1)(I), 86.090-10(a)(1)(iii), 86.091-10(a)(1)(I), and 86.091-10(a)(1)(iii) the statement: "This engine is certified for use in all heavy-duty vehicles."

(2) For engines certified under the provisions of 40 CFR 86.087-10(a)(3)(I), 86.088-10(a)(3)(I), 86.090- 10(a)(3)(I), 86.090-10(a)(3)(ii), 86.091-10(a)(3)(I), or 86.091-10(a)(3)(ii) the statement, "This engine is certified for use in all heavy-duty vehicles. It is certified to the emission standards applicable to heavy- duty vehicles with a gross vehicle weight rating above 14,000 lbs. and to U.S. EPA regulations applicable in California."

(3) For engines certified to the emission standards under 40 CFR 86.087-10(a)(1)(ii), 86.088-10(a)(1)(ii), 86.090- 10(a)(1)(ii), 86.090-10(a)(1)(iv), 86.091-10(a)(1)(ii), or 86.091-10(a)(1)(iv) the

statement: "This engine is certified for use only in heavy-duty vehicles with a gross vehicle weight rating above 14,000 lbs."

xiii. For 1988 model heavy-duty Otto-cycle engines and vehicles for which nonconformance penalties are to be paid in accordance with 86.1113-87(b), the following prominent statement: "The manufacturer of this engine/vehicle will pay a nonconformance penalty to be allowed to introduce it into commerce at an emission level higher than the applicable emission standard. The compliance level (or new emission standard) for this engine/vehicle is ____." (The manufacturer shall insert the applicable pollutant and compliance level calculated in accordance with 86.1112-87(a).)

(1) The above statement shall be printed on the label required in these specifications or on a separate permanent legible label in the English language and located in proximity to the label required in these specifications. The manufacturer shall begin labeling production engines or vehicles within ten days after the completion of the Production Compliance Audit (PCA).

(2) If a manufacturer introduces an engine or vehicle into commerce prior to the compliance level determination of 86.1112-87(a), it shall provide the engine or vehicle owner with a label as described above to be affixed in a location in proximity to the label required in these specifications within 30 days of the completion of the PCA.

Such statements shall not be used on labels placed on vehicles or engines which, in fact, do not comply with all applicable California regulations, including assembly-line test requirements, if any.

(b) The machine-readable VEC bar code and the machine-readable VIN bar code shall be designed in accordance with SAE standards J1892 (OCT 1993) and SAE J1877 (JUL 1994) as appropriate for the label material. These labeling requirements shall be applicable to 1990 through 2003 ~~and subsequent~~ model-year vehicles and engines except motorcycles, and diesel-fueled vehicles and diesel engines not subject to inspection and maintenance requirements. The Executive Officer may, as necessary, specify new character codes for the VEC label (as part of the "ECS Component Combination" table, Section 4.1.3., SAE J1892 (OCT 1993)) to designate new emission control systems or components as they are introduced for use in motor vehicles subject to the label requirements. For ZEVs, the first eight characters of the VEC bar code label shall be ZZZZZZZZ.

The eighth character of the VEC bar-code label is the code for the Emission Control System (ECS) Combination and the engine ignition frequency. Coding for this character is as follows:

Ignition Frequency	Label Code	Air Injection	EGR	OBD II
One ignition frequency per two engine revolutions	A	none	none	No
	B	yes	none	No
	C	none	yes	No
	D	yes	yes	No
	E	none	none	Yes
	F	yes	none	Yes
	G	none	yes	Yes
	H	yes	yes	Yes
One ignition frequency per one engine revolution	S	none	none	No
	T	yes	none	No
	U	none	yes	No
	V	yes	yes	No
	W	none	none	Yes
	X	yes	none	Yes
	Y	none	yes	Yes
	Z	yes	yes	Yes

The ninth character of the VEC bar-code label is the code for the emission standard to which the vehicle was certified. This character shall apply to all 1998 through 2003 ~~and subsequent~~ model passenger cars, light-duty trucks, medium-duty vehicles and heavy-duty engines. Coding for this character is as follows:

TLEV	A
LEV I	B
LEV II	J
LEV II, Option 1	K
ULEV I	C
ULEV II	P
ZEV	Z
150,000 SULEV	D
150,000 ULEV	E
150,000 LEV	F
SULEV	G
Federally-Certified Vehicles	H
Title 13, CCR, Section 1960.1(f)(2) Vehicles	L
Title 13, CCR, Section 1956.8(a) Vehicles	M
Title 13, CCR, Section 1956.8(c) Vehicles	N

The ninth character shall not be necessary if the sixth character of the VEC bar-code label correctly identifies the California emission standard to which the vehicle is certified.

For label identification, the VEC and VIN labels shall include the heading "VEC" and "VIN", respectively, above the bar coded information. If the VEC or VIN label is incorporated as part of the tune-up label or the federal certification label required pursuant to the Federal Motor Vehicle Safety Regulations No. 567, respectively, or at the location above the instrument panel, no heading shall be required. The heading shall be printed in block letters in the English language and printed pursuant to Section 5 of these procedures.

(c) The tune-up label shall include a vacuum hose routing diagram showing all emissions-related and emissions-critical parts that are actuated by vacuum and the correct routing of vacuum hoses if one or more vacuum hoses are employed. This diagram shall contain no more than two different vacuum hose routing patterns; if there are two routings on a single diagram each routing must be easily understandable. The hose diagram may be separated from the tune- up label provided that the vacuum hose diagram is placed in a visible and accessible position as provided in this section. If a separate label is used, it shall be of a permanent type; however the destruction limits in this section do not apply. ZEVs are exempt from these requirements.

(d) The manufacturer of any vehicle equipped with an emission control device which the Executive Officer has determined will be significantly impaired by the use of leaded gasoline shall:

i. At the time of vehicle manufacture, affix two or more permanent legible labels specifying the appropriate operating fuel(s) (for example "Methanol Fuel or Unleaded Gasoline Only" for fuel-flexible vehicles) as follows:

(1) One label shall be located on the instrument panel so as to be readily visible to the operator of the vehicle: Provided, however, that the required statement may be incorporated into the design of the instrument panel rather than provided on a separate label; and

(2) One label shall be located immediately adjacent to each fuel tank filler inlet, outside of any filler inlet compartment, and shall be located so as to be readily visible to any person introducing fuel to such filler inlet: Provided, however, that the Executive Officer may, upon application from a motor vehicle manufacturer, approve other label locations that achieve the purpose of this paragraph.

(3) Such labels shall be in the English language in block letters which shall be of a color that contrasts with their background.

ii. For purposes of this section a motor vehicle shall be deemed to be equipped with an emission control device which will be significantly impaired by the use of leaded gasoline if any alcohol fuel, unleaded gasoline, or a blend of these fuels

was used in any testing or service accumulation relating to the emission certification of said motor vehicles or engines installed therein.

3.5 Smog Index Labels. A smog index label made of paper or plastic shall be securely affixed in a location specified in section 43200 of the Health and Safety Code. The smog index label shall display the smog index for the vehicle, as specified in subsection 3.5(a) through 3.5(c), and the fleet average smog index, which shall be referred to as "The Smog Index of the average new vehicle." Every model-year, the fleet average smog index shall be updated on the smog index label as specified in subsection 3.5(d). The smog index label shall also include information to inform purchasers of the significance of the smog index. The smog index label shall take the following form for the 1998 - 2000 model years and the form set forth in Appendix A of this document for the 2001 through 2003 ~~and subsequent~~ model years. An alternative label may be used if shown to yield equivalent clarity and if approved in advance by the Executive Officer.

The Smog Index of this vehicle is
0.34
?

0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0... 10.0

Note: The Smog Index (SI) indicates the relative level of pollutants emitted by the vehicle. The lower the SI, the lower the vehicle's emissions.

(a) 1998 Through 2000 Model-Years: The following smog indices shall apply to 1998 through 2000 model-year light-duty vehicles:

	2.0g/ diurnal + hot soak evap. test at 50,000 miles	2.0g/ diurnal + hot soak test, 0.05 g/mi - running loss test, at 100,000 miles	Evap. Exempt
LEV I			
Passenger Car/Light-Duty Truck 1 (0-3750 lbs. LVW)			
Tier 1	1.00	0.70	n/a
TLEV	0.89	0.59	n/a
LEV	0.67	0.37	n/a
ULEV	0.64	0.34	n/a
ZEV	n/a	n/a	0.00
Light-Duty Truck 2 (3751-5750 lbs. LVW)			
Tier 1	1.00	0.77	n/a
TLEV	0.89	0.67	n/a
LEV	0.65	0.43	n/a
ULEV	0.62	0.39	n/a
ZEV	n/a	n/a	0.00

(b) 2001 Through 2003 Model-Years: The following smog indices shall apply to 2001 through 2003 model-year light-duty vehicles:

LEV I[(1)]		
	2.0g/ diurnal + hot soak test, 0.05 g/mi - running loss test, at 100,000 miles	Evap. Exempt
Passenger Car/Light-Duty Truck 1 (0-3750 lbs. LVW)		
Tier 1	1.00	0.90
TLEV	0.83	0.73
LEV	0.48	0.38
ULEV	0.43	0.33
ZEV	n/a	0.00
Light-Duty Truck 2 (3751-5750 lbs. LVW)		
Tier 1	1.51	1.42
TLEV	1.29	1.19
LEV	0.79	0.69
ULEV	0.72	0.63
ZEV	n/a	n/a

[(1)] The smog index for diesel vehicles certifying to Tier 1 standards for passenger cars and light-duty truck 1 shall be 1.82. The smog index for diesel vehicles certifying to Tier 1 standards for light-duty truck 2 shall be 2.64.

LEV II					
	Enhanced Evap. 2.0g/ diurnal + hot soak test, 0.05 g/mi - running loss test, at 100,000 miles	PCs 0.5 g/ diurnal + hot soak test, 0.05 g/mi - running loss test, at 150,000 miles	LDTs < 6,000 lbs. GVW 0.65 g/ diurnal + hot soak test, 0.05 g/mi - running loss test, at 150,000 miles	LDTs 6,001-8,500 lbs. GVW 0.90 g/ diurnal + hot soak test, 0.05 g/mi - running loss test, at 150,000 miles	Evap. Exempt
Passenger Cars; Light-Duty Truck 1 (0-3750 lbs. LVW); Light-Duty Truck 2 (3751 lbs.					
LEV	0.27	0.23	0.24 (0.27)[(1)]	0.24 (0.27)[(1)]	0.17
ULEV	0.22	0.19	0.19	0.20	0.13
SULEV	0.14	0.10	0.11	0.11	0.04
ZEV	n/a	n/a	n/a	n/a	0.00

(1) The smog index in parentheses applies to the optional LEV II LEV standard. Up to 4% of a manufacturer's light-duty truck 2 fleet with a maximum base payload of 2500 lbs may be certified to a standard of 0.07 g/mi NOx at 50,000 miles.

~~(c) 2004 and Subsequent Model-Years:~~

~~The following smog indices shall apply to 2004 and subsequent model-year passenger cars and light-duty trucks 0-8500 lbs. GVW:~~

	~~Enhanced Evap. 2.0g/ diurnal + hot soak test, 0.05 g/mi - running loss test, at 100,000 miles~~	~~PCs 0.5 g/ diurnal + hot soak test, 0.05 g/mi - running loss test, at 150,000 miles~~	~~LDTs < 6,000 lbs. GVW 0.65 g/ diurnal + hot soak test, 0.05 g/mi - running loss test, at 150,000 miles~~	~~LDTs 6,001-8,500 lbs. GVW 0.90 g/ diurnal + hot soak test, 0.05 g/mi - running loss test, at 150,000 miles~~	~~Evap. Exempt~~
~~LEV I~~					
~~Passenger Cars and Light-Duty Truck 1 (0-3750 lbs. LVW)~~					
~~LEV~~	~~1.00~~	~~0.92~~	~~0.93~~	~~0.94~~	~~0.80~~
~~ULEV~~	~~0.90~~	~~0.82~~	~~0.83~~	~~0.84~~	~~0.70~~
~~ZEV~~	~~n/a~~	~~n/a~~	~~n/a~~	~~n/a~~	~~0.00~~
~~Light-Duty Truck 2 (3751-5750 lbs. LVW)~~					
~~LEV~~	~~1.65~~	~~n/a~~	~~1.58~~	~~1.60~~	~~1.45~~
~~ULEV~~	~~1.51~~	~~n/a~~	~~1.44~~	~~1.45~~	~~1.30~~

~~ZEV~~	~~n/a~~	~~n/a~~	~~n/a~~	~~n/a~~	~~0.00~~
~~LEV II~~					
~~Passenger Cars; Light-Duty Truck 1 (0-3750 lbs. LVW); Light-Duty Truck 2 (3751 lbs. LVW - 8500 lbs. GVWR)~~					
~~LEV~~	~~0.57~~	~~0.49~~	~~0.50 (0.55)[(1)]~~	~~0.51 (0.57)[(1)]~~	~~0.36~~
~~ULEV~~	~~0.46~~	~~0.39~~	~~0.40~~	~~0.41~~	~~0.26~~
~~SULE~~	~~0.29~~	~~0.21~~	~~0.22~~	~~0.23~~	~~0.09~~
~~ZEV~~	~~n/a~~	~~n/a~~	~~n/a~~	~~n/a~~	~~0.00~~

~~(1) The smog index in parentheses applies to the optional LEV II LEV standard. Up to 4% of a manufacturer's light-duty truck 2 fleet with a maximum base payload of 2500 lbs may be certified to a standard of 0.07 g/mi NOx at 50,000 miles.~~

(d) Fleet Average Smog Indices: [Editorial Note: The 2004 and subsequent model year fleet average smog indices may be found in the "California Smog Index Label Specifications."]

The following fleet average smog indices shall apply to 2001 through 2003 model-year passenger cars and light-duty trucks 0-5750 lbs. LVW, ~~and 2004 and subsequent model-year passenger cars and light-duty trucks 0-8500 lbs. GVW:~~

2001	2002	2003	~~2004~~	~~2005~~	~~2006~~	~~2007~~	~~2008~~	~~2009~~	~~2010 and subsequent~~
0.53	0.52	0.50	~~1.02~~	~~0.80~~	~~0.58~~	~~0.40~~	~~0.38~~	~~0.37~~	~~0.36~~

4. The provisions of these specifications shall not prevent a manufacturer from also reciting on the label that such vehicle or engine conforms to any applicable federal emission standards for new motor vehicles or new motor vehicle engines or any other information that such manufacturer deems necessary for, or useful to, the proper operation and satisfactory maintenance of the vehicle or engine.

5. As used in these specifications, readily visible to the average person shall mean that the label shall be readable from a distance of eighteen inches (46 centimeters) without any obstructions from vehicle or engine parts (including all manufacturer available optional equipment) except for flexible parts (e.g., vacuum hoses, ignition wires) that can be moved out of the way without disconnection. Alternatively, information required by these specifications to be printed on the label shall be no smaller than 8 point type size provided that no vehicle or engine parts, (including all manufacturer available optional equipment), except for flexible parts, obstruct the label. For the VEC and VIN labels, sufficient clearance shall be provided to use a non-contact bar-code scanner.

6. For the tune-up label and vacuum hose routing diagram label, the labels and any adhesives used shall be designed to withstand, for the vehicle's total expected life, typical vehicle environmental conditions in the area where the label is attached. Typical vehicle environmental conditions shall include, but are not limited to, exposure to engine lubricants and coolants (e.g., gasoline, motor oil, brake fluids, water, ethylene glycol), underhood temperatures, steam cleaning, and paints or paint solvents. The manufacturer shall submit, with its certification application, a statement attesting that its labels comply with this requirement.

VEC and VIN machine-readable labels shall meet the applicable functional test specifications contained in SAE standards J1892 (OCT 1993) and J1877 (JUL 1994).

7. The manufacturer shall obtain approval from the Executive Officer for all emission control label formats and locations prior to use. Approval of the specific tune-up settings is not required; however, the format for all such settings and tolerances, if any, is subject to review. If the Executive Officer finds that the information on the label is vague or subject to misinterpretation, or that the location does not comply with these specifications, he or she may require that the label or its location be modified accordingly.

8. Samples of all actual production emission control labels used within an engine family shall be submitted to the Executive Officer within thirty days after the start of production.

9. The Executive Officer may approve alternate label locations or may, upon request, waive or modify the label content requirements provided that the intent of these specifications is met.

10. If the Executive Officer finds any motor vehicle or motor vehicle engine manufacturer using emission control labels which are different from those approved or which do not substantially comply with the readability or durability requirements set forth in these specifications, the Executive Officer may invoke Section 2109, Title 13, California Code of Regulations.

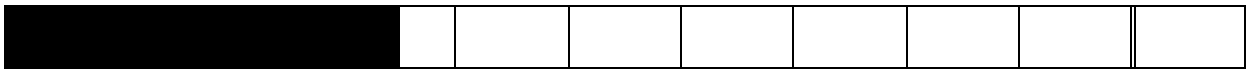
11. The sale and registration in this state of any certified new 1998 through 2003 ~~and subsequent~~ model passenger car or light-duty truck to which a smog index label has not been affixed in accordance with these procedures is prohibited.

APPENDIX A

SMOG EMISSIONS INFORMATION

The Smog Index of this vehicle is 0.34 ?

The Smog Index of the average new vehicle is 0.52 ?



0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0.....3.0

? CLEANER MORE POLLUTING?

Note: The Smog Index (SI) indicates the relative level of smog-forming pollutants emitted by the vehicle. The lower the SI, the lower the vehicle's emissions.

State of California
AIR RESOURCES BOARD

CALIFORNIA SMOG INDEX LABEL SPECIFICATIONS FOR 2004 AND SUBSEQUENT MODEL PASSENGER CARS AND LIGHT-DUTY TRUCKS

Adopted: September 5, 2003

Note: This new document is an abbreviated version of the "California Motor Vehicle Emission Control and Smog Index Label Specifications" (the old Label Specifications document), which has been sunsetted after the 2003 model year. All of the tune-up label requirements in the old Label Specifications document applicable to light-, medium and heavy-duty vehicles and motorcycles are being incorporated into their respective test procedure documents effective with the 2004 model year, making a separate document covering the California tune-up label requirements no longer necessary.

Effective with the 2004 model year, all of the smog index requirements in the old Label Specifications document are being moved to the new document shown here. Paragraph 1of this new document was previously contained in paragraph 11 of the old Label Specifications document; paragraphs 2, 3, and 4 were previously set forth in paragraphs 3.5, 3.5(c), and 3.5(d) respectively of the old Label Specifications document; and Appendix A in this new document is identical to Appendix A in the old Label Specifications document.

As Adopted: September 5, 2003
Board Hearing: December 12, 2002

State of California
AIR RESOURCES BOARD

California Smog Index Label Specifications

1. **Prohibition**. The sale and registration in this state of any certified new 2004 and subsequent model passenger car or light-duty truck to which a smog index label has not been affixed in accordance with these procedures is prohibited.

2. **Requirements**. A smog index label made of paper or plastic shall be securely affixed in a location specified in section 43200 of the Health and Safety Code. The smog index label shall display the smog index for the vehicle, as specified in section 3. below, and the fleet average smog index, which shall be referred to as "The Smog Index of the average new vehicle." Every model-year, the fleet average smog index shall be updated on the smog index label as specified in section 4 below. The smog index label shall also include information to inform purchasers of the significance of the smog index. The smog index label shall take the form set forth in Appendix A of this document. An alternative label may be used if shown to yield equivalent clarity and if approved in advance by the Executive Officer.

3. **Smog Indices**. The following smog indices shall apply to 2004 and subsequent model-year passenger cars and light-duty trucks 0-8500 lbs. GVW:

As Amended: September 5, 2003
Board Hearing: December 12, 2002

	Enhanced Evap. 2.0g/ diurnal + hot soak test, 0.05 g/mi – running loss test, at 100,000 miles	PCs 0.5 g/ diurnal + hot soak test, 0.05 g/mi – running loss test, at 150,000 miles	LDTs < 6,000 lbs. GVW 0.65 g/ diurnal + hot soak test, 0.05 g/mi – running loss test, at 150,000 miles	LDTs 6,001-8,500 lbs. GVW 0.90 g/ diurnal + hot soak test, 0.05 g/mi - running loss test, at 150,000 miles	Evap. Exempt
LEV I					
Passenger Cars and Light-Duty Truck 1 (0-3750 lbs. LVW)					
LEV	1.00	0.92	0.93	0.94	0.80
ULEV	0.90	0.82	0.83	0.84	0.70
ZEV	n/a	n/a	n/a	n/a	0.00
Light-Duty Truck 2 (3751-5750 lbs. LVW)					
LEV	1.65	n/a	1.58	1.60	1.45
ULEV	1.51	n/a	1.44	1.45	1.30
ZEV	n/a	n/a	n/a	n/a	0.00
LEV II					
Passenger Cars; Light-Duty Truck 1 (0-3750 lbs. LVW); Light-Duty Truck 2 (3751 lbs. LVW – 8500 lbs. GVWR)					
LEV	0.57	0.49	0.50 (0.55)[(1)]	0.51 (0.57)[(1)]	0.36
ULEV	0.46	0.39	0.40	0.41	0.26
SULE	0.29	0.21	0.22	0.23	0.09
ZEV	n/a	n/a	n/a	n/a	0.00

[(1)] The smog index in parentheses applies to the optional LEV II LEV standard. Up to 4% of a manufacturer's light-duty truck 2 fleet with a maximum base payload of 2500 lbs. may be certified to a standard of 0.07 g/mi NOx at 50,000 miles.

4. **Fleet Average Smog Indices:**

The following fleet average smog indices shall apply to 2004 and subsequent model-year passenger cars and light-duty trucks 0-8500 lbs. GVW:

2004	2005	2006	2007	2008	2009	2010 and subsequent
1.02	0.80	0.58	0.40	0.38	0.37	0.36

APPENDIX A

SMOG EMISSIONS INFORMATION

The Smog Index of this vehicle is 0.34 ?

The Smog Index of the average new vehicle is 0.52 ?

? CLEANER MORE POLLUTING?

Note: The Smog Index (SI) indicates the relative level of smog-forming pollutants emitted by the vehicle. The lower the SI, the lower the vehicle's emissions.

As Amended: September 5, 2003
Board Hearing: December 12, 2002

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

Note: Amendments to this document are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions compared to the test procedures adopted August 5, 1999.

As Amended: September 5, 2003
Board Hearing: December 12, 2002

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, light-duty trucks and medium-duty vehicles with a gross vehicle weight rating of less than 8,501 lbs. ~~Gaseous fueled vehicles are exempt from meeting these refueling standards.~~ 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" 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 4500 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

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."

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 "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, is 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 ~~and 86.1810-04~~ (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" or the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles."]

1.2 (k) through (n) [No change.]

1.3 (o) and (p) [n/a]

1.4 A manufacturer shall also demonstrate compliance with the fuel spillage test requirements contained in Title 13, California Code of Regulations, §2235, Specifications for Fill Pipes and Openings of Motor Vehicle Fuel Tanks, as last amended January 22, 1990, 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 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 86.1815 (all years).

2. The maximum refueling emissions for 2001 and subsequent model ~~gasoline-fueled, alcohol-fueled, diesel-fueled, fuel-flexible, and hybrid electric~~ 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 gram 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 2.2.(A) is provided in writing and applies for the full useful life of the vehicle.

G. Durability Demonstration procedures for refueling emissions.

[No change from 40 CFR §1825-01 (October 6, 2000).

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," are hereby incorporated by reference herein.

Refueling Test Procedures

86.146-96 Fuel dispensing spitback procedure. ~~March 24, 1993~~. August 23, 1995.
86.150-98 Overview, refueling test. ~~April 6, 1994~~ September 21, 1994.
86.151-98 General requirements; refueling test. April 6, 1994.
86.152-98 Vehicle preparation; refueling test. ~~April 6, 1994~~ August 23, 1995.
86.153-98 Vehicle and canister preconditioning; refueling test. ~~April 6, 1994~~ August 23, 1995.
86.154-98 Measure procedure; refueling test. ~~April 6, 1994~~ August 23, 1995.
86.155-98 Records required; refueling test. April 6, 1994.
86.156-98 Calculations. April 6, 1994.

State of California
AIR RESOURCES BOARD

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

Adopted: August 5, 1999
Amended: June 22, 2006

Note: The amendments to this document are shown in underline to indicate additions and ~~strikeouts~~ to indicate deletions compared to the test procedures as adopted August 5, 1999.

[This document has been reformatted using a 12-point Arial font in order to be consistent with the current formatting practice for Air Resources Board test procedure documents. Consequently, some minor repagination of certain section and subsection headings was necessary. The resulting changes to the "Table of Contents" are indicated using the same method described above.]

TABLE OF CONTENTS

CALIFORNIA EVAPORATIVE 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 A and B (as adopted or amended as of July 1, 1989);~~,~~ ~~and~~ Subpart S (as adopted or amended on May 4, 1999); and, such sections of these Subparts as last amended on such other date set forth next to the 40 CFR Part 86 section title listed below, insofar as those subparts pertain to evaporative emission standards and test procedures, are hereby adopted as the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Years," with the following exceptions and additions:

PART I. GENERAL CERTIFICATION REQUIREMENTS FOR EVAPORATIVE EMISSIONS

A. 40 CFR §86.1801-01 Applicability.

1.1 These evaporative standards and test procedures are applicable to all new 2001 and subsequent model gasoline-, liquefied petroleum- and alcohol-fueled passenger cars, light-duty trucks, medium-duty vehicles, heavy-duty vehicles, hybrid electric vehicles (including fuel-flexible, dual fuel and bi-fuel vehicles) and motorcycles. These standards and test procedures do not apply to motor vehicles that are exempt from exhaust emission certification, dedicated petroleum-fueled diesel vehicles, dedicated compressed natural gas-fueled vehicles, or hybrid electric vehicles that have sealed fuel systems which can be demonstrated to have no evaporative emissions. 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.

1.2. 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," as incorporated by reference in section 1961(d), title 13, California Code of Regulations (CCR), shall apply to light- and medium-duty vehicles; the "California Exhaust Emission Standards and Test Procedures for 1987 and Subsequent Model Heavy-Duty Otto-Cycle Engines and Vehicles," as incorporated by reference in section 1956.8(d), title 13, CCR, shall apply to heavy-duty vehicles; and section 1958, title 13, CCR shall apply to motorcycles, except as otherwise noted in these test procedures.

1.3 Approval of vehicles that are not exhaust emission tested using a chassis dynamometer pursuant to section 1961, title 13, CCR shall be based on an engineering evaluation of the system and data submitted by the applicant.

1.4. Reference to light-duty trucks in the federal CFR shall mean light-duty trucks and medium-duty vehicles. Regulations concerning methanol in the Title 40,

CFR Part 86, shall mean methanol and ethanol, except as otherwise indicated in these test procedures.

1.5 The term "[no change]" means that these test procedures do not modify the applicable federal requirement.

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

B. Definitions, Acronyms

These test procedures incorporate by reference the definitions 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" as incorporated by reference in section 1961(d), title 13, CCR, including the incorporated definitions from the Code of Federal Regulations.

C. Useful Life

1. §86.1805-01. Delete. For vehicles certified to the emission standards in section E.1.(a), "useful life" shall have the same meaning as provided in section 2112, title 13, CCR. For vehicles certified to the emission standards in sections E.1.(c) and (d), the "useful life" shall be 15 years or 150,000 miles, whichever first occurs.

D. General Standards; increase in emissions; unsafe conditions; waivers

1. Light- and Medium-Duty Vehicles.

1.1 Amend §86.1810-01 (December 8, 2005)~~and §86.1810-04~~ as follows:

(a) through (g). [The provisions of these paragraphs are contained in the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger ~~c~~Cars, Light-Duty Trucks and Medium-Duty Vehicles~~.~~," adopted August 5, 1999, as last amended June 22, 2006. "]

(h) For alcohol vehicles, hydrocarbon evaporative emissions shall be expressed as OMHCE.

(i) [No change.]

(j) Evaporative Emissions general provisions.

(1) The evaporative standards in section E. of this part apply equally to certification and in-use vehicles and trucks.

(2) For certification testing only, a manufacturer may conduct testing to quantify a level of stabilized non-fuel evaporative emissions for an individual certification test vehicle. Testing may be conducted on a representative vehicle to determine the non-fuel evaporative emission characteristics of the certification test vehicle. The demonstration must be submitted for advance approval by the Executive Officer and include a description of the sources of vehicle non-fuel evaporative emissions, the methodology for the quantification of the non-fuel emissions, an estimated non-fuel emission decay rate, and the stabilized non-fuel emission level. The demonstrated stabilized level of non-fuel evaporative emissions may be used in place of the test vehicle non-fuel evaporative emissions and be combined with the vehicle fuel evaporative emissions to determine compliance with the evaporative emission standard.

(3) [No change.]

(4) [No change.]

(k) through (n) [The provisions of these paragraphs are contained in the "California Refueling Emission Standards and Test Procedures for 2001 and Subsequent Model Year Motor Vehicles~~.~~," adopted August 5, 1999, as last amended June 22, 2006.

(o) through (p). [The provisions of these paragraphs are contained in 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.]

2. Heavy-Duty Vehicles. Approval of heavy-duty vehicles over 14,000 lbs. GVWR and incomplete medium-duty vehicles shall be based on an engineering evaluation of the system and data submitted by the applicant. Such evaluation may include successful public usage on light-duty or medium-duty vehicles, adequate capacity of storage containers, routing of lines to prevent siphoning, and other emissions-related factors deemed appropriate by the Executive Officer. For LPG systems, this engineering evaluation shall include: emissions from pressure relief valves, carburetion systems and other sources of leakage; emissions due to fuel system wear and aging, and evaporative emission test data from light-duty or medium-duty vehicles with comparable systems.

E. Emission Standards

1. Evaporative Emission Standards for 2001 and Subsequent Model Year Vehicles Other Than Motorcycles.

(a) For the 2001 through 2005 model year vehicles identified below, tested in accordance with the test procedure sequence set forth in Part III, the maximum projected total hydrocarbon evaporative emissions are:

Class of Vehicle	Running Loss (grams per mile)	Three-Day Diurnal + Hot Soak (grams per test)	Two-Day Diurnal + Hot Soak (grams per test)
Passenger Cars, Light-Duty Trucks	0.05	2.0	2.5
Medium-Duty Vehicles (6,001 - 8,500 lbs. GVWR)			
with fuel tanks < 30 gallons	0.05	2.0	2.5
with fuel tanks ≥ 30 gallons	0.05	2.5	3.0
Medium-Duty Vehicles (8,501 - 14,000 lbs. GVWR)	0.05	3.0 (1)	3.5
	0.05	2.0 (2)	3.5
Heavy-Duty Vehicles (over 14,000 lbs. GVWR)	0.05	2.0	4.5
Hybrid Electric PCs, LDTs and MDVs	0.05	2.0	2.5

(1) The standards in this row apply to medium-duty vehicles certified according to the exhaust standards in section 1961, title 13, CCR.

(2) The standards in this row apply to incomplete medium-duty vehicles certifying to the exhaust standards in section 1956.8, title 13, CCR.

(b) Zero emission vehicles shall produce zero fuel evaporative emissions under any and all possible operational modes and conditions.

(c) The optional zero-fuel evaporative emission standards for the three-day and two-day diurnal-plus-hot-soak tests are 0.35 grams per test for passenger cars, 0.50 grams per test for light-duty trucks 6,000 lbs. GVWR and under, and 0.75 grams per test for light-duty trucks from 6,001 to 8,500 lbs. GVWR, to account for vehicle non-fuel evaporative emissions (resulting from paints, upholstery, tires, and other vehicle sources). Vehicles demonstrating compliance with these evaporative emission standards shall also have zero (0.0) grams of fuel evaporative emissions per test for the three-day and two-day diurnal-plus-hot-soak tests. The "useful life" shall be 15 years or 150,000 miles, whichever occurs first. In lieu of demonstrating compliance with the zero (0.0) grams of fuel evaporative emissions per test over the three-day and two-day diurnal-plus-hot-soak tests, the manufacturer may submit for advance Executive Officer approval a test plan to demonstrate that the vehicle has zero (0.0) grams of fuel evaporative emissions throughout its useful life.

Additionally, in the case of a SULEV vehicle for which a manufacturer is seeking a partial ZEV credit, the manufacturer may prior to certification elect to have measured fuel evaporative emissions reduced by a specified value in all certification and in-use testing of the vehicle as long as measured mass exhaust emissions of NMOG for the vehicle are increased in all certification and in-use testing. The measured fuel evaporative emissions shall be reduced in increments of 0.1 gram per test, and the measured mass exhaust emissions of NMOG from the vehicle shall be increased by a gram per mile factor, to be determined by the Executive Officer, for every 0.1 gram per test by which the measured fuel evaporative emissions are reduced. For the purpose of this calculation, the evaporative emissions shall be measured, in grams per test, to a minimum of three significant figures.

(d) For the 2004 and subsequent model motor vehicles identified below, tested in accordance with the test procedure sequence set forth in Part III, the maximum projected total hydrocarbon evaporative emissions are:

Vehicle Type	Hydrocarbon Standards[1][2]		
	Running Loss (grams per mile)	Three-Day Diurnal + Hot Soak (grams per test)	Two-Day Diurnal + Hot Soak (grams per test)
Passenger Cars	0.05	0.50	0.65
Light-Duty Trucks (under 8,501 lbs. GVWR)			
6,000 lbs. GVWR and under	0.05	0.65	0.85
6,001 - 8,500 lbs. GVWR	0.05	0.90	1.15
Medium-Duty Vehicles			

(8,501 - 14,000 lbs. GVWR)	0.05	1.00	1.25
Heavy-Duty Vehicles (over 14,000 lbs. GVWR)	0.05	1.00	1.25

(1) (a) These evaporative emission standards shall be phased-in beginning with the 2004 model year. Each manufacturer, except small volume manufacturers, shall certify at a minimum the specified percentage of its vehicle fleet to the evaporative emission standards in this table or the optional zero-evaporative emission standards in section E.1.(c) according to the schedule set forth below. For purposes of this paragraph (a), each manufacturer's vehicle fleet consists of the total projected California sales of the manufacturer's gasoline-fueled, liquefied petroleum-fueled and alcohol-fueled passenger cars, light-duty trucks, medium-duty vehicles, and heavy-duty vehicles.

Model Year	*Minimum Percentage of Vehicles Certified to the Standards in Sections E.1.(c) and E.1.(d)*
2004	40
2005	80
2006 and subsequent	100

A small volume manufacturer shall certify 100 percent of its 2006 and subsequent model vehicle fleet to the evaporative emission standards in the table or the optional zero-evaporative emission standards in section E.1.(c).

All 2004 through 2005 model-year motor vehicles which are not subject to these standards or the standards in section E.1.(c) pursuant to the phase-in schedule shall comply with the requirements of sections section E.1.(a).

(b) A manufacturer may use an "Alternative or Equivalent Phase-in Schedule" to comply with the phase-in requirements. An "Alternative Phase-in" is one that achieves at least equivalent emission reductions by the end of the last model year of the scheduled phase-in. Model-year emission reductions shall be calculated by multiplying the percent of vehicles (based on the manufacturer's projected California sales volume of the applicable vehicle fleet) meeting the new requirements per model year by the number of model years implemented prior to and including the last model year of the scheduled phase-in. The "cumulative total" is the summation of the model-year emission reductions (e.g., the three model-year 40/80/100 percent phase-in schedule would be calculated as: (40%*3 years) + (80%*2 years) + (100%*1 year) =380). The required cumulative total for the phase-in of these standards is 380 emission reductions. Any alternative phase-in that results in an equal or larger cumulative total than the required cumulative total by the end of the last model year of the scheduled phase-in shall be considered acceptable by the Executive Officer only if all vehicles subject to the phase-in comply with the respective requirements in the last model year of the required phase-in schedule. A manufacturer shall be allowed to include vehicles introduced before the first model year of the scheduled phase-in (e.g., in the previous example, 10 percent introduced one year

before the scheduled phase-in begins would be calculated as: (10%*4 years)=40) and added to the cumulative total.

(c) These evaporative emission standards do not apply to zero-emission vehicles.

(2) In-use compliance whole vehicle testing shall not begin until the motor vehicle is at least one year from the production date and has accumulated a minimum of 10,000 miles. For vehicles introduced prior to the 2007 model year, in-use compliance standards of 1.75 times the "Three-Day Diurnal + Hot-Soak" and "Two-Day Diurnal + Hot-Soak" gram per test standards shall apply for only the first three model years of an evaporative family certified to a new standard.

2. Evaporative Emission Standards for 2001 and Subsequent Model Year Motorcycles. The maximum projected evaporative emission standards for 2001 and subsequent model gasoline-fueled motorcycles are:

Motorcycle Class	Hydrocarbons (grams per test)
Class I and Class II (50-279 cc)	2.0
Class III (280 cc and greater)	2.0

PART II. DURABILITY DEMONSTRATION

A. Light- and Medium-Duty Vehicles

1. Evaporative/refueling emission family determination. §86.1821-01 [No change.]

2. Durability Demonstration Procedures for Evaporative Emissions

2.1. §86.1824-01 Amend as follows:

(a) and (b) Delete.
(c) [No change.]
(d) Delete.
(e) [No change.]

2.2. For all passenger cars, light-duty trucks and chassis-certified medium-duty vehicles subject to the standards specified in section I.E of these test procedures, demonstration of system durability and determination of three-day diurnal plus hot soak, two-day diurnal plus hot soak, and running loss emission deterioration factors ("evaporative DFs") for each evaporative/refueling family shall be based on tests of representative vehicles and/or systems. For purposes of evaporative emission durability testing, a representative vehicle is one which, with the possible exception of the engine and drive train, was built at least three months prior to the commencement of evaporative emission testing, or is one which the manufacturer demonstrates has stabilized non-fuel-related evaporative emissions.

2.3. Prior to commencement of a durability program, the manufacturer shall propose a method for durability testing and for determination of evaporative DFs for each evaporative/refueling family. The 4,000 and full useful life mile test points (or their equivalent) used in determining a DF must be within the standards of section I.E or data will not be acceptable for use in the calculation of a DF. A manufacturer is not required to obtain a new approval to use a previously approved evaporative emission durability procedure. The Executive Officer shall review the method, and shall approve it if it meets the following requirements:

2.3.1. The method must cycle and test the complete evaporative emission control system for the equivalent of the applicable vehicle useful life (i.e., 100,000 or 120,000 miles) of typical customer use.

2.3.2 The method must reflect the flow of liquid and gaseous fuel through the evaporative emission control system, and the exposure (both peak and cyclical) to heat, vibration, and ozone expected based on typical customer use through the applicable useful life.

2.3.3 The method must have the specifications for acceptable system performance, including maximum allowable leakage based on typical customer use through the applicable vehicle useful life.

2.4 (a) In addition to the requirements of subparagraph 2.3. above, for evaporative/refueling families subject to testing for exhaust emission durability, at least one evaporative emission test shall be conducted at 5,000, 40,000, 70,000, and 100,000 mile test points for all passenger car, and light-duty truck durability vehicles and at 5,000, 40,000, 70,000, 90,000, and 120,000 mile test points for all medium-duty durability vehicles. With prior written approval from the Executive Officer, manufacturers may terminate evaporative emissions testing at the mileage corresponding to 75 percent of the vehicle's useful life if no significant vehicle maintenance or emissions change are observed. Testing may be performed at different intervals as determined by the manufacturer using good engineering judgment. Evaporative emission testing may be performed at corresponding exhaust emission mileage points as set forth in Section F.4 (40 CFR §86.1823) of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles," as incorporated by reference in §1961(d), title 13, CCR. The 4,000 and full useful life mile test points (or their equivalent) used in determining a DF must be within the standards of section I.E. or data will not be acceptable for use in the calculation of a DF.

(b) For evaporative families subject to the requirements of subparagraph 2.4(a), manufacturers may demonstrate compliance by conducting an exhaust and evaporative emission test sequence at the end of the useful life of the exhaust durability data vehicle if the procedure set forth in subparagraph 2.3 includes on-road, useful life deterioration on the evaporative test vehicle. The evaporative test vehicle used to meet the criteria in subparagraph 2.3 must be deteriorated based on typical customer use throughout the applicable useful life. The manufacturer may perform unscheduled maintenance on the evaporative test vehicle at the final test point only upon prior Executive Officer approval, which shall be granted if the Executive Officer determines that the exhaust emission control system will not be affected, and the manufacturer demonstrates that the effectiveness of the evaporative emission control system is not diminished. The unscheduled maintenance must be conducted in accordance with 40 CFR §86.1834-01 as amended by the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles," as incorporated by reference in §1961(d), title 13, CCR.

2.5 The evaporative DFs determined under subparagraph 2.4, if any, shall be averaged with the evaporative DFs determined under subparagraph 2.3 to determine a single evaporative DF for each evaporative/refueling family. Evaporative DFs shall be generated for the running loss test and for the hot soak and the diurnal test in the three-day diurnal sequence, and for the hot soak and the diurnal test in the two-day diurnal sequence. The manufacturer may carry-across the DF generated in the three-day diurnal sequence to the two-day diurnal sequence if the manufacturer can demonstrate

that the DF generated in the three-day diurnal sequence is at least as great as the DF generated in the two-day diurnal sequence.

3. Assigned DFs

3.1. §86.1826-01. [No change.]

3.2 Any manufacturer may request to certify evaporative/refueling families using assigned DFs for a combined total of 4,500 projected annual California sales of passenger cars, light-duty trucks, medium-duty vehicles, and heavy-duty engines per manufacturer regardless of total sales.

3.3 Assigned DFs shall be used only where specific evaporative durability data do not exist. Assigned DFs shall be used in lieu of data from durability vehicle(s) only when a manufacturer demonstrates that it has control over design specifications, can provide development data, has in-house testing capabilities including accelerated aging of components/systems, and has evaluation criteria to ensure emission control system (ECS) durability for the vehicle's useful life. The applying manufacturer must demonstrate that evaporative emission control system(s) developed or adapted for the particular vehicle will be durable and comply with the applicable emission standards for the vehicle's useful life. In evaluating any information provided, all relevant test data and design factors shall be considered, including but not limited to: canister nominal working capacity and location, purge strategy, method of purge control, fuel tank capacity, variables affecting fuel temperature (use of fuel return, material, shape of fuel tank, distance of fuel tank from road surface and distance from exhaust pipe, total underbody airflow), fuel and vapor hose materials, use of sensors and auxiliary control devices, technical comparison to an evaporative emission control system and the durability of any evaporative emission control system components that may have been used in other vehicle applications. The assigned DFs shall be applied only to entire evaporative/refueling families.

If emission control parts from other certified vehicles are utilized, then parameter comparisons of the above data must also be provided including part numbers where applicable. Evaporative emission control durability may include special in-house specifications.

3.4 The criteria for evaluating assigned DFs for evaporative/refueling families are the same as those for exhaust families. However, in determining evaporative/refueling family DFs these test procedures require that an evaporative family DF be determined by averaging DFs obtained from durability vehicle testing and from bench testing. Therefore, if a manufacturer meets the criteria as specified above, the Executive Officer may grant assigned DFs for either (or both) the durability vehicle DF or the bench DF.

3.5 Assigned DFs for bench test requirements do not depend upon the 4,500 maximum sales limit. The assigned bench DF is applicable only to evaporative emission control systems which are similar to those used by the manufacturer for 1998 or later model-year vehicles and where an evaporative DF was determined.

4. Emission Data Vehicle Selection

4.1. §86.1828-01 [No change.]

4.2. In selecting medium-duty test vehicles, the Executive Officer shall consider the availability of test data from comparably equipped light-duty vehicles and the size of medium-duty vehicles as it relates to the practicability of evaporative emission testing.

5. Durability and Emission Testing Requirements~~.~~; waivers ~~§86.1829-01 [No change.]~~

5.1. §86.1829-01 (December 8, 2005). [No change, except as otherwise noted.]

5.2. References to the "EPA" shall mean the Executive Officer of the Air Resources Board.

5.3. The optional provision for a manufacturer to provide a statement of compliance in lieu of a demonstration of compliance with the supplemental two-day diurnal plus hot soak emission standard for certification purposes, as contained in §86.1829-01(b)(2)(iii), shall be applicable to gasoline- and ethanol-fueled passenger cars, light-duty trucks, and medium-duty vehicles, including hybrid electric, fuel-flexible, dual fuel, and bi-fuel vehicles. Heavy-duty vehicles over 14,000 lbs. GVWR and incomplete medium-duty vehicles shall comply with the requirements of section I.D.2.

B. Motorcycles

1. Durability Requirements. Certification of a motorcycle evaporative emission control system requires that the manufacturer demonstrate the durability of each evaporative emission control system family.

1.1 The motorcycle manufacturer can satisfy the vehicle durability testing requirements by performing an evaporative emission test at each scheduled exhaust emission test (40 CFR §86.427-78) during the motorcycle exhaust emission certification test (40 CFR §86.425-78) for each evaporative emission family. The minimum mileage accumulated shall be the total distance (one-half the useful life distance), although the manufacturer may choose to extend the durability test to the useful life distance (40 CFR §86.436-78). The displacement classes and test distances are shown below:

Displacement Class	Engine Displacement Range (cc)	Total Test Distance (km)	Useful Life Distance (km)
I	50-169	6,000	12,000
II	170-279	9,000	18,000
III	280 and greater	15,000	30,000

(i) All durability vehicles shall be built at least one month before the evaporative emissions test, or the manufacturer must demonstrate that the non-fuel related evaporative emissions have stabilized.

(ii) Testing at more frequent intervals than the scheduled exhaust emissions tests may be performed only when authorized in writing by the Executive Officer.

(iii) The DF shall be determined by calculating a least-squares linear regression of the evaporative emissions data with respect to mileage. The DF is defined as the extrapolated (from the regression) value at the useful life distance minus the interpolated value at the total test distance, where these distances are taken from the table in paragraph 1.1, above.

(iv) The extrapolated useful life and total test distance emissions shall be less than the applicable evaporative emission standards of section I.E.2 or the data will not be acceptable for use in the calculation of a DF and demonstration of compliance.

(v) Motorcycle manufacturers may use the ARB Component Bench Test Procedures or propose in their application a method for durability bench testing and determination of a DF for each evaporative family. The Executive Officer shall review the method, and shall approve it if it is similar to the requirements specified below. Any reference to 4,000 miles and 50,000 miles shall mean total test distance and useful life distance, respectively, as defined in paragraph II.B.1.1 for the appropriate engine displacement class.

The manufacturer shall propose in its preliminary application for certification a method for durability testing and for determination of a DF for each evaporative family. The 4,000 and 50,000 mile test points (or their equivalent) used in determining the DF must be within the standards of II.B1.1. or data will not be acceptable for use in the calculation of a DF. The Executive Officer shall review the method, and shall approve it if it meets the following requirements:

(A) The method must cycle and test the complete evaporative emission control system for the equivalent of at least 50,000 miles of typical customer use.

(B) The method must reflect the flow of liquid and gaseous fuel through the evaporative emission control system, and the exposure (both peak and cyclical) to heat, vibration, and ozone expected through 50,000 miles of typical customer use.

(C) The method must have the specifications for acceptable system performance, including maximum allowable leakage after 50,000 miles of typical customer use.

(vi) The DF determined under paragraph II.B.1.1(iii) shall be averaged with the DF determined under paragraph II.B.1.1(v) to determine a single evaporative emission DF for each evaporative family. For those motorcycles that do not require exhaust emission control system durability testing, the evaporative emission control system DF shall be determined under paragraph II.B.1.1(v) only. Compliance with the standard shall be demonstrated by performing an evaporative emission test on a stabilized motorcycle. The motorcycle shall have accumulated at least the minimum test distance. The extrapolated useful life distance emissions after applying the bench test-derived DF shall be less than the applicable evaporative emission standards of paragraph I.E.2.

(vii) (A) Manufacturers of Class III motorcycles may elect to use an assigned evaporative emission control system DF, provided they meet the following requirements:

- Annual California motorcycle sales do not exceed 500 units, and

- The evaporative emission control system has been previously certified to meet the emission standards specified in these procedures, or the manufacturer provides test data from previous certification demonstrating that the system complies with the durability requirements set forth in this paragraph.

(B) Manufacturers of Class III motorcycles using an assigned evaporative emission control system DF pursuant to paragraph II.B.1.1(vii)(A) may submit a written request for a waiver of evaporative emission testing. The waiver shall be granted if the Executive Officer determines that the motorcycles will comply with the evaporative emission standard. The determination shall be based on the performance of the evaporative emission control system on other motorcycles, the capacity of vapor storage containers, the routing of lines to prevent siphoning, and other emission-related factors determined by the Executive Officer to be relevant to evaluation of the waiver request.

(C) Nothing in this paragraph shall be construed as an exemption from the exhaust emission standards and test procedures applicable pursuant to section 1958, title 13, CCR or paragraph IV.4.(ii) of these test procedures.

(viii) The emission label (40 CFR §86.413-78) shall identify the evaporative emission family.

1.2 Motorcycle manufacturers with annual sales of less than 2,000 units for the three displacement classes in California are not required to submit the information specified by these test procedures to the Executive Officer. However, all information required by these test procedures must be retained on file and be made available on request to the Executive Officer for inspection. These manufacturers shall submit the following information for evaporative emission certification:

(i) A brief description of the vehicles to be covered by the Executive Order. (The manufacturer's sales data book or advertising, including specifications, will satisfy this requirement for most manufacturers.)

(ii) A statement signed by an authorized representative of the manufacturer stating "The vehicles described herein have been tested in accordance with the provisions of the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles," and on the basis of those tests, are in conformance with the aforementioned standards and test procedures."

1.3 The definitions for motorcycle evaporative emission families as set forth in EPA's MSAPC Advisory Circular No. 59, section D shall apply.

PART III. EVAPORATIVE EMISSION TEST PROCEDURES FOR LIGHT- AND MEDIUM-DUTY VEHICLES

A. Instrumentation

The instrumentation necessary to perform evaporative emission testing is described in 40 CFR 86.107-90. The following language is applicable in lieu of 40 CFR §86.107-90(a)(1):

1. Diurnal Evaporative Emission Measurement Enclosure

1.1 The diurnal evaporative emissions measurement enclosure shall be equipped with an internal blower or blowers coupled with an air temperature management system (typically air to water heat exchangers and associated programmable temperature controls) to provide for air mixing and temperature control. The blower(s) shall provide a nominal total flow rate of 0.8 ± 0.2 ft^3/min per ft^3 of the nominal enclosure volume, V_n. The inlets and outlets of the air circulation blower(s) shall be configured to provide a well dispersed air circulation pattern that produces effective internal mixing and avoids significant temperature or hydrocarbon and alcohol stratification. The discharge and intake air diffusers in the enclosure shall be configured and adjusted to eliminate localized high air velocities which could produce non-representative heat transfer rates between the vehicle fuel tank(s) and the air in the enclosure. The air circulation blower(s), plus any additional blowers if needed, shall also maintain a minimum wind speed of 5 mph under the fuel tank of the test vehicle. The Executive Officer may adjust wind speed and location to ensure sufficient air circulation around the fuel tank. The wind speed requirement may be satisfied by consistently using a blower configuration that has been demonstrated to meet a broad 5-mph air flow in the vicinity of the vehicle's fuel tank, subject to verification by the Executive Officer.

The enclosure temperature shall be taken with thermocouples located 3 feet above the floor of the approximate mid-length of each side wall of the enclosure and within 3 to 12 inches of each side wall and with a thermocouple located underneath the vehicle where it would provide a temperature measurement representative of the temperature of the air under the fuel tank. The temperature conditioning system shall be capable of controlling the internal enclosure air temperature to follow the prescribed temperature versus time cycle as specified in 40 CFR §86.133-90 as modified by paragraph III.D.10 (diurnal breathing loss test) of these procedures within an instantaneous tolerance of ± 3.0°F and an average tolerance of ± 2.0°F as measured by the vehicle underbody thermocouple, and within an instantaneous tolerance of ± 5.0°F as measured by the side wall thermocouples. The control system shall be tuned to provide a smooth temperature pattern which has a minimum of overshoot, hunting, and instability about the desired long term temperature profile.

1.2 The enclosure shall be of sufficient size to contain the test vehicle with personnel access space. It shall use materials on its interior surfaces which do not adsorb or desorb hydrocarbons, or alcohols (if the enclosure is used for alcohol-fueled vehicles). The enclosure shall be insulated to enable the test temperature profile to be achieved with a heating/cooling system which has minimum surface temperatures in the enclosure no less than 25.0^{o}F below the minimum diurnal temperature specification. The enclosure shall be equipped with a pressure transducer with an accuracy and precision of ± 0.1 inches H_2O. The enclosure shall be constructed with a minimum number of seams and joints which provide potential leakage paths. Particular attention shall be given to sealing and gasketing of such seams and joints to prevent leakage.

1.3 The enclosure shall be equipped with features which provide for the effective enclosure volume to expand and contract in response to both the temperature changes of the air mass in the enclosure, and any fluctuations in the ambient barometric pressure during the duration of the test. Either a variable volume enclosure or a fixed volume enclosure may be used for diurnal emission testing.

1.3.1 The variable volume enclosure shall have the capability of latching or otherwise constraining the enclosed volume to a known, fixed value, V_n. The V_n shall be determined by measuring all pertinent dimensions of the enclosure in its latched configuration, including internal fixtures, based on a temperature of 84^{o}F, to an accuracy of ± 1/8 inch (0.5 cm) and calculating the net V_n to the nearest 1 ft^3. In addition, V_n shall be measured based on a temperature of 65^{o}F and 105^{o}F. The latching system shall provide a fixed volume with an accuracy and repeatability of $0.005xV_n$. Two potential means of providing the volume accommodation capabilities are a moveable ceiling which is joined to the enclosure walls with a flexure; or a flexible bag or bags of Tedlar or other suitable materials which are installed in the enclosure and provided with flowpaths which communicate with the ambient air outside the enclosure. By moving air into and out of the bag(s), the contained volume can be adjusted dynamically. The total enclosure volume accommodation shall be sufficient to balance the volume changes produced by the difference between the extreme enclosure temperatures and the ambient laboratory temperature with the addition of a superimposed barometric pressure change of 0.8 in. Hg. A minimum total volume accommodation range of $\pm 0.07xV_n$ shall be used. The action of the enclosure volume accommodation system shall limit the differential between the enclosure internal pressure and the external ambient barometric pressure to a maximum value of ± 2.0 inches H_2O.

1.3.2 The fixed volume enclosure shall be constructed with rigid panels that maintain a fixed enclosure volume, which shall be referred to as V_n. V_n shall be determined by measuring all pertinent dimensions of the enclosure including internal fixtures to an accuracy of ± 1/8 inch (0.5 cm) and calculating the net V_n to the nearest 1 ft^3. The enclosure shall be equipped with an outlet flow stream that withdraws air at a low, constant rate and provides makeup air as needed, or by reversing the flow of air into and out of the enclosure in response to rising or falling temperatures. If inlet air is

added continuously throughout the test, it must be filtered with activated carbon to provide a relatively constant hydrocarbon and alcohol level. Any method of volume accommodation shall maintain the differential between the enclosure internal pressure and the barometric pressure to a maximum value of ±2.0 inches of water. The equipment shall be capable of measuring the mass of hydrocarbon, and alcohol (if the enclosure is used for alcohol-fueled vehicles) in the inlet and outlet flow streams with a resolution of 0.01 gram. A bag sampling system may be used to collect a proportional sample of the air withdrawn from and admitted to the enclosure. Alternatively, the inlet and outlet flow streams may be continuously analyzed using an on-line Flame Ionization Detector (FID) analyzer and integrated with the flow measurements to provide a continuous record of the mass hydrocarbon and alcohol removal.

1.4. An online computer system or stripchart recorder shall be used to record the following parameters during the diurnal evaporative emissions test sequence:

-Enclosure internal air temperature
-Diurnal ambient air temperature specified profile as defined in 40 CFR §86.133-90 as modified in paragraph III.D.10 (diurnal breathing loss test).
-Vehicle fuel tank liquid temperature
-Enclosure internal pressure
-Enclosure temperature control system surface temperature(s)
-FID output voltage recording the following parameters for each sample analysis:

-zero gas and span gas adjustments
-zero gas reading
-enclosure sample reading
-zero gas and span gas readings

The data recording system shall have a time resolution of 30 seconds and shall provide a permanent record in either magnetic, electronic or paper media of the above parameters for the duration of the test.

1.5 Other equipment configurations may be used if approved in advance by the Executive Officer. The Executive Officer shall approve alternative equipment configurations if the manufacturer demonstrates that the equipment will yield test results equivalent to those resulting from use of the specified equipment.

2. Running Loss Measurement Facility

2.1 For all types of running loss measurement test facilities, the following shall apply:

2.1.1. The measurement of vehicle running loss fuel vapor emissions shall be conducted in a test facility which is maintained at a nominal ambient temperature of

105.0^{o}F. Manufacturers have the option to perform running loss testing in either an enclosure incorporating atmospheric sampling equipment, or in a cell utilizing point source sampling equipment. Confirmatory testing or in-use compliance testing may be conducted by the Executive Officer using either sampling procedure. The test facility shall have space for personnel access to all sides of the vehicle and shall be equipped with the following test equipment:

-A chassis dynamometer which meets the requirements of 40 CFR §86.108-00 with the following addition to §86.108-00(d):

Another dynamometer configuration may be used for running loss testing if approved in advance by the Executive Officer based on a demonstration that measured running loss emissions are equivalent to the emissions using the single-roll electric dynamometer described in 86.108-00(b)(2).

-A fuel tank temperature management system which meets the requirements specified in 2.1.3 of this paragraph.

-A running loss fuel vapor hydrocarbon analyzer which meets the requirements specified in 40 CFR §86.107-90(a)(2)(i) and a running loss fuel vapor alcohol analyzer which meets the requirements specified in 40 CFR §86.107-90(a)(2)(ii).

-A running loss test data recording system which meets the requirements specified in 2.1.4 of this paragraph.

2.1.2. All types of running loss test facilities shall be configured to provide an internal ambient temperature of 105^{o}F ± 5^{o}F maximum and ± 2^{o}F on average throughout the running loss test sequence. This shall be accomplished by any one or combination of the following techniques:

-Using the test facility without artificial cooling and relying on the residual heat in the test vehicle for temperature achievement.

-Adding insulation to the test facility walls.

-Using the test facility artificial cooling system (if so equipped) with the setpoint of the cooling system adjusted to a value not lower than 105.0^{o}F, where the cooling system set point refers to the internal test facility air temperature.

-Using a full range test facility temperature management system with heating and cooling capabilities.

2.1.3. Cell/enclosure temperature management shall be measured at the inlet of the vehicle cooling fan. The vehicle cooling fan shall be a road speed modulated fan which is controlled to a discharge velocity which matches the dynamometer roll speed at least up to 30 mph throughout the driving cycle. The fan outlet may discharge airflow to both the vehicle radiator air inlet(s) and the vehicle underbody. An additional fan, not to exceed 8,000 cfm, may be used to discharge airflow from the front of the vehicle directly to the vehicle underbody to control fuel temperatures.

The fuel tank temperature management system shall be configured and operated to control the fuel tank temperature profile of the test vehicle during the running loss test sequence. The use of a discrete fuel tank temperature management system is not required provided that the existing temperature and airflow conditions in the test facility are sufficient to match the on-road fuel tank liquid (T_{liq}) temperature profile of the test vehicle within a tolerance of ± 3.0°F throughout the running loss driving cycle, and, if applicable, the fuel tank vapor (T_{vap}) temperature profile of the test vehicle within a tolerance of ± 5°F throughout the running loss driving cycle and ± 3.0°F during the final 120 second idle period of the test. The system shall provide a ducted air flow directed at the vehicle fuel tank which can be adjusted in flow rate and/or temperature of the discharge air to manage the fuel tank temperature. The system shall monitor the vehicle fuel tank temperature sensors located in the tank according to the specifications in paragraph III.C.1 (40 CFR §86.129-80) during the running loss drive cycle. The measured temperature shall be compared to a reference on-road profile for the same platform/powertrain/fuel tank combination developed according to the procedures in section III.C.1 (40 CFR §86.129-80). The system shall adjust the discharge flow and/or temperature of the outlet duct to maintain the tank liquid temperature profile within ± 3.0°F of the reference on-road liquid temperature profile throughout the test. If applicable, the vapor temperature shall match the reference on-road vapor temperature profile within ± 5.0°F throughout the test and ± 3.0°F during the final 120 second idle period. The system shall be designed to avoid heating or cooling of the fuel tank vapor space in a way that would cause vapor temperature behavior to be unrepresentative of the vehicle's on-road vapor profile. The system shall provide a discharge airflow up to 4,000 cfm. With advance Executive Officer approval, the system may provide a discharge airflow with a maximum of 6,000 cfm.

Blowers or fans shall be used to mix the enclosure contents during evaporative emission testing. The blowers or fans shall have a total capacity of at least 1.0 ft^3/min per ft^3 of -V_n. The inlets and outlets of the air circulation blower(s) shall be configured to provide a well dispersed air circulation pattern that produces effective internal mixing and avoids significant temperature or hydrocarbon and alcohol stratification.

The temperature of the air supplied to the outlet duct shall be within a range of 90°F to 160°F for systems which utilize artificial heating and/or cooling of the air supply to the outlet duct. This requirement does not apply to systems which recirculate air from inside the test cell without temperature conditioning the airflow. The control system shall be tuned and operated to provide a smooth and continuous fuel tank temperature profile which is representative of the on-road temperature profile.

Direct fuel heating may be used to control fuel temperatures for vehicles under exceptional circumstances in which airflow alone is insufficient to control fuel temperatures. The heating system must not cause hot spots on the tank wetted surface that could cause local overheating of the fuel. Heat must not be applied to the vapor in the tank above the liquid fuel, nor near the liquid-vapor interface.

2.1.4. An on-line computer system or strip-chart recorder shall be used to record the following parameters during the running loss test sequence:

-Cell/enclosure ambient temperature
-Vehicle fuel tank liquid (T_{liq}) and, if applicable, vapor space (T_{vap}) temperatures
-Vehicle coolant temperature
-Vehicle fuel tank headspace pressure
-Reference on-road fuel tank temperature profile developed according to paragraph III.C.1 (40 CFR §86.129-80)
-Dynamometer rear roll speed (if applicable)
-FID output voltage recording the following parameters for each sample analysis:
    -zero gas and span gas adjustments
    -zero gas reading
    -dilute sample bag reading (if applicable)
    -dilution air sample bag reading (if applicable)
    -zero gas and span gas readings

-methanol sampling equipment data:
    -the volumes of deionized water introduced into each impinger
    -the rate and time of sample collection
    -the volumes of each sample introduced into the gas chromatograph
    -the flow rate of carrier gas through the column
    -the column temperature
    -the chromatogram of the analyzed sample

2.2. If an enclosure, or atmospheric sampling, running loss facility is used, the following requirements (in addition to those in subparagraph 2.1 above) shall also be applicable:

2.2.1. The enclosure shall be readily sealable and rectangular in shape. When sealed, the enclosure shall be gas tight in accordance with 40 CFR 86.117-90. Interior surfaces shall be impermeable and non-reactive to hydrocarbons, and to alcohol (if the enclosure is used for alcohol-fueled vehicles). One surface should be of flexible, impermeable, and non-reactive material to allow for minor volume changes, resulting from temperature changes.

2.2.2. In the event an artificial cooling or heating system is used, the surface temperature of the heat exchanging elements shall be a minimum of 70.0^{o}F.

2.2.3. The enclosure shall be equipped to supply air to the vehicle, at a temperature of 105 ± 5^{o}F, from sources outside of the running loss enclosure directly

into the operating engine's air intake system. Supplemental air requirements shall be supplied by drawing air from the engine intake source.

2.3 If a point source running loss measurement facility (cell) is used, the following requirements (in addition to those in subparagraph 2.1 above) shall also be applicable:

2.3.1. The running loss vapor collection system shall be configured to collect all running loss emissions from each of the discrete emissions sources, which include vehicle fuel system vapor vents, and transport the collected vapor emissions to a CFV or PDP based dilution and measurement system. The collection system shall consist of a collector at each discrete vehicle emissions source, lengths of heated sample line connecting each collector to the inlet of the heated sample pump, and lengths of heated sample line connecting the outlet of the heated sample pump to the inlet of the running loss fuel vapor sampling system. Up to 3 feet of unheated line connecting each of the vapor collectors to the heated sample lines shall be allowed. Each heated sample pump and its associated sample lines shall be maintained at a temperature between 175.0^{o}F and 200.0^{o}F to prevent condensation of fuel vapor in the sample lines. The heated sample pump(s) and its associated flow controls shall be configured and operated to draw a flow of ambient air into each collector at a flow rate of at least 40 standard cubic feet per hour (SCFH). The flow controls on each heated sampling system shall include an indicating flow meter which provides an alarm output to the data recording system if the flow rate drops below 40 SCFH by more than 5 percent. The collector inlet for each discrete emissions source shall be placed in proximity to the source as necessary to capture any fuel vapor emissions without significantly affecting flow or pressure of the normal action of the source. The collector inlets shall be designed to interface with the configuration and orientation of each specific source. For vapor vents which terminate in a tube or hose barb, a short length of tubing of an inside diameter larger throughout its length than the inside diameter of the vent outlet, may be used to extend the vent into the mouth of the collector as illustrated in Figure 1. For those vapor vent designs which are not compatible with such collector configurations and other emissions sources, the vehicle manufacturer shall supply a collector which is configured to interface with the vapor vent design or the specific emissions source design, and which terminates in a fitting approved by the Executive Officer. The Executive Officer shall approve the fitting if the manufacturer demonstrates that it is capable of capturing all vapors emitted from the source.

2.3.2. The running loss fuel vapor sampling system shall be a CFV or PDP based dilution and measurement system which further dilutes the running loss fuel vapors collected by the vapor collection system(s) with ambient air, collects continuously proportional samples of the diluted running loss vapors and dilution air in sample bags, and measures the total dilute flow through the sampling system over each test interval. In practice, the system shall be configured and operated in a manner which is directly analogous to an exhaust emissions constant volume sampling system, except that the input flow to the system is the flow from the running loss vapor collection

system(s) instead of vehicle exhaust flow. The system shall be configured and operated to meet the following requirements:

(1) The running loss fuel vapor sampling system shall be designed to measure the true mass of fuel vapor emissions collected by the running loss vapor collection system from the specified discrete emissions source. The total volume of the mixture of running loss emissions and dilution air shall be measured, and a continuously proportionated sample of volume shall be collected for analysis. Mass emissions shall be determined from the sample concentration and total flow over the test period.

(2) The PDP-CVS shall consist of a dilution air filter and mixing assembly, heat exchanger, positive displacement pump, sampling system, and associated valves, pressure and temperature sensors. The PDP-CVS shall conform to the following requirements:

-The gas mixture temperature, measured at a point immediately ahead of the positive displacement pump, shall be within ± 10^{o}F of the designed operating temperature at the start of the test. The gas mixture temperature variation from its value at the start of the test shall be limited to ± 10^{o}F during the entire test. The temperature measuring system shall have an accuracy and precision of ± 2^{o}F.

-The pressure gauges shall have an accuracy and precision of ± 1.6 inches of water (± 0.4 kPa).

-The flow capacity of the CVS shall not exceed 350 CFM (0.165 m^3/s).

- Sample collection bags for dilution air and running loss fuel vapor samples shall be sufficient size so as not to impede sample flow.

(3) The CFV sample system shall consist of a dilution air filter and mixing assembly, a sampling venturi, a critical flow venturi, a sampling system and assorted valves, and pressure and temperature sensors. The CFV sample system shall conform to the following requirements:

-The temperature measuring system shall have an accuracy and precision of ± 2^{o}F and a response time of 0.100 seconds of 62.5 percent of a temperature change (as measured in hot silicone oil).
-The pressure measuring system shall have an accuracy and precision of ± 1.6 inches of water (0.4 kPa).
-The flow capacity of the CVS shall not exceed 350 CFM (0.165 m^3/s).
-Sample collection bags for dilution air and running loss fuel vapor samples shall be of sufficient size so as not to impede sample flow.

2.3.3. The on-line computer system or strip-chart recorder specified in 2.1.4 of this paragraph shall be used to record the following additional parameters during the running loss test sequence, if applicable:

-CFV (if used) inlet temperature and pressure
-PDP (if used) inlet temperature and pressure and differential pressure
-Running loss vapor collection system low flow alarm events

2.4. Other equipment configurations may be used if approved in advance by the Executive Officer. The Executive Officer shall approve alternate equipment configurations if the manufacturer demonstrates that the equipment will yield test results equivalent to those resulting from use of the specified equipment.

3. Hot Soak Evaporative Emission Measurement Enclosure

The enclosure shall be readily sealable, rectangular in shape, with space for personnel access to all sides of the vehicle. When sealed, the enclosure shall be gas tight in accordance with §86.117-90. Interior surfaces shall be impermeable and non-reactive to hydrocarbon, and to alcohol (if the enclosure is used for alcohol-fueled vehicles). One surface shall be of flexible, impermeable and non-reactive material to allow for minor volume changes, resulting from temperature changes. The enclosure shall be configured to provide an internal enclosure ambient temperature of $105^{o}F \pm 5^{o}F$ maximum and $\pm 2^{o}F$ on average during the test time interval from 5 minutes after the enclosure is closed and sealed until the end of the one hour hot soak interval. For the first 5 minutes, the ambient temperature shall be maintained at $105^{o}F \pm 10^{o}F$. The enclosure shall be equipped with an internal air circulation blower(s). The blower(s) shall be sized to provide a nominal total flow rate within a range of 0.8 ± 0.2 ft^3/min per ft^3 of V_n. The inlets and outlets of the blower(s) shall be configured to provide a well dispersed air circulation pattern that produces effective internal mixing and avoids significant temperature or hydrocarbon and alcohol stratification. The discharge and intake air diffusers in the enclosure shall be configured and adjusted to eliminate localized high air velocities which could produce non-representative heat transfer rates between the vehicle fuel tank(s) and the air in the enclosure. The enclosure temperature shall be taken with thermocouples located 3 feet above the floor of the approximate mid-length of each side wall of the enclosure and within 3 to 12 inches of each side wall. This shall be accomplished by any one or combination of the following techniques:

-Using the enclosure without artificial cooling and relying on the residual heat in the test vehicle for temperature achievement.

-Adding insulation to the enclosure walls.

-Using the enclosure artificial cooling system (if so equipped) with the set point of the cooling system adjusted to a value not lower than $105.0^{o}F$,

where the cooling system set point refers to the internal enclosure air temperature.

-Using a full range enclosure temperature management system with heating and cooling capabilities.

In the event an artificial cooling or heating system is used, the surface temperature of the heat exchanging elements shall be a minimum of 70.0^{o}F.

The requirements in 40 CFR §86.107-90(a)(4) shall not apply.

B. Calibrations

1. Evaporative emission enclosure calibrations are specified in 40 CFR §86.117-90. Methanol measurements may be omitted when methanol-fueled vehicles will not be tested in the evaporative enclosure. Amend 40 CFR §86.117-90 to include an additional subsection 1.1, to read:

1.1 Diurnal evaporative emission enclosure. The diurnal evaporative emission measurement enclosure calibration consists of the following parts: initial and periodic determination of enclosure background emissions, initial determination of enclosure volume, and periodic hydrocarbon (HC) and methanol retention check and calibration. Calibration for HC and methanol may be conducted in the same test run or in sequential test runs.

1.1.1 The initial and periodic determination of enclosure background emissions shall be conducted according to the procedures specified in §86.117-90(a)(1) through (a)(6). The enclosure shall be maintained at a nominal temperature of 105.0^{o}F throughout the four hour period. Variable volume enclosures may be operated in either the latched volume configuration, or with the variable volume feature active. Fixed volume enclosures shall be operated with inlet and outlet flow streams closed. The allowable enclosure background emissions of HC and/or methanol as calculated according to 40 CFR §86.117-90(a)(7) shall not be greater than 0.05 grams in 4 hours. The enclosure may be sealed and the mixing fan operated for a period of up to 12 hours before the initial HC concentration reading (C_{HCi}) and the initial methanol concentration reading (C_{CH3OHi}) is taken and the four hour background measurement period begins.

1.1.2 The initial determination of enclosure internal volume shall be performed according to the procedures specified in paragraph III.A.1.3. If the enclosure will be used for hot soak determination, the determination of enclosure internal volume shall also be performed based on 105^{o}F.

1.1.3 The HC and methanol measurement and retention checks shall evaluate the accuracy of enclosure HC and methanol mass measurements and the ability of the

enclosure to retain trapped HC and methanol. The check shall be conducted over a 24 hour period with all of the normally functioning subsystems of the enclosure active. A known mass of propane and/or methanol shall be injected into the enclosure and an initial enclosure mass measurement(s) shall be made. The enclosure shall be subjected to the temperature cycling specified in paragraph III.D.10.1.7. of these procedures (revising 40 CFR §86.133-90(l)) for a 24 hour period. The temperature cycle shall begin at 105□F (hour 11) and continue according to the schedule until a full 24-hour cycle is completed. A final enclosure mass measurement(s) shall be made. The following procedure shall be performed prior to the introduction of the enclosure into service and following any modifications or repairs to the enclosure that may impact the integrity of this enclosure; otherwise, the following procedure shall be performed on a monthly basis. (If six consecutive monthly retention checks are successfully completed without corrective action, the following procedure may be determined quarterly thereafter as long as no corrective action is required.)

(a) Zero and span the HC analyzer.

(b) Purge the enclosure until a stable enclosure HC level is attained.

(c) Turn on the enclosure air mixing and temperature control system and adjust it for an initial temperature of $105.0^{o}F$ and a programmed temperature profile covering one diurnal cycle over a 24 hour period according to the profile specified in paragraph III.D.10.1.7. of these procedures (revising 40 CFR §86.133-90). Close the enclosure door. On variable volume enclosures, latch the enclosure to the enclosure volume measured at $105^{o}F$. On fixed volume enclosures, close the outlet and inlet flow streams.

(d) When the enclosure temperature stabilizes at $105.0^{o}F \pm 3.0^{o}F$ seal the enclosure; measure the enclosure background HC concentration (C_{HCe1}) and/or background methanol concentration (C_{CH3OH1}) and the temperature (T_1), and pressure (P_1) in the enclosure.

(e) Inject into the enclosure a known quantity of propane between 2 to 6 grams and/or a known quantity of methanol in gaseous form between 2 to 6 grams. For evaporative emission enclosures that will be used for testing motor vehicles certified to the reduced evaporative standards in Part I, sections E.1.(c) and (d), use a known amount of propane or gaseous methanol between 0.5 to 1.0 grams. The injection method shall use a critical flow orifice to meter the propane and/or methanol at a measured temperature and pressure for a measured time period. Techniques which provide an accuracy and precision of ± 0.5 percent of the injected mass are also acceptable. Allow the enclosure internal HC and/or methanol concentration to mix and stabilize for up to 300 seconds. Measure the enclosure HC concentration (C_{HCe2}) and/or the enclosure methanol concentration (C_{CH3OH2}). For fixed volume enclosures, measure the temperature (T_2) and pressure in the enclosure (P_2). On variable volume enclosures, unlatch the enclosure. On fixed volume enclosures, open the outlet and

inlet flow streams. Start the temperature cycling function of the enclosure air mixing and temperature control system. These steps shall be completed within 900 seconds of sealing the enclosure.

(f) For fixed volume enclosures, calculate the initial recovered HC mass (M_{HCe1}) according to the following formula:

$$M_{HCe1} = (3.05 \times V \times 10^{-4} \times [P_2 (C_{HCe2} - rC_{CH3OH2})/T_2 - P_1 (C_{HCe1} - rC_{CH3OH1})/T_1])$$

where:

V is the enclosure volume at 105^oF (ft^3)
P_1 is the enclosure initial pressure (inches Hg absolute)
P_2 is the enclosure final pressure (inches Hg absolute)
C_{HCen} is the enclosure HC concentration at event n (ppm C)
C_{CH3OHn} is the enclosure methanol concentration calculated according to 40 CFR §86.117-90 (d)(2)(iii) at event n (ppm C)
r is the FID response factor to methanol
T_1 is the enclosure initial temperature (^oR)
T_2 is the enclosure final temperature (^oR)

For variable volume enclosures, calculate the initial recovered HC mass and initial recovered methanol mass according to the equations used above except that P_2 and T_2 shall equal P_1 and T_1.

Calculate the initial recovered methanol mass (M_{CH3OH1}) according to 40 CFR §86.117-96(d)(1), as amended March 24, 1993.

If the recovered HC mass agrees with the injected mass within 2.0 percent and/or the recovered methanol mass agrees with the injected mass within 6.0 percent, continue the test for the 24 hour temperature cycling period. If the recovered mass differs from the injected mass by greater than the acceptable percentage(s) for HC and/or methanol, repeat the enclosure concentration measurement in step (E) and recalculate the initial recovered HC mass (M_{HCe1}) and/or methanol mass (M_{CH3OH1}). If the recovered mass based on the latest concentration measurement agrees within the acceptable percentage(s) of the injected mass, continue the test for the 24 hour temperature cycling period and substitute this second enclosure concentration measurement for C_{HCe2} and/or C_{CH3OH2} in all subsequent calculations. In order to be a valid calibration, the final measurement of C_{HCe2} and C_{CH3OH2} shall be completed within the 900 second time limit outlined above. If the discrepancy persists, the test shall be terminated and the cause of the difference determined, followed by the correction of the problems(s) and the restart of the test.

(g) At the completion of the 24 hour temperature cycling period, measure the final enclosure HC concentration (C_{HCe3}) and/or the final enclosure

methanol concentration (C_{CH3OH3}). For fixed-volume enclosures, measure the final pressure (P_3) and final temperature (T_3) in the enclosure.

For fixed volume enclosures, calculate the final recovered HC mass (M_{HCe2}) as follows:

$$M_{HCe2} = [3.05 \times V \times 10^{-4} \times (P_3 (C_{HCe3} - rC_{CH3OH3})/T_3 - P_1 (C_{HCe1} - rC_{CH3OH1})/T_1)] + M_{HC,out} - M_{HC,in}$$

where:

V is the enclosure volume at 105°F (ft^3)
P_1 is the enclosure initial pressure (inches Hg absolute)
P_3 is the enclosure final pressure (inches Hg absolute)
C_{HCe3} is the enclosure HC concentration at the end of the 24 hour temperature cycling period (ppm C)
C_{CH3OH3} is the enclosure methanol concentration at the end of the 24 hour temperature cycling period, calculated according to 40 CFR §86.117-90 (d)(2)(iii) (ppm C)
r is the FID response factor to methanol
T_1 is the enclosure initial temperature (°R)
T_3 is the enclosure final temperature (°R)
$M_{HC,out}$ is mass of HC exiting the enclosure, (grams)
$M_{HC,in}$ is mass of HC entering the enclosure, (grams)

For variable volume enclosures, calculate the final recovered HC mass and final recovered methanol mass according to the equations used above except that P_3 and T_3 shall equal P_1 and T_1 , and $M_{HC,out}$ and $M_{HC,in}$ shall equal zero.

Calculate the final recovered methanol mass (M_{CH3OH2}) according to 40 CFR §86.117-96(d)(1), as amended March 24, 1993.

(h) If the calculated final recovered HC mass for the enclosures is not within 3 percent of the initial enclosure mass or the calculated final recovered methanol mass for the enclosures is not within 6 percent of the initial enclosure mass, then action shall be required to correct the error to the acceptable level.

1.2 The running loss equipment shall be calibrated as follows:

1.2.1 The chassis dynamometer shall be calibrated according to the requirements of 40 CFR §86.118-78. The calibration shall be conducted at a typical ambient temperature of 75°F ± 5°F.

1.2.2 The running loss HC analyzer shall be calibrated according to the requirements of 40 CFR §86.121- 90.

1.2.3 If a point source facility is used, the running loss fuel vapor sampling system shall be calibrated according to the requirements of 40 CFR§86.119-90, with the additional requirement that the CVS System Verification in 40 CFR §86.119-90(c) be conducted by injecting the known quantity of propane into the inlet of the most frequently used fuel vapor collector configured to collect vapors from the source of the evaporative emission vapor storage canister. This procedure shall be conducted in the running loss test cell with the collector installed in a vehicle in the normal test configuration, except that the vent hose from the vehicle evaporative emission canister shall be routed to a ventilation outlet to avoid unrepresentative background HC concentration levels. The propane injection shall be conducted by injecting approximately 4 grams of propane into the collector while the vehicle is operated over one Urban Dynamometer Driving Schedule (UDDS) test procedure, as described in 40 CFR §86.115-78 and Appendix I. The propane injection shall be conducted at a typical ambient temperature of $75^{o}F \pm 5^{o}F$.

1.2.4 In the event the running loss test is conducted using the atmospheric sampling measurement technique, the following procedure shall be used for the enclosure calibration:

(a) The initial and periodic determination of enclosure background emissions shall be conducted according to the procedures specified in 40 CFR §86.117-90(a)(1) through (a)(6). The enclosure shall be maintained at a nominal temperature of $105.0^{o}F$ throughout the four hour period. The allowable enclosure background emissions as calculated according to 40 CFR §86.117-90 (a)(7) shall not be greater than 0.2 grams in 4 hours. The enclosure may be sealed and the mixing fan operated for a period of up to 12 hours before the initial HC concentration reading is taken.

(b) The initial determination of enclosure internal volume shall be performed according to the procedures specified in 40 CFR §86.117-90 (b).

(c) The enclosure shall meet the calibration and retention requirements of 40 CFR §86.117-90(c). The propane injection recovery test shall be conducted with a test vehicle being driven over one UDDS cycle in the enclosure during the propane injection test. The vehicle used shall be configured and operated under conditions which ensure that its own running loss contribution is negligible, by using fuel of the lowest available volatility (7.0 psi RVP), maintaining the tank temperature at low levels ($<100^{o}F$), and routing the canister vent to the outside of the enclosure.

1.2.5 Hot soak enclosure. The hot soak enclosure calibration consists of the following parts: initial and periodic determination of enclosure background emissions, initial determination of enclosure volume, and periodic HC and methanol retention check and calibration. The hot soak enclosure calibration shall be conducted according to the method specified in section III.B.1.1 with a retention check of 4 hours at $105^{o}F$ or the method specified in section III.B.1.2.4. If the hot soak enclosure is also for diurnal

testing, the 4 hour retention check at 105^{o}F may be replaced by the 24 hour diurnal retention check.

1.2.6 Diurnal and hot soak enclosure HC analyzer. The HC analyzers used for measuring the diurnal and hot soak samples shall be calibrated according to the requirements of 40 CFR §86.121-90.

1.2.7 Other equipment. Other test equipment including temperature and pressure sensors and the associated amplifiers and recorders, flow measurement devices, and other instruments shall be calibrated and operated according to the manufacturer's specifications and recommendations, and good engineering practice.

C. Road Load Power, Test Weight, Inertia Weight Class, and Running Loss Fuel Tank Temperature Profile Determination

Amend 40 CFR §86.129-80 to include an additional subsection 1. to read:

1. Determination of running loss test fuel tank temperature profile. The manufacturer shall establish for each combination of vehicle platform/powertrain/fuel tank submitted for certification a representative profile of fuel tank liquid and vapor temperature versus time to be used as the target temperature profile for the running loss evaporative emissions test drive cycle. If a vehicle has more than one fuel tank, a profile shall be established for each tank. If manufacturers use a vehicle model to develop a profile to represent multiple vehicle models, the vehicle model selected must have the greatest expected fuel liquid temperature and fuel vapor temperature increase during driving of all of the vehicle models it will represent. Manufacturers must select test vehicles with any available vehicle options that could increase fuel temperature during driving, such as any feature that limits underbody air flow. The profile shall be established by driving the vehicle on-road over the same driving schedule as is used for the running loss evaporative emissions test according to the following sequence:

1.1. The vehicle to be used for the fuel tank temperature profile determination shall be equipped with at least 2 thermocouples installed so as to provide a representative bulk liquid average fuel temperature. The specific placement of the thermocouples shall take into account the tank configuration and orientation and shall be along the major axis of the tank. The thermocouples shall not be placed within internal reservoirs or other locations which are thermally isolated from the bulk volume of the fuel. The thermocouples shall be placed at a vertical depth equivalent to the mid-volume of the liquid fuel at a fill level of 40 percent of nominal tank capacity. A third thermocouple, shall be installed in the approximate center of the vapor space of the fuel tank. A pressure transducer with a minimum precision and accuracy of ± 1.0 inches H_2O shall be connected to the vapor space of the fuel tank. A means of conveniently draining the fuel tank shall be provided. The vehicle shall be equipped with a driver's aid which shall be configured to provide the test driver with the desired UDDS vehicle speed versus time trace as defined in Part 86, Appendix I and with the desired NYCC

vehicle speed versus time trace as defined in Part 86, Appendix I of the CFR, amended as of March 24, 1993, and the actual vehicle speed. Vehicle coolant temperature shall be monitored to ensure adequate vehicle coolant air to the radiator intake(s). A computer, data logger, or strip chart data recorder shall record the following parameters during the test run:

- Desired speed
- Actual speed
- Average liquid fuel temperature (T_{liq})
- Vapor space temperature (T_{vap})
- Vapor space pressure

The data recording system shall provide a time resolution of 1 second, and an accuracy of ± 1 mph, ± 2.0^{o}F, and ± 1.0 inches H_2O. The temperature and pressure signals may be recorded at intervals of up to 30 seconds.

1.2. The temperature profile determination shall be conducted during ambient conditions which include:

- ambient temperature above 95^{o}F and increasing or stable (± 2^{o}F)
- sunny or mostly sunny with a maximum cloud cover of 25 percent
- wind conditions calm to light with maximum sustained wind speeds of 15 mph; temporary gusts of wind between 15 and 25 mph may occur up to 5 percent of the total driving time
- road surface temperature (T_{sur}) at least 30^{o}F above T_{amb} or at least 135^{o}F, whichever is less

The track surface temperature shall be measured with an embedded sensor, a portable temperature probe, or an infrared pyrometer which can provide an accuracy of ± 2.0^{o}F. Temperatures must be measured on a surface representative of the surface where the vehicle is driven. The test shall be conducted on a track or other restricted access facility so that the speed versus time schedule can be maintained without undue safety risks.

Prior to the start of the profile generation, the fuel tank may be artificially heated to the ambient temperature to a maximum of 105^{o}F. The vehicle may be soaked in a temperature-controlled enclosure. Fans blowing ambient air may be used to help control fuel temperatures. Engine idling may not be used to control fuel temperatures. If the fuel tank is artificially heated, the liquid fuel temperature and the vapor temperature must be stabilized for at least one hour at the ambient temperature within ± 2^{o}F to a maximum of 105^{o}F before the profile generation begins. If the allowance for a lower initial fuel temperature established in section III.D.7 is used, the fuel in the test vehicle may not be stabilized at a temperature higher than the established lower initial temperature.

Tank pressure shall not exceed 10 inches of water 30 seconds after the start of the engine until the end of engine operation during the temperature profile determination unless a pressurized system is used and the manufacturer demonstrates in a separate test that vapor would not be vented to the atmosphere if the fuel cap was removed at the end of the running loss fuel tank temperature profile determination.

1.3. The vehicle fuel tank shall be drained and filled to 40 percent of the nominal tank capacity with fuel meeting the requirements of paragraph III.D.1. of these procedures. For hybrid electric vehicles, the battery state-of-charge shall be set at a level such that the auxiliary power unit would be activated by the vehicle's control strategy within 30 seconds of starting the first UDDS of the fuel tank temperature profile determination test sequence. If the auxiliary power unit is capable of being manually activated, the auxiliary power unit shall be manually activated at the beginning of and operating throughout the fuel tank temperature profile determination. The vehicle shall be moved to the location where the driving cycle is to be conducted. It may be driven a maximum distance of 5.0 miles, longer distances shall require that the vehicle be transported by other means. The vehicle shall be parked for a minimum of 12 hours in an open area on a surface that is representative of the test road. The orientation of the front of the vehicle during parking (N, SW, etc.) shall be documented. Once the 12 hour minimum parking time has been achieved and the ambient temperature and weather conditions and track surface temperature are within the allowable ranges, the vehicle engine shall be started. The vehicle air conditioning system (if so equipped) shall be set to the "NORMAL" air conditioning mode and adjusted to the minimum discharge air temperature and high fan speed. Vehicles equipped with automatic temperature controlled air conditioning systems shall be operated in "AUTOMATIC" temperature and fan modes with the system set at 72^{o}F. The vehicle may be operated at minimum throttle for periods up to 60 seconds prior to beginning the first UDDS cycle in order to move from the parking location onto the road surface. The driver's aid shall be started and the vehicle operated over one UDDS cycle, then two NYCCs, and another UDDS cycle. The end of each UDDS cycle and the end of the two NYCCs shall be followed by an idle period of 120 seconds during which the engine shall remain on with the vehicle in the same transmission range and clutch (if so equipped) actuation mode as specified in 40 CFR §86.128-79 except for the following:

> Revise section (c) to include: Idle modes may be run with automatic transmission in "Neutral" and shall be placed in "Drive" with the wheels braked at least 5 seconds before the end of the idle mode. Manual transmission may be in "Neutral" with the clutch engaged and shall be placed in gear with the clutch disengaged at least 5 seconds before the end of the idle mode.

The data recording system shall provide a record of the required parameters over the entire sequence from the initiation of the first UDDS cycle to the end of the third 120 second idle period. Following the completion of the test, the data recording system and driver's aid shall be turned off.

1.4. In addition to the vehicle data recording, the following parameters shall be documented for the running loss test fuel tank temperature determination:

-Date and time of vehicle fueling
-Odometer reading at vehicle fueling
-Date and time vehicle was parked and parking location and orientation
-Odometer reading at parking
-Time and temperature of fuel tank heating, if applicable
-Date and time engine was started
-Time of initiation of first UDDS cycle
-Time of completion of third 120 second idle period
-Ambient temperature and track surface temperature at initiation of first UDDS cycle (T_{amb1} and T_{sur1})
-Ambient temperature and track surface temperature at completion of third 120 second idle period (T_{amb2} and T_{sur2})

1.5. The two UDDS and two NYCC driving traces shall be verified to meet the speed tolerance requirements of 40 CFR 86.115-78 (b)(1), amended as follows:

1.5.1 Revise (v) to read: When conducted to meet the requirements of 40 CFR §86.129, up to three additional occurrences of speed variations greater than the tolerance are acceptable, provided they occur for less than 15 seconds on any occasion. All speed variations must be clearly documented as to the time and speed at that point in relation to the driving schedule.

1.5.2 Add (vi) to read: When conducted to meet the requirements of 40 CFR §86.129 and §86.132, the speed tolerance shall be as specified above, except that the upper and lower limits shall be 4 mph.

1.6 The following temperature conditions shall be verified:

$(T_{amb1}) \geq 95.0^{o}F$
$(T_{amb2}) \geq (T_{amb1} - 2.0^{o}F)$
$(T_{sur(n)} - T_{amb\,(n)}) \geq 30.0^{o}F$

where n is the incremental measurements in time.

or $T_{sur} > 135^{o}F$

1.7 Failure to comply with any of these requirements shall result in a void test, and require that the entire test procedure be repeated beginning with the fuel drain specified in 1.3 of this subparagraph.

1.8 If all of these requirements are met, the following calculations shall be performed:

$T_{corr} = T_{(i)} - T_o$

where: $T_{(i)}$ is the liquid fuel temperature (^oF) or vapor fuel temperature (^oF) during the drive where i is the incremental measurements in time.

T_o is the corresponding liquid fuel temperature (^oF) or vapor fuel temperature (^oF) observed at the start of the specified driving schedule

The individual tank liquid (T_{liq}) and vapor space (T_{vap}) temperatures recorded during the test run shall be adjusted by arithmetically adding the corresponding temperature correction (T_{corr}) adjustment calculated above to 105^oF. If T_o is higher than the corresponding ambient temperature by 2^oF, the temperature correction shall be determined by the above equation plus the difference in T_o and the corresponding ambient temperature.

1.9. Other methodologies for developing corrected liquid and vapor space temperature profiles are acceptable if approved in advance by the Executive Officer. The Executive Officer shall approve an alternate method if the manufacturer demonstrates equivalence to data collected at 105^oF.

D. Test Procedure

The test sequence described in 40 CFR §86.130 through §86.140 shall be performed with the following modifications:

1. General Requirements

The following language shall be applicable in lieu of 40 CFR §86.130-78:

The test sequence shown in Figure 2 (Figure 3A or 3B for hybrid electric vehicles) describes the steps encountered as the vehicle undergoes the three-day diurnal sequence and the supplemental two-day diurnal sequence to determine conformity with the standards set forth. Methanol measurements may be omitted when methanol-fueled vehicles will not be tested in the evaporative enclosure. Ambient temperature levels encountered by the test vehicle throughout the entire duration of this test sequence shall not be less than 68^oF nor more than 86^oF, unless otherwise specified. The temperatures monitored during testing shall be representative of those experienced by the test vehicle. The test vehicle shall be approximately level during all phases of the test sequence to prevent abnormal fuel distribution. The temperature tolerance of a soak period may be waived for up to 10 minutes to allow purging of the enclosure or transporting the vehicle into the enclosure.

If tests are invalidated after collection of emission data from previous test segments, the test may be repeated to collect only those data points needed to complete emission

measurements. Compliance with emission standards may be determined by combining emission measurements from these different test runs. If any emission measurements are repeated, the new measurements supersede previous values.

The three-day diurnal test sequence shown in Figure 2 (and Figure 3A or B for hybrid electric vehicles) is briefly described as follows:

1.1. The fuel tank shall be drained and filled to the prescribed tank fuel volume, as specified in 40 CFR §86.1803-01, in preparation for the vehicle preconditioning. For hybrid electric vehicles only, the manufacturer may elect to perform the All-Electric Range Test pursuant to the "California Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck, and Medium-Duty Vehicle Classes" as incorporated by reference in §1962(e), title 13, CCR, prior to fuel drain and fill.

1.2. The vehicle preconditioning drive shall be performed in accordance with 40 CFR §86.132-90, except that following the vehicle fueling step at 40 CFR §86.132-90(a)(1) a minimum soak period of 6 hours shall be provided to allow the vehicle to stabilize to ambient temperature prior to the preconditioning drive. Vehicles performing consecutive tests at a test point with the same fuel specification and while remaining under laboratory ambient temperature conditions for at least 6 hours, may eliminate the initial fuel drain and fill and vehicle soak. In such cases, each subsequent test shall begin with the preconditioning drive.

1.3 Following the vehicle preconditioning drive, the fuel tank shall be drained and then filled to 40 percent capacity.

1.4. The vehicle shall be allowed to soak for 12 to 36 hours prior to the exhaust emissions test.

1.5. During the 12 to 36 hour soak specified in subparagraph 1.4 above, the vehicle's canister shall be purged with a volume of air equivalent to 300 canister charcoal bed volumes at a flow rate of 48 SCFH (22.7 slpm).

1.6. The canister shall then be loaded using a butane-nitrogen mixture.

1.7. Perform exhaust emission tests in accordance with procedures as provided in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles," and these procedures.

1.7.1 For hybrid electric vehicles, a four phase exhaust test shall be performed as shown in Figure 3A pursuant to the "California Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Zero-Emission Vehicles, and 2001

and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck, and Medium-Duty Vehicle Classes" as incorporated by reference in §1962(e), title 13, CCR. Following the four phase exhaust test, the test sequence shall repeat from step 1.3 of this section to conduct the evaporative test using the standard cold start test and hot start test (standard three phase test) without emission sampling. Battery state-of-charge setting prior to the standard three phase test shall be performed pursuant to section 6.1.6 of the "California Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck, and Medium-Duty Vehicle Classes" as incorporated by reference in §1962(e), title 13, CCR. Four phase exhaust testing may be performed in conjunction with evaporative testing as shown in Figure 3B with advance Executive Officer approval if the manufacturer is able to provide data demonstrating compliance with evaporative emission standards using the standard three phase test.

1.8. Upon completion of the hot start test, the vehicle shall be parked in a temperature controlled area between one to six hours to stabilize the fuel temperature at 105^{o}F for one hour. Artificial cooling or heating of the fuel tank may be induced to achieve a fuel temperature of 105^{o}F. The initial fuel and, if applicable, vapor temperatures for the running loss test may be less than 105^{o}F with advance Executive Order approval if the manufacturer is able to provide data demonstrating initial temperatures at least 3^{o}F lower than the required 105^{o}F starting temperature.

1.9. A running loss test shall be performed after the fuel tank is stabilized at 105^{o}F. The fuel tank temperature shall be controlled using a specified tank temperature profile for that vehicle during the test. The temperature profile shall be achieved either using temperature controllers or by an air management system that would simulate airflow conditions under the vehicle during driving.

1.10. The hot soak enclosure test shall then be performed at an enclosure ambient temperature of 105^{o}F.

1.11. Upon completion of the hot soak enclosure test, the vehicle shall be soaked for no less than 6 hours nor more than 36 hours. For at least the last 6 hours of this period, the vehicle shall be soaked at 65^{o}F.

1.12. A three-day diurnal test shall be performed in a variable temperature enclosure.

The supplemental two-day diurnal sequence in Figure 2 (and Figure 3A or 3B for hybrid electric vehicles) shall be conducted according to the steps described in 1.1 through 1.4, 1.6, 1.7, followed by 1.10 through 1.12 of this paragraph except that the ambient temperature of the hot soak test is conducted at an ambient temperature between 68^{o}F and 86^{o}F at all times and that the diurnal test will consist of a two-day test. Emission

sampling is not required for the standard cold start test and hot start test (standard three phase test) in the supplemental two-day diurnal sequence as shown in Figure 3A.

2. Vehicle Preparation

Amend 40 CFR §86.131-90 to read:

2.1 Prepare the fuel tank(s) for recording the temperature(s) of the prescribed test fuel liquid and, if applicable, fuel vapor according to the requirements of paragraph III.C.1.1. (40 CFR §86.129-80). Measurement of the fuel vapor temperature is optional. If vapor temperature is not measured, the measurement of the fuel tank pressure is not required.

2.2 If applicable, the vehicle shall be equipped with a pressure transducer to monitor the fuel tank headspace pressure during the test. The transducer shall have an accuracy and precision of ± 1.0 inches water.

2.3 Provide additional fittings and adapters, as required, to accommodate a fuel drain at the lowest point possible in the fuel tank(s) as installed on the vehicle.

2.4 Provide valving or other means to allow purging and loading of the evaporative emission canister(s). Special care shall be taken during this step not to alter normal functions of the fuel vapor system components.

2.5 For vehicles to be tested for running loss emissions, prepare the exhaust system by sealing and/or plugging all detectable sources of exhaust gas leaks. The exhaust system shall be tested or inspected to ensure that detectable exhaust hydrocarbons are not emitted into the running loss enclosure during the running loss test.

3. Vehicle Preconditioning

3.1 For supplemental vehicle preconditioning requirements for hybrid electric vehicles, refer to the "California Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck, and Medium-Duty Vehicle Classes" as incorporated by reference in §1962(e), title 13, CCR.

3.2 The following language shall be applicable in lieu of 40 CFR §86.132-90(a)(4):

The Executive Officer may also choose to conduct or require the performance of optional or additional preconditioning to ensure that the evaporative emission control system is subjected to conditions typical of normal driving. The optional preconditioning shall consist of no less than 20 and no more than 50 miles of on-road mileage accumulation under typical driving conditions.

3.3 The following language shall be applicable in lieu of 40 CFR §86.132-90(b):

3.3.1 Within five minutes of completion of preconditioning, the vehicle shall be driven off the dynamometer to a work area. For hybrid electric vehicles following battery state-of-charge setting, the vehicle shall only be pushed or towed to avoid disturbing battery state-of-charge setting.

3.3.2. The fuel tank(s) of the prepared vehicle shall be drained and refilled with the applicable test fuel, as specified in paragraph III.F. of these procedures, to the prescribed tank fuel volume, defined in 40 CFR §86.1803-01. The vehicle shall be refueled within 1 hour of completion of the preconditioning drive.

3.3.3. Following the fuel drain and fill described in subparagraph 3.3.2. above, the test vehicle shall be allowed to soak for a period of not less than 12 or more than 36 hours prior to the exhaust emissions test. During the soak period, the canister shall be connected to a pump or compressor and loaded with butane as described in 3.3.4. below for the three-day diurnal sequence and in 3.3.5. below for the supplemental two-day diurnal sequence. For all vehicles subjected to exhaust emissions testing only, the canister loading procedure as set forth in paragraph 3.3.4. below shall be used.

For methanol-fueled and flexible-fueled vehicles, canister preconditioning shall be performed with a fuel vapor composition representative of that which the vehicle would generate with the fuel mixture used for the current test. Manufacturers shall develop a procedure to precondition the canister, if the vehicle is so equipped for the different fuel. The procedure shall represent a canister loading equivalent to that specified in 3.3.4. below for the three-day diurnal sequence and in 3.3.5. below for the supplemental two-day diurnal sequence and shall be approved in advance by the Executive Officer.

3.3.4. For the three-day diurnal sequence, the evaporative emissions storage canister(s) shall be preloaded with an amount of butane equivalent to 1.5 times the nominal working capacity. For vehicles with multiple canisters in a series configuration, the set of canisters must be preconditioned as a unit. For vehicles with multiple canisters in a parallel configuration, each canister shall be preconditioned separately. For vehicles equipped with a non-integrated refueling emission control system, the non-integrated canisters shall be preconditioned for the three-day diurnal test sequence according to the procedure in section 3.3.5(a) below. If a vehicle is designed to actively control evaporative or refueling emissions without a canister, the manufacturer shall devise an appropriate preconditioning procedure subject to the approval of the Executive Officer. If canisters on both certification and production vehicles are equipped with purge and load service ports, the service port shall be used for the canister preconditioning. The nominal working capacity of a carbon canister shall be established by determining the mass of butane required to load a stabilized canister to

a two gram breakthrough. The 2 gram breakthrough is defined as the point at which the cumulative quantity of hydrocarbons emitted is equal to 2 grams. The determination of nominal capacity shall be based on the average capacity of no less than five canisters which are in a stabilized condition. For stabilization, each canister must be cycled no less than 10 times and no more than 100 times to a two gram breakthrough with a 50/50 mixture by volume of butane and nitrogen, at a rate of 15 ± 2 grams butane per hour. Each canister loading step must be preceded by canister purging with 300 canister bed volume exchanges at 48 SCFH. The following procedure shall be used to preload the canister:

(a) Prepare the evaporative emission canister(s) for the canister purging and loading operation. The canister shall not be removed from the vehicle, unless access to the canister in its normal location is so restricted that purging and loading can only reasonably be accomplished by removing the canister from the vehicle. Special care shall be taken during this step so that the normal functions of the fuel system components or the normal pressure relationships in the system are not disturbed. The canister purge shall be performed with ambient air of controlled humidity to 50 ± 25 grains per pound of dry air. This may be accomplished by purging the canister in a room which is conditioned to this level of absolute humidity. The flow rate of the purge air shall be maintained at a nominal flow rate of 48 SCFH (22.7 slpm), and the duration shall be determined to provide a total purge volume flow through the canister equivalent to 300 canister charcoal bed volume exchanges.

(b) The evaporative emission canister(s) shall then be loaded with an amount of commercial grade butane vapors equivalent to 1.5 times the nominal working capacity. Canister loading shall not be less than 1.5 times the nominal canister capacity. The canister shall be loaded with a mixture composed of 50 percent butane and 50 percent nitrogen by volume. The butane shall be loaded into the canister at a rate of 15 ± 2 grams of butane per hour. If the canister loading at this rate takes longer than 12 hours, a manufacturer may determine a new rate, based on completing the canister loading in no less than 12 hours. Either a Critical Flow Orifice (CFO) butane injection device, a gravimetric method, or electronic mass flow controllers shall be used to fulfill the requirements of this step. The time of completion of the canister loading activity shall be recorded. Manufacturers shall disclose to the Executive Officer their canister loading procedure. The protocol may not allow for the replacement of components. In addition, the Executive Officer may require that the manufacturer demonstrate that the procedure does not unduly disturb the components of the evaporative system.

(c) Reconnect the evaporative emission canister(s), if applicable.

3.3.5. For the supplemental two-day diurnal sequence, the evaporative emission storage canister(s) shall be loaded to the point of breakthrough using either (a) or (b) below. For vehicles with multiple canisters in a series configuration, the set of canisters must be preconditioned as a unit. For vehicles with multiple canisters in a parallel

configuration, each canister shall be preconditioned separately. For vehicles equipped with a non-integrated refueling emission control system, the non-integrated canisters shall be preconditioned for the supplemental two-diurnal test sequence according to the procedure in III.D.3.3.5(a). Breakthrough may be determined by emission measurement in an enclosure or by measuring the weight gain of an auxiliary evaporative canister connected downstream of the vehicle's canister, in which case, the following references to the enclosure can be ignored. The auxiliary canister shall be well purged with ambient air of humidity controlled to 50±25 grains per pound of dry air prior to loading. Breakthrough is defined as the point at which the cumulative quantity of hydrocarbons emitted is equal to 2 grams.

(a) The following procedure provides for loading of the canister to breakthrough with a mixture composed of 50 percent butane and 50 percent nitrogen by volume. If the canisters on both certification and production vehicles are equipped with purge and load service ports, the service port shall be used for the canister preconditioning.

1. Prepare the evaporative/refueling emission canister(s) for the canister loading operation. The canister shall not be removed from the vehicle, unless access to the canister in its normal location is so restricted that loading can only reasonably be accomplished by removing the canister from the vehicle. Special care shall be taken during this step to avoid damage to the components and the integrity of the fuel system. The evaporative emission enclosure shall be purged for several minutes. The FID hydrocarbon analyzer shall be zeroed and spanned immediately prior to the canister loading procedure. If not already on, the evaporative enclosure mixing fan shall be turned on at this time. Place the vehicle in the sealed enclosure and measure emissions with the FID.

2. Load the canister with a mixture composed of 50/50 mixture by volume of butane and nitrogen at a rate of 40 ± 2 grams butane per hour. As soon as the canister reaches breakthrough, the vapor source shall be shut off.

3. Reconnect the evaporative/refueling emission canister, if applicable.

(b) The following procedure provides for loading the canister with repeated diurnal heat builds to breakthrough.

1. The evaporative emission enclosure shall be purged for several minutes. The FID hydrocarbon analyzer shall be zeroed and spanned immediately prior to the diurnal heat builds. If not already on, the evaporative enclosure mixing fan shall be turned on at this time. The average temperature of the dispensed fuel shall be 60 ± 12^{o}F. Within one hour of being refueled, the vehicle shall be placed, with the engine shut off, in the evaporative emission enclosure. The fuel tank temperature sensor shall be connected to the temperature recording system. A heat

source, specified in 40 CFR §86.107-90(a)(4), shall be properly positioned with respect to the fuel tank(s) and connected to the temperature controller.

2. The fuel may be artificially heated or cooled to the starting diurnal temperature of 65^{o}F. Turn off purge blower (if not already off); close and seal enclosure doors; and initiate measurement of the hydrocarbon level in the enclosure. When the fuel temperature reaches 65^{o}F, start the diurnal heat build. The diurnal heat build should conform to the following function to within ± 4^{o}F:

$$F = T_o \pm 0.4t$$

F is the fuel temperature, ^{o}F
T_o is the initial temperature, ^{o}F
t is the time since beginning of test, minutes

3. As soon as breakthrough occurs or when the fuel temperature reaches 105^{o}F, whichever occurs first, the heat source shall be turned off, the enclosure doors shall be unsealed and opened. If breakthrough has not occurred by the time the fuel temperature reaches 105^{o}F, the heat source shall be removed from the vehicle, the vehicle shall be removed (with the engine still off) from the evaporative emission enclosure and the entire procedure outlined above shall be repeated until breakthrough occurs.

4. After breakthrough occurs, the fuel tank(s) of the prepared vehicle shall be drained and filled with test fuel, as specified in paragraph III.F of these procedures, to the "tank fuel volume" defined in 40 CFR §86.1803-01. The fuel shall be stabilized to a temperature within ± 3^{o}F of the lab ambient before beginning the driving cycle for the exhaust emission test.

3.4 As allowed under the provisions of section III.G of these test procedures, a manufacturer may propose, for Executive Officer approval, the use of an alternative method to precondition canisters in lieu of the methods required under sections III.D.3.3.4; III.D.3.3.5(a); and, III.D.3.3.5(b). The Executive Officer may conduct certification confirmatory tests and in-use compliance tests with the either the alternative canister loading method or the methods specified in sections III.D.3.3.4; III.D.3.3.5(a); and, III.D.3.3.5(b), as applicable.

4. Dynamometer Procedure.

To be conducted according to 40 CFR §86.135-90 (December 8, 2005). For hybrid electric vehicles, the dynamometer procedure shall be performed pursuant to the "California Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck, and Medium-Duty Vehicle Classes" as incorporated by reference in §1962(e), title 13, CCR.

5. Engine Starting and Restarting.

Amend 40 CFR §86.136-90 to read as follows:

Revise section (c) to read: If the vehicle does not start after the manufacturer's recommended cranking time (or 10 continuous seconds in the absence of a manufacturer's recommendation), cranking shall cease for the period recommended by the manufacturer (or 10 seconds in the absence of a manufacturer's recommendation). This may be repeated for up to three start attempts. If the vehicle does not start after three attempts, the reason for failure to start shall be determined. The gas flow measuring device on the CVS (usually a revolution counter) or CFV shall be turned off and the sampler selector valves, including the alcohol sampler, placed in the "standby" position during this diagnostic period. In addition, either the CVS should be turned off, or the exhaust tube disconnected from the tailpipe during the diagnostic period. If failure to start is an operational error, the vehicle shall be rescheduled for testing from a cold start.

6. Dynamometer Test Run, Gaseous and Particulate Emissions.

To be conducted according to 40 CFR §86.137-90. For hybrid electric vehicles, the dynamometer test run, gaseous and particulate emissions shall be performed pursuant to the "California Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck, and Medium-Duty Vehicle Classes" as incorporated by reference in §1962(e), title 13, CCR.

7. Vehicle Fuel Tank Temperature Stabilization

Immediately after the hot transient exhaust emission test, the vehicle shall be soaked in a temperature controlled area between one hour to six hours, until the fuel and, if applicable, vapor temperatures are stabilized at $105^{o}F \pm 3^{o}F$ for one hour. This is a preparatory step for the running loss test. Cooling or heating of the fuel tank may be induced to bring the fuel to $105^{o}F$. The fuel heating rate shall not exceed $5^{o}F$ in any 1-hour interval. Higher fuel heating rates are allowed with Executive Officer approval if the $5^{o}F$ per hour heating rate is insufficient to heat the fuel to $105^{o}F$ in the allowed soak time. The vehicle fuel temperature stabilization step may be omitted on vehicles whose tank fuel and, if applicable, vapor temperatures are already at $105^{o}F$ upon completion of the exhaust emission test.

The initial fuel and, if applicable, vapor temperatures for the running loss test may be less than $105^{o}F$ with advance Executive Officer approval if the manufacturer is able to provide data justifying initial temperatures at least $3^{o}F$ lower than the required $105^{o}F$ starting temperature. The test data shall include the maximum fuel temperatures experienced by the vehicle during an extended parking event and after a UDDS cycle

and be conducted on a day which meets the ambient conditions specified in section III.C.1.2, except the ambient temperature must be at least 105°F. During the profile generation, the temperature offset shall apply.

The vehicle air conditioning system (if so equipped) shall be set to the "NORMAL" air conditioning mode and adjusted to the minimum discharge air temperature and high fan speed. Vehicles equipped with automatic temperature controlled air conditioning systems shall be operated in "AUTOMATIC" temperature and fan modes with the system set at 72°F.

8. Running Loss Test

After the fuel temperature is stabilized at 105°F or at the temperature specified by the manufacturer, the running loss test shall be performed. During the test, the running loss measurement enclosure shall be maintained at 105°F ± 5°F maximum and within ± 2°F on average throughout the running loss test sequence. Control of the vapor temperature throughout the test to follow the vapor temperature profile generated according to the procedures in section III.C. is optional. In those instances where vapor temperature is not controlled to follow the profile, the measurement of the fuel tank pressure is not required, and 8.1.10 and 8.2.5 below shall not apply. In the event that a vehicle exceeds the applicable emission standard during confirmatory testing or in-use compliance testing, and the vapor temperature was not controlled, the manufacturer may, utilizing its own resources, test the vehicle to demonstrate if the excess emissions are attributable to inadequate control of vapor temperature. If the vehicle has more than one fuel tank, the fuel temperature in each tank shall follow the profile generated in paragraph III.C. If a warning light or gauge indicates that the vehicle's engine coolant has overheated, the test run may be stopped.

8.1. If running loss testing is conducted using an enclosure which incorporates atmospheric sampling equipment, the manufacturer shall perform the following steps for each test:

8.1.1. The running loss enclosure shall be purged for several minutes immediately prior to the test. If at any time the concentration of hydrocarbons, of alcohol, or of alcohol and hydrocarbons exceeds 15,000 ppm C, the enclosure should be immediately purged. This concentration provides at least a 4:1 safety factor against the lean flammability limit.

8.1.2. Place the drive wheels of the vehicle on the dynamometer without starting the engine.

8.1.3. Attach the exhaust tube to the vehicle tailpipe(s).

8.1.4. The test vehicle windows and the luggage compartments shall be closed.

8.1.5. The fuel tank temperature sensor and the ambient temperature sensor shall be connected to the temperature recording system and, if required, to the air management and temperature controllers. The vehicle cooling fan shall be positioned as described in 40 CFR §86.135-90(b). During the running loss test, the cover of the vehicle engine compartment shall be closed as much as possible, windows shall be closed, and air conditioning system (if so equipped) shall be operated according to the requirements of paragraph III.C (§86.129-80 (d)(3)). Vehicle coolant temperature shall be monitored to ensure adequate vehicle coolant air to the radiator intake(s). The temperature recording system and the hydrocarbon and alcohol emission data recording system shall be started.

8.1.6. Close and seal enclosure doors.

8.1.7. When the ambient temperature is $105^{o}F \pm 5^{o}F$, the running loss test shall begin. Analyze enclosure atmosphere for hydrocarbons and alcohol at the beginning of each phase of the test (i.e., each UDDS and 120 second idle; the two NYCCs and 120 second idle) and record. This is the background hydrocarbon concentration, herein denoted as $C_{HCa(n)}$ for each phase of the test and the background methanol concentration, herein denoted as $C_{CH3OHa(n)}$ for each phase of the test. The methanol sampling must start simultaneously with the initiation of the hydrocarbon analysis and continue for 4.0 ± 0.5 minutes. Record the time elapsed during this analysis. If the 4 minute sample period is inadequate to collect a sample of sufficient concentration to allow accurate Gas Chromatography analysis, rapidly collect the methanol sample in a bag and then bubble the bag sample through the impingers at the specified flow rate. The time elapsed between collection of the bag sample and flow through the impingers should be minimized to prevent any losses.

8.1.8. The vehicle shall be driven through one UDDS, then two NYCCs and followed by one UDDS. Each UDDS and the NYCC driving trace shall be verified to meet the speed tolerance requirements of 40 CFR §86.115-78 (b) as modified by III.C. The end of each UDDS cycle and the two NYCCs shall be followed by an idle period of 120 seconds during which the engine shall remain on with the vehicle in the same transmission range and clutch (if so equipped) actuation mode as specified in §86.128-79, modified by paragraph III.C.1.3.

The fuel tank liquid temperature during the dynamometer drive shall be controlled within $\pm 3^{o}F$ of the fuel tank temperature profile obtained on the road according to the procedures in paragraph III.C (40 CFR §86.129-80) for the same vehicle platform/powertrain/fuel tank configuration. If applicable, the fuel tank vapor temperature throughout the running loss test shall agree with the corresponding vapor temperature with a tolerance of $\pm 5^{o}F$. A running loss test with a fuel tank vapor temperature that exceeded the corresponding vapor temperature profile by more than the $\pm 5^{o}F$ tolerance may be considered valid if test results comply with the applicable running loss evaporative emission standards. In addition, the fuel tank vapor temperature during the final 120 second idle period shall agree with the corresponding

vapor temperature from the on-road profile within ± 3°F. For testing conducted by the Executive Officer, vapor temperatures may be cooler than the specified tolerances without invalidating test results. The fuel tank temperatures shall be monitored at a frequency of at least once every 15 seconds.

8.1.9. For engine starting and restarting, the provisions of §86.136-90(a) and (e) shall apply. If the vehicle does not start after the manufacturer's recommended cranking time or 10 continuous seconds in the absence of a manufacturer's recommendation, cranking shall cease for the period recommended by the manufacturer or 10 seconds in the absence of a manufacturer's recommendation. This may be repeated for up to three start attempts. If the vehicle does not start after these three attempts, cranking shall cease and the reason for failure to start shall be determined. If the failure is caused by a vehicle malfunction, corrective action of less than 30 minutes duration may be taken (according to 40 CFR §86.1830-01), and the test continued, provided that the ambient conditions to which the vehicle is exposed are maintained at 105°F ± 5°F. When the engine starts, the timing sequence of the driving schedule shall begin. If the vehicle cannot be started, the test shall be voided.

8.1.10. Tank pressure shall not exceed 10 inches of water during the running loss test unless a pressurized system is used and the manufacturer demonstrates in a separate test that vapor would not be vented to the atmosphere if the fuel cap was removed at the end of the test. Transitory incidents of the pressure exceeding 10 inches of water, not greater than 10 percent of the total driving time, shall be acceptable during the running loss test if the manufacturer can demonstrate that the tank pressure does not exceed 10 inches of water during in-use operation. No pressure checks of the evaporative system shall be allowed. If the manufacturer suspects faulty or malfunctioning instrumentation, a repair of the test instrumentation may be performed. Under no circumstances will any changes/repairs to the evaporative emissions control system be allowed.

8.1.11. The FID hydrocarbon analyzer shall be zeroed and spanned immediately prior to the end of each phase of the test.

8.1.12. Analyze the enclosure atmosphere for hydrocarbons and for alcohol following each phase. This is the sample hydrocarbon concentration, herein denoted as $C_{HCs(n)}$ for each phase of the test and the sample alcohol concentration, herein denoted as $C_{CH3OHs\ (n)}$ for each phase of the test. The sample hydrocarbon and alcohol concentration for a particular phase of the test shall serve as the background concentration for the next phase of the test. The running loss test ends with completion of the final 120 second idle and occurs 72 ± 2 minutes after the test begins. The elapsed time of this analysis shall be recorded.

8.1.13. Turn off the vehicle cooling fan and the vehicle underbody fan if used. The test vehicle windows and luggage compartment shall be opened. This is a preparatory step for the hot soak evaporative emission test.

8.1.14. The technician may now leave the enclosure through one of the enclosure doors. The enclosure door shall be open no longer than necessary for the technician to leave.

8.2. If running loss testing is conducted using a cell which incorporates point source sampling equipment, the manufacturer shall perform the following steps for each test:

8.2.1. The running loss test shall be conducted in a test cell meeting the specifications of 40 CFR §86.107-90 (a)(1) as modified by paragraph III.A.2 of these procedures. Ambient temperature in the running loss test cell shall be maintained at 105 ± 5°F maximum and within ± 2°F on average throughout the running loss test sequence. The ambient test cell temperature shall be measured in the vicinity of the vehicle cooling fan, and it shall be monitored at a frequency of at least once every 15 seconds. The vehicle running loss collection system and underbody cooling apparatus (if applicable) shall be positioned and connected. The vehicle shall be allowed to re-stabilize until the liquid fuel tank temperature is within ± 3.0°F of the initial liquid fuel temperature calculated according to paragraph III.C.1.5. (40 CFR §86.129-80) before the running loss test may proceed.

8.2.2. The vehicle cooling fan shall be positioned as described in 40 CFR §86.135-90(b). During the running loss test, the cover of the vehicle engine compartment shall be closed as much as possible, windows shall be closed, and air conditioning system (if so equipped) shall be operated according to the requirements of paragraph III.C.1.3. (40 CFR §86.129-80). Vehicle coolant temperature shall be monitored to ensure adequate vehicle coolant air to the radiator intake(s).

8.2.3. The vehicle shall be operated on the dynamometer over one UDDS, two NYCCs, and one UDDS. Each UDDS and NYCC driving trace shall be verified to meet the speed tolerance requirements of 40 CFR §86.115-78 (b) as modified by paragraph III.C. Idle periods of 120 seconds shall be added to the end of each of the UDDS and to the end of the two NYCCs. The transmission may be operated according to the specifications of 40 CFR §86.128-79 as modified by paragraph III.C.1.3. Engine starting and restarting shall be conducted according to paragraph III.D.8.1.9.

8.2.4. The fuel tank liquid temperature during the dynamometer drive shall be controlled within ± 3°F of the fuel tank liquid temperature profile obtained on the road according to the procedures in paragraph III.C (40 CFR §86.129-80) for the same vehicle platform/powertrain/fuel tank configuration. If applicable, the fuel tank vapor temperature throughout the running loss test shall agree with the corresponding vapor temperature with a tolerance of ± 5°F. A running loss test with a fuel tank vapor temperature that exceeded the corresponding vapor temperature profile by more than the ± 5°F tolerance may be considered valid if test results comply with the applicable running loss evaporative emission standards. In addition, the fuel tank vapor

temperature during the final 120 second idle period shall agree with the corresponding vapor temperature from the on-road profile within ± 3°F. For testing conducted by the Executive Officer, vapor temperatures may be cooler than the specified tolerances without invalidating test results. The fuel tank temperatures shall be monitored at a frequency of at least once every 15 seconds.

8.2.5. Tank pressure shall not exceed 10 inches of water during the running loss test unless a pressurized system is used and the manufacturer demonstrates in a separate test that vapor would not be vented to the atmosphere if the fuel cap was removed at the end of the test. Transitory incidents of the pressure exceeding 10 inches of water, not greater than 10 percent of the total driving time, shall be acceptable during the running loss test if the manufacturer can demonstrate that the tank pressure does not exceed 10 inches of water during in-use operation. No pressure checks of the evaporative system shall be allowed. If the manufacturer suspects faulty or malfunctioning instrumentation, a repair of the test instrumentation may be performed. Under no circumstances will any changes/repairs to the evaporative emissions control system be allowed.

8.2.6. After the test vehicle is positioned on the dynamometer, the running loss vapor collection system shall be properly positioned at the specified discrete emissions sources, which include vapor vents of the vehicle's fuel system, if not already positioned. The typical vapor vents for current fuel systems are the vents of the evaporative emission canister(s) and the tank pressure relief vent typically integrated into the fuel tank cap as depicted in figure 1. Other designated places, if any, where fuel vapor can escape, shall also be included.

8.2.7. The running loss vapor collection system may be connected to the PDP-CVS or CFV bag collection system. Otherwise, running loss vapors shall be sampled continuously with analyzers meeting the requirements of §86.107-90(a)(2).

8.2.8. The temperature of the collection system until it enters the main dilution airstream shall be maintained between 175°F to 200°F throughout the test to prevent fuel vapor condensation.

8.2.9. The sample bags shall be analyzed within 20 minutes of their respective sample collection phases, as described in 40 CFR §86.137-90(b)(15).

8.2.10. After the completion of the final 120 seconds, turn off the vehicle cooling fan and the vehicle underbody fan if used.

8.3. Manufacturers may use an alternative running loss test procedure if it provides an equivalent demonstration of compliance. The use of an alternative procedure also requires the prior approval of the Executive Officer. ~~However,~~ The Executive Officer may conduct confirmatory testing or in-use compliance testing ~~may be conducted by the Executive Officer~~ using either the running loss measurement

enclosure incorporating atmospheric sampling equipment or in a test cell utilizing point source sampling equipment, as specified in paragraph III.A.2 (40 CFR §86.107-90(a)(1)), ~~and~~ in conjunction with the procedures as outlined in either paragraph III.D.8.1 or III.D.8.2 of this test procedure, or using the manufacturer's approved alternative running loss test procedure for a specific evaporative family.

9. Hot Soak Test

9.1 Amend the first paragraph of 40 CFR §86.138-90 as follows: For the three-day diurnal sequence, the hot soak evaporative emission test shall be conducted immediately following the running loss test. The hot soak test shall be performed at an ambient temperature of $105^{o}F \pm 10.0^{o}F$ for the first 5 minutes of the test. The remainder of the hot soak test shall be performed at $105^{o}F \pm 5.0^{o}F$ and $\pm 2.0^{o}F$ on average.

9.2. Revise section (a) to read: If the hot soak test is conducted in the running loss enclosure, the final hydrocarbon and alcohol concentration for the running loss test, calculated in paragraph III.D.11.3.1(b), shall be the initial hydrocarbon concentration (time=0 minutes) C_{HCe1} and the initial alcohol concentration (time=0 minutes) $C_{CH3OHe1}$ for the hot soak test. If the vehicle must be transported to a different enclosure, sections 9.3 through 9.7, as modified below, shall be conducted.

9.3. Revise section (d) to include: Analyze the enclosure atmosphere for hydrocarbons and alcohol and record. This is the initial (time=0 minutes) hydrocarbon concentration, C_{HCe1} and the initial (time=0 minutes) alcohol concentration, $C_{CH3OHe1}$, required in paragraph III.D.11.3.1(a).

9.4. Revise section (e) to read: If the hot soak test is not conducted in the running loss enclosure, the vehicle engine compartment cover shall be closed, the cooling fan shall be moved, the vehicle shall be disconnected from the dynamometer and exhaust sampling system, and then driven at minimum throttle to the vehicle entrance of the enclosure.

9.5. Revise section (i) to read: If hot soak testing is not conducted in the same enclosure as running loss testing, the hot soak enclosure doors shall be closed and sealed within two minutes of engine shutdown and within seven minutes after the end of the running loss test. If running loss and hot soak testing is conducted in the same enclosure, the hot soak test shall commence immediately after the completion of the running loss test.

9.6. Revise section (j) to read: The 60 ± 0.5 minutes hot soak begins when the enclosure door(s) are sealed or when the running loss test ends if the hot soak test is conducted in the running loss enclosure.

9.7 For the supplemental two-day diurnal test sequence, the hot soak test shall be conducted immediately following the hot start exhaust test. The hot soak test shall be performed at an ambient temperature between 68 to 86^{o}F at all times. The hot soak test shall be conducted according to 40 CFR §86.138-90, revised by 9.2 through 9.7 of this paragraph.

10. Diurnal Breathing Loss Test

A three-day diurnal test shall be performed in a variable temperature enclosure, described in paragraph III.A.1 of this test procedure. The test consists of three 24-hour cycles. For purposes of this diurnal breathing loss test, all references to methanol shall be applicable to alcohol.

If testing indicates that a vehicle design may result in fuel temperature responses during enclosure testing that are not representative of in-use summertime conditions, the Executive Officer may adjust air circulation and temperature during the test as needed to ensure that the test sufficiently duplicates the vehicle's in-use experience.

10.1 Revise 40 CFR §86.133-90 to read as follows:

10.1.1. Revise section (a)(1) to read: Upon completion of the hot soak test, the test vehicle shall be soaked for no less than 6 hours nor more than 36 hours. For at least the last 6 hours of this period, the vehicle shall be soaked at 65^{o}F ± 3^{o}F. The diurnal breathing loss test shall consist of three 24-hour test cycles.

10.1.2. Omit section (f).

10.1.3. Omit section (i).

10.1.4. Revise section (j) to read: Prior to initiating the emission sampling:

10.1.5. Revise section (k) to read: Emission sampling shall begin within 10 minutes of closing and sealing the doors, as follows:

10.1.6. Revise section (k)(3) to read: Start diurnal heat build and record time. This commences the 24 hour ± 2 minute test cycle.

10.1.7. Revise section (l) to read: For each 24-hour cycle of the diurnal breathing loss test, the ambient temperature in the enclosure shall be changed in real time as specified in the following table:

Hour	0	1	2	3	4	5	6	7	8	9	10	11	12
(^{O}F)	65.0	66.6	72.6	80.3	86.1	90.6	94.6	98.1	101.2	103.4	104.9	105.0	104.2
Hour	13	14	15	16	17	18	19	20	21	22	23	24	--
(^{O}F)	101.1	95.3	88.8	84.4	80.8	77.8	75.3	72.0	70.0	68.2	66.5	65.0	--

10.1.8. Omit section (m).

10.1.9. Revise section (n) to read: The end of the first 24-hour cycle of the diurnal test occurs 24 hours ± 2 minutes after the heat build begins. Analyze the enclosure atmosphere for hydrocarbons and alcohol and record. This is the final hydrocarbon concentration, C_{HCe2}, and the final alcohol concentration, $C_{CH3OHe2}$, in paragraph III.D.11.3.1(c) which modifies 40 CFR §86.143-90, for this test cycle. The time (or elapsed time) of this analysis shall be recorded. The procedure, commencing with paragraph (k)(1) shall be repeated until three consecutive 24-hour tests are completed. The data from the test cycle yielding the highest diurnal hydrocarbon mass shall be used in evaporative emissions calculations as required by paragraph III.D.11.3.1(c). which modifies 40 CFR §86.143-90.

10.1.10. Revise section (q) to read: Upon completion of the final 24-hour test cycle, and after the final alcohol sample has been collected, the enclosure doors shall be unsealed and opened.

10.1.11. Omit section (r).

10.1.12. Add section (t) to read: For hybrid electric vehicles, the manufacturer shall specify the working capacity of the evaporative emission control canister, and shall specify the number of 24-hour diurnals that can elapse before the auxiliary power unit will activate solely for the purposes of purging the canister of hydrocarbon vapor.

10.1.13. Add section (u) to read: In order to determine that the working capacity of the canister is sufficient to store the hydrocarbon vapor generated over the manufacturer specified number of days between auxiliary power unit activation events for the purposes of purging the evaporative canister, the evaporative canister shall be weighed after completion of the three-day diurnal period. The weight of the vapor contained in the canister shall not exceed the working capacity of the canister multiplied by three days and divided by the manufacturer specified number of days between auxiliary power unit activation events.

10.1.14. Add section (v) to read: The manufacturer shall specify the time interval of auxiliary power unit operation necessary to purge the evaporative emission control canister, and shall submit an engineering analysis to demonstrate that the canister will be purged to within five percent of its working capacity over the time interval.

The two-day diurnal test shall be performed in an enclosure, described in paragraph III.A.1 of this test procedure. The test consists of two 24-hour cycles. The test procedure shall be conducted according to 40 CFR §86.133-90, revised by 10.1.1 through 10.1.15 of this paragraph except that only two consecutive 24-hour cycles will be performed. For the purposes of this diurnal breathing loss test, all references to methanol shall be applicable to alcohol.

11. Calculations: Evaporative Emissions

Revise 40 CFR §86.143-90 as follows:

11.1. Revise section (a) to read: The calculation of the net hydrocarbon plus methanol mass change in the enclosure is used to determine the diurnal, hot soak, and running loss mass emissions. If the emissions also include ethanol and other alcohol components, the manufacturer shall determine an appropriate calculation(s) which reflect characteristics of the alcohol component similar to the equations below, subject to the Executive Officer approval. The mass changes are calculated from initial and final hydrocarbon and methanol concentrations in ppm carbon, initial and final enclosure ambient temperatures, initial and final barometric pressures, and net enclosure volume using the following equations:

11.2. Revise section (a)(1) to read:

Methanol calculations shall be conducted according to 40 CFR §86.143-96(b)(1)(i), as amended March 24, 1993.

11.3. Revise section (a)(2) to read:

11.3.1 For hydrocarbons:

(a) Hot soak HC mass. For fixed volume enclosures, the hot soak enclosure mass is determined as:

$$M_{HChs} = [2.97x (V_n - 50) x10^{-4} x \{P_f (C_{HCe2} - rC_{CH3OHe2})/T_f - P_i (C_{HCe1} - rC_{CH3OHe1})/T_i\}]$$

where: M_{HChs} is the hot soak HC mass emissions (grams)

V_n is the enclosure nominal volume if the running loss enclosure is used or the enclosure volume at 105°F if the diurnal enclosure is used. (ft^3)

P_i is the initial barometric pressure (inches Hg)

P_f is the final barometric pressure (inches Hg)

C_{HCe2} is the final enclosure hydrocarbon concentration including FID response to methanol in the sample (ppm C)

C_{HCe1} is the initial enclosure hydrocarbon concentration including FID response to methanol in the sample (ppm C)

$C_{CH3OHe2}$ is the final methanol concentration calculated according to §86.143-90 (a)(2)(iii) (ppm C equivalent)

$C_{CH3OHe1}$ is the initial methanol concentration calculated according to §86.143-90 (a)(2)(iii) (ppm C equivalent)

r is the FID response factor to methanol

T_i is the initial enclosure temperature (°R)

T_f is the final enclosure temperature (°R)

For variable volume enclosures, calculate the hot soak enclosure mass (M_{HChs}) according to the equation used above except that P_f and T_f shall equal P_i and T_i.

(b) Running loss HC mass. The running loss HC mass per distance traveled is defined as:

$$M_{HCrlt} = (M_{HCrl(1)} + M_{HCrl(2)} + M_{HCr1(3)})/(D_{rl(1)} + D_{rl(2)} + D_{rl(3)})$$

where: M_{HCrlt} is the total running loss HC mass per distance traveled (grams HC per mile)

$M_{HCrl(n)}$ is the running loss HC mass for phase n of the test (grams HC)

$D_{rl(n)}$ is the actual distance traveled over the driving cycle for phase n of the test (miles)

For the point-source method:

Hydrocarbon emissions:

$M_{HCrl(n)} = (C_{HCs(n)} - C_{HCa(n)}) \times 16.88 \times V_{mix} \times 10^{-6}$

where: $C_{HCs(n)}$ is the sample bag HC concentration for phase n of the test (ppm C)

$C_{HCa(n)}$ is the background bag concentration for phase n of the test (ppm C)

16.88 is the density of pure vapor at 68^{o}F (grams/ft^3)

V_{mix} is the total dilute CVS volume (std. ft^3)

and: V_{mix} is calculated per 40 CFR §86.144-90

Methanol emissions:

$M_{CH3OHrl(n)} = (C_{CH3OHs(n)} - C_{CH3OHa(n)}) \times 37.74 \times V_{mix}$

where: $C_{CH3OHs(n)}$ is the sample bag methanol concentration for phase n of the test (ppm C equivalent)

$C_{CH3OHa(n)}$ is the background bag concentration for phase n of the test (ppm C equivalent)

37.71 is the density of pure vapor at 68^{o}F (grams/ft^3)

V_{mix} is the total dilute CVS volume (std. ft^3)

and: V_{mix} is calculated per 40 CFR §86.144-90

For the enclosure method:

$M_{HCrl(n)}$ shall be determined by the same method as the hot soak hydrocarbon mass emissions determination specified in paragraph III.D.11.3.1(a).

(c) Diurnal mass. For fixed volume enclosures, the HC mass for each of the three diurnals is defined for an enclosure as:

$$M_{HCd} = [2.97x(V - 50)x10^{-4}x\{P_f (C_{HCe2} - rC_{CH3OHe2})/T_f - P_i (C_{HCe1} - rC_{CH3OHe1})/T_i \}] + M_{HC, out} - M_{HC, in}$$

where: M_{HCd} is the diurnal HC mass emissions (grams)

V is the enclosure volume at 65^o F (ft^3)

P_i is the initial barometric pressure (inches Hg)

P_f is the final barometric pressure (inches Hg)

C_{HCe2} is the final enclosure hydrocarbon concentration including FID response to methanol in the sample (ppm C)

C_{HCe1} is the initial enclosure hydrocarbon concentration including FID response to methanol in the sample (ppm C)

$C_{CH3OHe2}$ is the final methanol concentration calculated according to 40 CFR §86.143-90 (a)(2)(iii)

$C_{CH3OHe1}$ is the initial methanol concentration calculated according to 40 CFR §86.143-90 (a)(2)(iii)

r is the FID response factor to methanol

T_i is the initial enclosure temperature (^{o}R)

T_f is the final enclosure temperature (^{o}R)

$M_{HC, out}$ is the mass of hydrocarbon exiting the enclosure from the beginning of the cycle to the end of the cycle (grams)

$M_{HC, in}$ is the mass of hydrocarbon entering the enclosure from the beginning of the cycle to the end of the cycle (grams)

For variable volume enclosures, calculate the HC mass for each of the three diurnals (M_{HCd}) according to the equation used above except that P_f and T_f shall equal P_i and T_i and $M_{HC, out}$ and $M_{HC, in}$ shall equal zero.

11.3.2. Revise section (a)(3) to read:

The total mass emissions shall be adjusted as follows:

(1) $M_{hs} = M_{HChs} + (14.2284/32.042) \times 10^{-6} M_{CH3OH}$

(2) $M_{di} = M_{HCd} + (14.3594/32.042) \times 10^{-6} M_{CH3OH}$

(3) $M_{rl} = M_{HCrlt} + (14.2284/32.042) \times 10^{-6} M_{CH3OH}$

11.3.3. Revise section (b) to read: The final evaporative emission test results reported shall be computed by summing the adjusted evaporative emission result determined for the hot soak test (M_{hs}) and the highest 24-hour result determined for the diurnal breathing loss test (M_{di}). The final reported result for the running loss test shall be the adjusted emission result (M_{r1}), expressed on a grams per mile basis.

E. Liquefied Petroleum Gas-fueled Vehicles

1. For 1983 and subsequent model-year LPG-fueled motor vehicles, the introduction of 40 percent by volume of chilled fuel and the heating of the fuel tank under the diurnal part of the evaporative test procedures shall be eliminated.

2. Calculation of LPG Emissions. The evaporative emissions for LPG systems shall be calculated in accordance with 40 CFR §86.143-78 or §86.143-90 except that a H/C ratio of 2.658 shall be used for both the diurnal and hot soak emissions.

F. Fuel Specifications

Evaporative emission test fuel shall be the fuel specified for exhaust emission testing as specified in the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles," except as provided in section III.G. of these test procedures.

G. Alternative Test Procedures

If a manufacturer uses for evaporative and exhaust emission testing a gasoline test fuel meeting the specifications set forth in 40 CFR §86.113-94(a)(1), the manufacturer may use the evaporative emission test procedures set forth in 40 CFR §§86.107-96 through 86.143-96 in place of the test procedures set forth in these test procedures.

Manufacturers may use an alternative set of test procedures to demonstrate compliance with the standards set forth in section I.E. of these test procedures with advance Executive Officer approval if the alternative procedure is demonstrated to yield

test results equivalent to, or more stringent than, those resulting from the use of the test procedures set forth in section III.D. of these test procedures.

If the manufacturer uses for certification a test procedure other than section III.D, the Executive Officer has the option to conduct confirmatory and in-use compliance testing with the test procedures set forth in section III.D. of this California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles.

H. Use of Comparable Federal Requirements for Carry-across Specifications and Road Profile Correction Factors

Upon prior written approval of the Executive Officer, a manufacturer may use the comparable federal requirements in Title 40, CFR, Part 86 in lieu of the carry-across specifications of paragraph II.A. of these test procedures and the running loss road profile correction factors of paragraph III.C. The Executive Officer shall approve a manufacturer's request if the manufacturer demonstrates to the Executive Officer that the alternative methodology will not adversely affect in-use evaporative emissions.

PART IV. EVAPORATIVE EMISSION TEST PROCEDURES FOR MOTORCYCLES

1. For the purposes of these procedures, the following references in 40 CFR, Part 86, Subpart B to light-duty vehicle evaporative testing shall also apply to motorcycles: 40 CFR §§86.117-78, 86.117-90, 86.121-82 and 86.121-90. In addition, 40 CFR, Part 86, Subparts E, F, and other cited sections of Subpart B are incorporated into this test procedure by reference.

2. Preconditioning shall be performed in accordance with 40 CFR §86.532-78. The provisions of §86.132-78 which prohibit abnormal loading of the evaporative emission control system during fueling and setting the dynamometer horsepower using a test vehicle shall be observed. Additional preconditioning (40 CFR §86.132-82(a)(3) and §86.132-90(a)(3)) may be allowed by the Executive Officer under unusual circumstances.

3. Instrumentation. The instrumentation necessary to perform the motorcycle evaporative emission test is described in 40 CFR §86.107-78 and §86.107-90, with the following changes:

(i) Revise section (a)(4) to read: Tank fuel heating system. The tank fuel heating system shall consist of two separate heat sources with two temperature controllers. A typical heat source is a pair of heating strips. Other sources may be used as required by circumstances and the Executive Officer may allow manufacturers to provide the heating apparatus for compliance testing. The temperature controllers may be manual, such as variable transformers, or they may be automated. Since vapor and fuel temperature are to be controlled independently, an automatic controller is recommended for the fuel. The heating system must not cause hot spots on the tank wetted surface which could cause local overheating of the fuel or vapor. Heating strips for the fuel, if used, should be located as low as practicable on the tank and should cover at least 10 percent of the wetted surface. The centerline of the fuel heating strips, if used, shall be below 30 percent of the fuel depth as measured from the bottom of the fuel tank and approximately parallel to the fuel level in the tank. The centerline of the vapor heating strips, if used, should be located at the approximate height of the center of the vapor volume. The temperature controller must be capable of controlling the fuel and vapor temperatures to the diurnal heating profile within the specified tolerance.

(ii) Revise section (a)(5) (Temperature Recording System) to read: In addition to the specifications in this section, the vapor temperature in the fuel tank shall be measured. When the fuel or vapor temperature sensors cannot be located in the fuel tank to measure the temperature of the prescribed test fuel or vapor at the approximate mid-volume, sensors shall be located at the approximate mid-volume of each fuel or vapor containing cavity. The average of the readings from these sensors shall constitute the fuel or vapor temperature. The fuel and vapor temperature sensors shall be located at least one inch away from any heated tank surface. The Executive

Officer may approve alternate sensor locations where the specifications above cannot be met or where tank symmetry provides redundant measurements.

(iii) Calibration shall be performed in accordance with 40 CFR §86.516-78 or §86.516-90.

4. Test Procedure

(i) The motorcycle exhaust emission test sequence is described in 40 CFR §86.530-78 through §86.540-78. The SHED test shall be accomplished by performing the diurnal portion of the SHED test (40 CFR §86.133-78 except subsections a(1), k, and p; §86.133-90 except subsections a(1), l, and s; and neglecting references to windows and luggage compartments in these sections) after preconditioning and soak but prior to the "cold" start test. The fuel will be cooled to below 30^{o}C after the diurnal test. The "cold" and "hot" start exhaust emission tests shall then be run. The motorcycle will then be returned for the hot soak portion of the SHED test. This general sequence is shown in Figure E78-10, under 4- CFR §86.130-78. The specified time limits shall be followed with the exception of soak times which are specified in 40 CFR §86.532-78 for motorcycles.

Running loss tests, when necessary, will be performed in accordance with 40 CFR §86.134-78, except references to §§86.135-82 through 86.137-82 and §§86.135-90 through 86.137-90 shall mean §§86.535-78 through 86.537-78.

(ii) A manufacturer of Class III motorcycles with annual California sales of less than 500 units using an assigned evaporative emission control system DF pursuant to paragraph II.B.2.1.1(vii) shall measure and report to the Executive Officer exhaust emissions from the CVS test between the diurnal and the hot soak tests even if the test is being conducted for evaporative emissions only. The exhaust emission levels projected for the motorcycle's useful life utilizing the exhaust emission DF determined during previous federal or California certification testing shall not exceed the standards set forth in section 1958, title 13, CCR.

(iii) The fuel and vapor temperatures for the diurnal portion of the evaporative emission test shall conform to the following functions within ± 1.7^{o}C with the tank filled to 50 percent ±2.5 of its actual capacity, and with the motorcycle resting on its center kickstand (or a similar support) in the vertical position.

$$T_f = (1/3)t + 15.5^{o}C$$

$$T_v = (1/3)t + 21.0^{o}C$$

where T_f = fuel temperature, ^{o}C
T_v = vapor temperature, ^{o}C
t = time since the start of the diurnal temperature rise, minutes.

The test duration shall be 60 ± 2 minutes, giving a fuel and vapor temperature rise of $20^{o}C$. The final fuel temperature shall be $35.5^{o}C \pm 0.5\ ^{o}C$.

An initial vapor temperature up to $5^{o}C$ above $21^{o}C$ may be used. For this condition, the vapor shall not be heated at the beginning of the diurnal test. When the fuel temperature has been raised to $5.5^{o}C$ below the vapor temperature by following the T_f function, the remainder of the vapor heating profile shall be followed.

(iv) An alternate temperature rise for the diurnal test may be approved by the Executive Officer. If a manufacturer has information which shows that a particular fuel tank design will change the temperature rise significantly from the function above, the manufacturer may present the information to the Executive Officer for evaluation and consideration.

(v) The hot soak evaporative emission test shall be performed immediately following the "hot" start exhaust emission test. This test is described in 40 CFR §§86.138-78 and 86.138-90, except for §§86.138-78(d) and 86.138-90(e) which are revised to require that the motorcycle be pushed with the engine off rather than driven at a minimum throttle from the dynamometer to the SHED.

(vi) Calculations shall be performed in accordance with 40 CFR §86.143-78 or 86.143-90, except the standard volume for a motorcycle shall be $5ft^3$ instead of $50\ ft^3$.

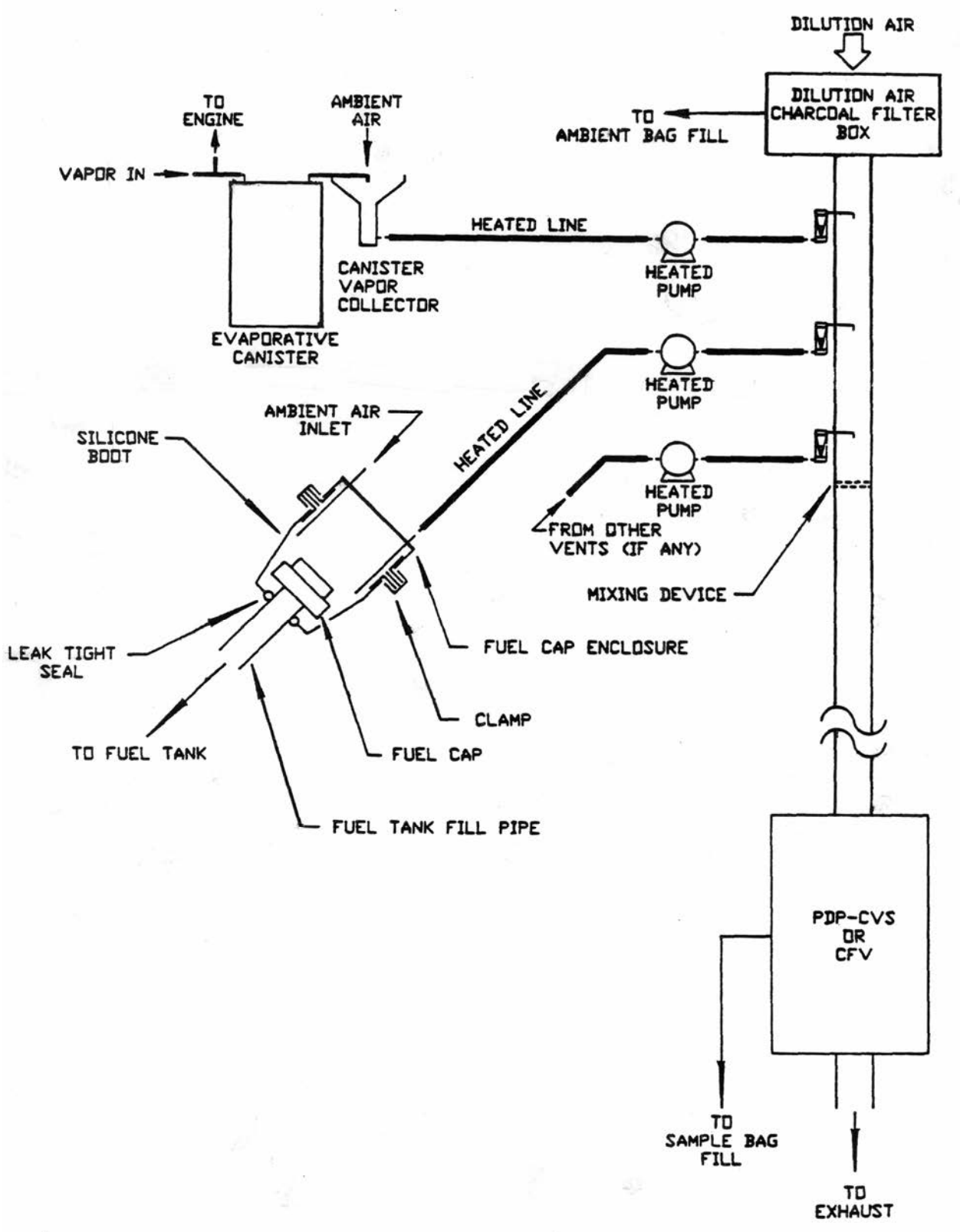


Figure 1: Running Loss Vapor Vent Collection System

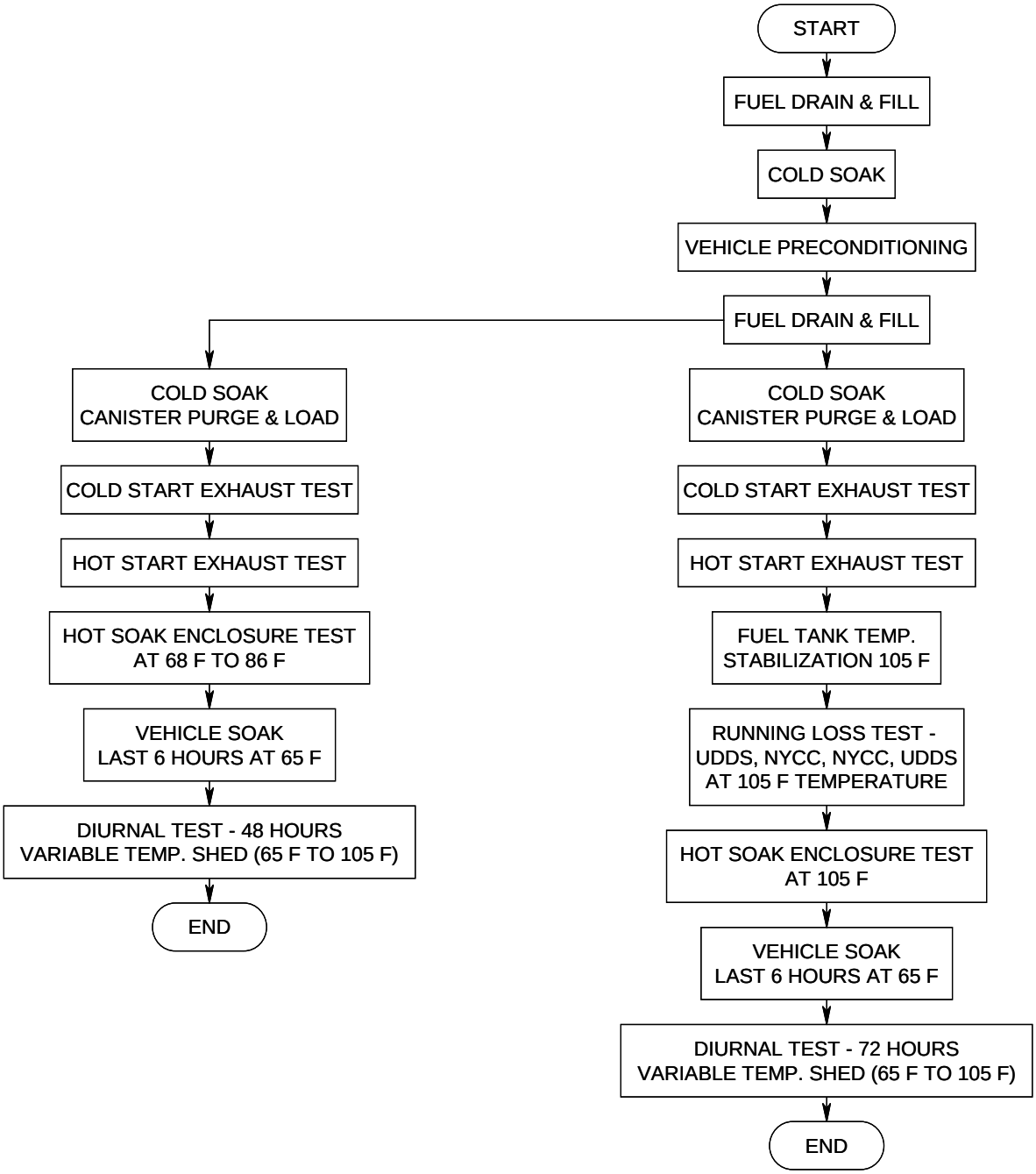


Figure 2: Test Procedure for 2001 and Subsequent Model Motor Vehicles

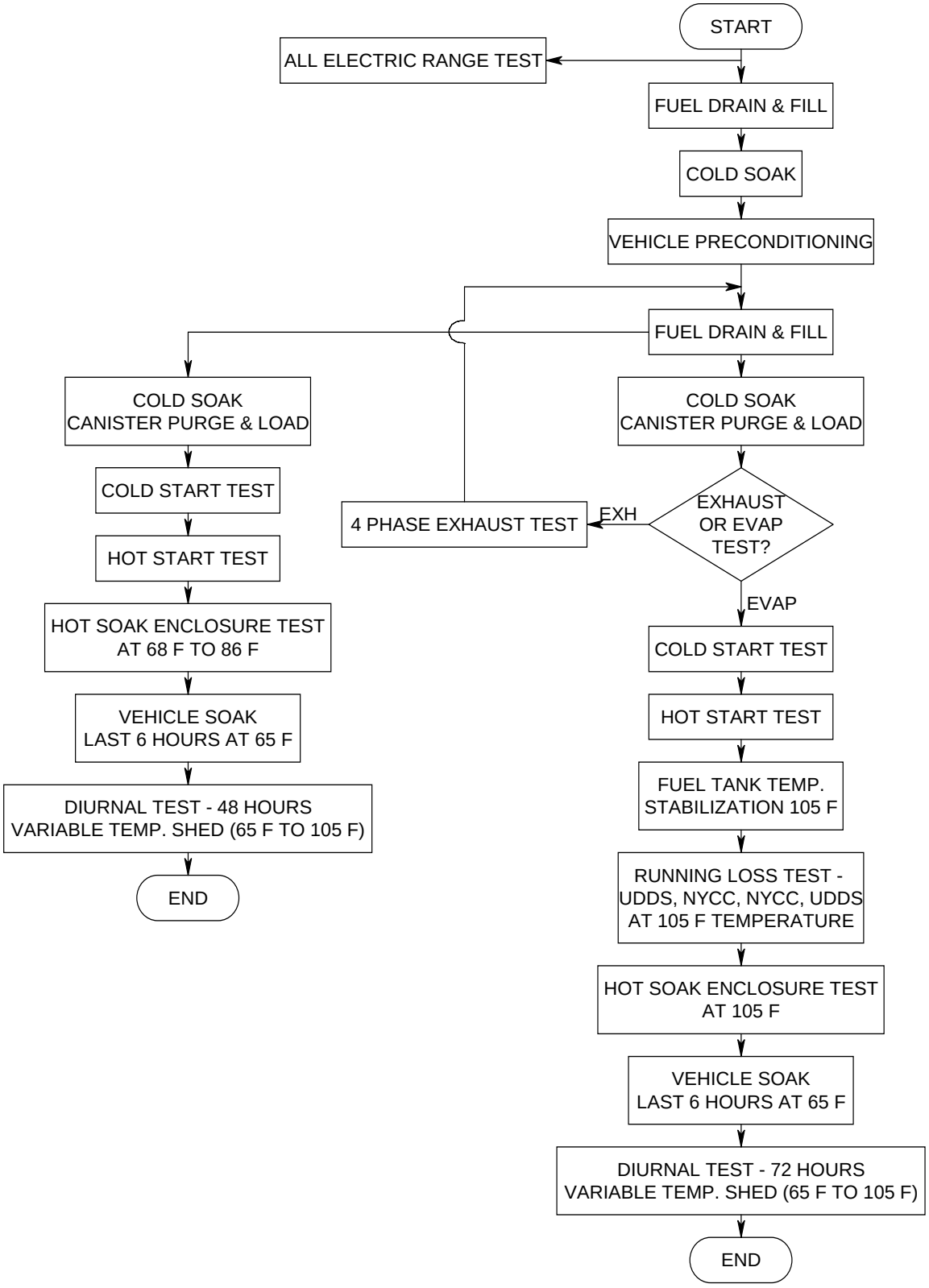


Figure 3A: Test Procedure for 2001 and Subsequent Model Hybrid Electric Vehicles

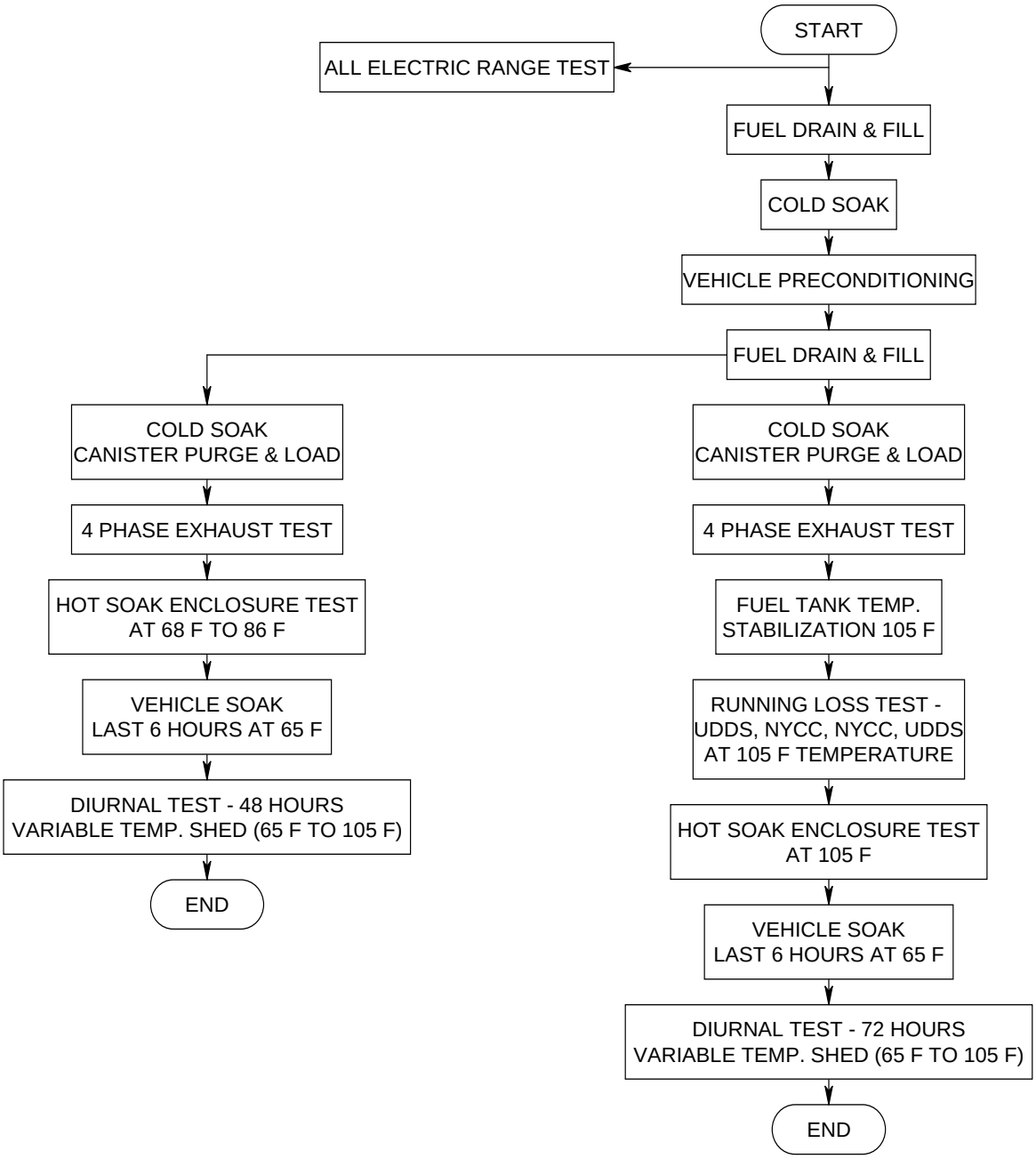


Figure 3B: Test Procedure for 2001 and Subsequent Model Hybrid Electric Vehicles

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

Note: The amendments to this document are shown in underline to indicate additions and ~~strikeouts~~ to indicate deletions compared to the test procedures as last amended September 5, 2003. Existing intervening text that is not amended is indicated by a row of asterisks (* * * *).

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

* * * *

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

1. Amend §§86.1810-01 (~~July 12, 2001~~December 8, 2005) 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)~~ through (n)~~ [No change.]

1.3 ~~(o) and (p) [n/a]~~(l) Substitute certification to the applicable refueling emission standards set forth in section 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.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).~~A manufacturer shall also demonstrate compliance with the fuel spillage test requirements contained in Title 13, California Code of Regulations, §2235, Specifications for Fill Pipes and Openings of Motor Vehicle Fuel Tanks, as last amended January 22, 1990, incorporated by reference herein.~~

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, Specifications for Fill Pipes and Openings of Motor Vehicle Fuel Tanks, as last amended January 22, 1990, which is hereby incorporated by reference herein.

* * * *

F. Emission Standards

1. Delete 40 CFR §§86.1811 through ~~86.1815~~86.1816 (all years).

* * * *

G. Durability Demonstration procedures for refueling emissions.

[No change from 40 CFR §1825-01 (October 6, 2000).]

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," are hereby incorporated by reference herein.

Refueling Test Procedures

86.146-96 Fuel dispensing spitback procedure. August 23, 1995.
86.150-98 Overview, refueling test. September 21, 1994.
86.151-98 General requirements; refueling test. April 6, 1994.
86.152-98 Vehicle preparation; refueling test. ~~August 23, 1995~~December 8, 2005.
86.153-98 Vehicle and canister preconditioning; refueling test. ~~August 23, 1995~~December 8, 2005.
86.154-98 Measure procedure; refueling test. August 23, 1995.
86.155-98 Records required; refueling test. April 6, 1994.
86.156-98 Calculations. April 6, 1994.

California Environmental Protection Agency
AIR RESOURCES BOARD

CALIFORNIA EXHAUST EMISSION STANDARDS TEST PROCEDURES FOR 2001 AND SUBSEQUENT MODEL PASSENGER CARS, LIGHT-DUTY TRUCKS, AND MEDIUM-DUTY VEHICLES

Adopted: August 5, 1999
Amended: December 27, 2000
Amended: July 30, 2002
Amended: September 5, 2002 (corrected February 20, 2004)
Amended: May 28, 2004
Amended: August 4, 2005
Amended: June 22, 2006

Note: The amendments are shown in underlined text to indicate additions to the existing text, and in ~~strikeouts~~ to indicate deletions, compared to the test procedures as last amended August 4, 2005. Existing intervening text that is not amended is indicated by a row of asterisks (* * * *).

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 2001 AND SUBSEQUENT MODEL PASSENGER CARS, LIGHT-DUTY TRUCKS AND MEDIUM-DUTY VEHICLES

The provisions of Subparts B, C, and S, Part 86, Title 40, Code of Federal Regulations, as adopted or amended 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, and to the extent they pertain to exhaust emission standards and test procedures, are hereby adopted as the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," with the following exceptions and additions.

PART I: GENERAL PROVISIONS FOR CERTIFICATION AND IN-USE VERIFICATION OF EMISSIONS

* * * *

C. General Requirements for Certification

* * * *

3. §86.1807 Vehicle Labeling.

3.1 §86.1807-01. ~~October 6, 2000~~December 8, 2005. Amend as follows:

* * * *

3.1.8. Subparagraph (g): Add the following: The manufacturer shall obtain approval from the Executive Officer for all emission control label formats and locations prior to use. ~~Approval of the specific tune-up settings is not required; however, the format for all such settings and tolerances, if any, is subject to review.~~ If the Executive Officer finds that the information on the label is vague or subject to misinterpretation, or that the location does not comply with these specifications, ~~he or she~~the Executive Officer may require that the label or its location be modified accordingly. Samples of all actual production emission control labels used within a test group shall be submitted to the Executive Officer within thirty days after the start of production. The Executive Officer may approve alternate label locations or may, upon request, waive or modify the label content requirements provided that the intent of these requirements is met. If the Executive Officer finds any motor vehicle or motor vehicle engine manufacturer using emission control labels which are different from those approved or which do not substantially comply with the readability or durability requirements set forth in these labeling requirements, the Executive Officer may invoke §2109, title 13, CCR.

3.2 §86.1807-07. January 18, 2001. [No change, except that the amendments to §86.1807-01, 70 FR 72917 (December 8, 2005), still apply.]

* * * *

D. §86.1810 General standards; increase in emissions; unsafe conditions; waivers

1. §86.1810-01. ~~April 13, 2001~~December 8, 2005. Amend §86.1810-01 as follows:

* * * *

G. Procedures for Demonstration of Compliance with Emission Standards

* * * *

3. §86.1829 Durability data and emission data testing requirements; waivers.

3.1 §86.1829-01. ~~July 12, 2001~~December 8, 2005. Amend as follows:

* * * *

I. In-Use Compliance Requirements and Procedures

1. §86.1845 Manufacturer in-use verification testing requirements.

1.1 §86.1845-01. ~~October 6, 2000~~December 8, 2005. Amend as follows:

* * * *

1.2 §86.1845-04. ~~July 12, 2001~~December 8, 2005. Amend as follows:

* * * *

PART II: CALIFORNIA EXHAUST AND PARTICULATE EMISSION TEST PROCEDURES FOR PASSENGER CARS, LIGHT-DUTY TRUCKS AND MEDIUM-DUTY VEHICLES

This part describes the equipment required and the procedures necessary to perform gaseous and particulate exhaust emission tests (40 CFR Part 86, Subpart B); cold temperature test procedures (40 CFR Part 86, Subpart C); the California 50^{o}F test procedure; the development of reactivity adjustment factors; and the supplemental federal test procedure (40 CFR Part 86, Subpart B) on passenger cars, light-duty trucks and medium-duty vehicles.

A. 40 CFR Part 86, Subpart B – Emission Regulations for 1977 and Later Model Year New Light-Duty Vehicles and New Light-Duty Trucks; Test Procedures.

* * * *

100.4 Calibrations methods and frequency.

* * * *

86.117-96 Evaporative emission enclosure calibrations. ~~August 23, 1995~~December 8, 2005.

* * * *

100.5 Test Procedures and Data Requirements.

* * * *

100.5.3 California Vehicle Preconditioning Requirements.

* * * *

86.134-96 Running loss test. ~~August 23, 1995~~December 8, 2005.
86.135-00 Dynamometer procedure. October 22, 1996. [No change, except that the amendments to §86,135-90, 70 FR 72917 (December 8, 2005), shall apply.]

* * * *

100.5.4 Calculations; exhaust emissions.

* * * *

86.159-00 Exhaust emission test procedures for US06 emissions. ~~October 22, 1996~~December 8, 2005.
86.160-00 Exhaust emission test procedure for SC03 emissions. ~~October 22, 1996~~December 8, 2005.

* * * *

State of California
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CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 2004 AND SUBSEQUENT MODEL HEAVY-DUTY DIESEL -ENGINES AND VEHICLES

Adopted:	December 12, 2002
Amended:	July 24, 2003
Amended:	September 1, 2006
Amended:	July 26, 2007
Amended:	October 17, 2007
Amended:	October 14, 2008
Amended:	September 27, 2010
Amended:	October 12, 2011
Amended:	March 22, 2012

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 last amended September 27, 2010. [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 "* * * *".

As Amended: March 22, 2012
Date of Hearing: January 26-27, 2012

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CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 2004 AND SUBSEQUENT MODEL HEAVY-DUTY DIESEL -ENGINES AND VEHICLES

The following provisions of Subparts A, I, N, S, and T, Part 86, and of Subparts A through K, Part 1065, Title 40, Code of Federal Regulations, as adopted or amended by the U.S. Environmental Protection Agency on the date set forth next to the applicable section listed below, and only to the extent they pertain to the testing and compliance of exhaust emissions from heavy-duty diesel engines and vehicles, are adopted and incorporated herein by this reference as the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles," except as altered or replaced by the provisions set forth below.

PART 86 – CONTROL OF EMISSIONS FROM NEW AND IN-USE HIGHWAY VEHICLES AND ENGINES

I. GENERAL PROVISIONS FOR CERTIFICATION AND IN-USE VERIFICATION OF EMISSIONS.

* * * *

Subpart A - General Provisions for Emission Regulations for 1977 and Later Model Year New Light-Duty Vehicles, Light-Duty Trucks, and Heavy-Duty Engines, and for 1985 and Later Model Year New Gasoline-Fueled, Natural Gas-Fueled, Liquefied Petroleum Gas-Fueled and Methanol-Fueled Heavy-Duty Vehicles.

* * * *

2. Definitions. [§86.xxx-2]

A. Federal Provisions.

1. **§86.004-2** January 18, 2001. [All federal definitions apply, except as otherwise noted below. Definitions specific to other requirements are contained in separate documents.]

2. **§86.010-2** April 30, 2010. [All federal definitions apply, except as otherwise noted below. Definitions specific to other requirements are contained in separate documents.]

* * * *

11. Emission standards for diesel heavy-duty engines and vehicles. [§86.xxx-11]

* * * *

B. California provisions.

* * * *

5. **Standards for Medium-Duty Engines.**

5.1 **Requirements Specific to Heavy-Duty Engines Used in Medium-Duty Vehicles 8,501 to 10,000 pounds GVW.** For the 2004 through 2019 model years, a~~A~~ manufacturer of heavy-duty engines used in medium-duty vehicles 8,501 to 10,000 pounds GVW may choose to comply with the following standards as an alternative to the primary emission standards and test procedures specified in title 13, CCR, §1961 or §1961.2, as applicable. A manufacturer that chooses to comply with these optional heavy-duty standards and test procedures shall specify, in the application for certification, an in-use compliance test procedure, as provided in title 13, CCR, §2139(c). For the 2020 and subsequent model years, a manufacturer of heavy-duty engines used in medium-duty vehicles 8,501 to 10,000 pounds GVW must comply with the primary emission standards and test procedures specified in title 13, CCR, §1961.2.

5.2 **Requirements Specific to Heavy-Duty Engines Used in Medium-Duty Vehicles 10,001 to 14,000 pounds GVW.** For the 2004 and subsequent model years, a manufacturer of heavy-duty engines used in medium-duty vehicles 10,001 to 14,000 pounds GVW may choose to comply with the following standards as an alternative to the primary emission standards and test procedures specified in title 13, CCR, §1961 or §1961.2, as applicable. A manufacturer that chooses to comply with these optional heavy-duty standards and test procedures shall specify, in the application for certification, an in-use compliance test procedure, as provided in title 13, CCR, §2139(c).

5.3 **Exhaust Emission Standards for Medium-Duty Engines.** The exhaust emissions from new 2004 through 2019 model heavy-duty diesel engines used in ultra-low emission and super-ultra-low emission medium-duty diesel vehicles 8,501 to 10,000 pounds GVW and 2004 and subsequent model heavy-duty diesel engines used in ultra-low emission and super-ultra-low emission medium-duty diesel vehicles 10,001 to 14,000 pounds GVW shall not exceed:

Exhaust Emission Standards for 2004 – <u>through</u> 2006 Model Medium-Duty ULEVs and SULEVs				
Vehicle Emission Category	NOx + NMHC	CO	PM	HCHO
ULEV[1] Option A	2.5 (with a 0.5 cap on NMHC)	14.4	0.10	0.050
ULEV[1]; Option B	2.4	14.4	0.10	0.050

Exhaust Emission Standards for 2007 <u>through 2019 Model Medium-Duty ULEVs and SULEVs 8,501-10,000 lbs. GVW</u> and <u>2007 and</u> Subsequent Model Medium-Duty ULEVs and SULEVs <u>10,001-14,000 lbs. GVW</u>					
Vehicle Emission Category	NOx	NMHC or NMHCE	CO	PM	HCHO
ULEV[1]	0.20	0.14	15.5	0.01	0.050
SULEV[1]	0.10	0.07	7.7	0.005	0.025

[1] Emissions averaging may be used to meet these standards using the requirements for participation averaging, banking and trading programs, as set forth in Section I.15 of these test procedures.

5.4 **<u>Optional Standards for Complete Heavy-Duty Vehicles.</u>**
<u>Manufacturers may request to group complete heavy-duty vehicles into the same test group as vehicles certifying to the LEV III exhaust emission standards and test procedures specified in title 13, CCR, §1961.2, so long as those complete heavy-duty diesel vehicles meet the most stringent LEV III standards to which any vehicle within that test group certifies.</u>

* * * *

21. Application for certification. [§86.xxx-21]

A. Federal provisions.

* * * *

2. **§86.007-21** ~~July 13, 2005~~ <u>August 30, 2006</u>. Amend as follows:

* * * *

<u>2.6 Subparagraph (q). [No change.]</u>

* * * *

23. Required data. [§86.xxx-23]

A. Federal provisions.

1. **§86.098-23**. ~~October 21, 1997~~ April 30, 2010.

* * * *

2. **§86.001-23.** October 21, 1997. [No change, except that the amendments indicated for §86.098-23 above still apply.]

3. **§86.007-23.** ~~January 18, 2001~~ October 30, 2009. [No change, except that the amendments indicated for §86.098-23 above still apply.]

* * * *

26. Mileage and service accumulation; emission measurements. [§86.004-26] ~~October 6, 2000~~ July 13, 2005.

* * * *

28. Compliance with emission standards. [§86.xxx-28] January 18, 2001.

A. Federal provisions.

1. **§86.004-28**. ~~January 18, 2001~~ August 30, 2006. Amend as follows:

* * * *

30. Certification. [§86.xxx-30]

A. Federal provisions

1. **§86.004-30**. ~~October 21, 1997~~ October 6, 2000. Amend as follows:

* * * *

2. **§86.007-30**. February 24, 2009. Amend as follows:

1.1 Subparagraphs (a) through (a)(2). [No change.]

1.2 Add the following sentence to subparagraph (a)(3)(i). For heavy-duty engines certified under the provisions of section I.11.B.4 of these test procedures two certificates will be issued, one for each fueling mode. [No change to remainder of paragraph.]

1.3 Subparagraphs (a)(3)(ii) through (b)(2). [No change.]

1.4 Subparagraph (b)(3). Add the following sentence: If, after a review of the request and supporting data, the Executive Officer finds that the request raises a substantial factual issue, he shall provide the manufacturer a hearing in accordance with title 17, CCR, §60040, et seq., with respect to such issue.

1.5 Subparagraph (b)(4). [No change.]

1.6 Subparagraph (b)(4)(i). Add the following phrase at the beginning of the paragraph: Request a hearing under title 17, CCR, §60040, et seq.; or…

1.7 Subparagraph (b)(4)(ii) through (b)(5). [No change.]

1.8 Subparagraph (b)(5)(i). Add the following phrase at the beginning of the paragraph: Request a hearing under title 17, CCR, §60040, et seq.; or…

1.9. Subparagraph (b)(5)(ii) through (c)(5). [No change.]

1.10 Subparagraph (c)(5)(i). Add the following phrase at the beginning of the paragraph: Be made only after the manufacturer concerned has been offered an opportunity for a hearing conducted in accordance with title 17, CCR, §60040, et seq. hereof; and …

1.11 Subparagraph (c)(5)(ii). [No change.]

1.12 Subparagraph (c)(6). Add the following sentence: The manufacturer may request in the form and manner specified in paragraph (b)(3) of this section that any determination made by the Executive Officer under paragraph (c)(1) of this section to withhold or deny certification be reviewed in a hearing conducted in accordance with title 17, CCR, §60040, et seq. If the Executive Officer finds, after a review of the request and supporting data, that the request raises a substantial factual issue, he will grant the request with respect to such issue.

1.13 Subparagraphs (d) through (e). [No change.]

1.14 Delete subparagraph (f) and replace with the following: All medium-duty diesel cycle engines used in vehicles up to 14,000 pounds GVW must have an on-board diagnostic system as required in title 13, CCR §1968 et seq, as applicable.

* * * *

38. Maintenance instructions. [§86.xxx-38]

A. Federal provisions

1. **§86.004-38** ~~October 21, 1997~~ June 27, 2003.

1.1 Subparagraphs (a) through (f). [No change.]

1.2 Amend subparagraph (g)(1) as follows: (g) Emission control diagnostic service information:

(1) Manufacturers shall furnish or cause to be furnished to any person engaged in the repairing or servicing of motor vehicles or motor vehicle engines, or the Administrator upon request, any and all information needed to make use of the on-board diagnostic system and such other information, including instructions for making emission-related diagnosis and repairs, including, but not limited to, service manuals, technical service bulletins, recall service information, data stream information, bi-directional control information, and training information, unless such information is protected by section 208(c) of the Act or California

Government Code Section 6250, as a trade secret. No such information may be withheld under section 208(c) of the Act or California Government Code Section 6250 if that information is provided (directly or indirectly) by the manufacturer to franchised dealers or other persons engaged in the repair, diagnosing, or servicing of motor vehicles or motor vehicle engines.

1.3 Subparagraphs (g)(2) through (h). [No change.]

2. **§86.007-38** ~~January 18, 2001~~ June 29, 2004.

2.1 Subparagraphs (a) through (h). [No change, except as amended in §86.004-38, above.]

2.2 Amend subparagraph (i) as follows: For each new diesel-fueled engine subject to the standards prescribed in title 13, CCR §1956.8(a), §1956.8(h), and Sec. 86.007-11, as applicable, the manufacturer shall furnish or cause to be furnished to the ultimate purchaser a statement that "This engine must be operated only with low sulfur diesel fuel (that is, diesel fuel meeting ARB specifications for highway diesel fuel, including a 15 ppm sulfur cap)."

3. **§86.010-38** April 30, 2010.

3.1 Subparagraphs (a) through (f). [No change.]

3.2 Subparagraph (g). Delete; replace with: Manufacturers of heavy-duty diesel engines used in vehicles weighing 14,000 pounds GVW and less must comply with the motor vehicle service information requirements set forth in title 13, CCR §1969.

3.3 Subparagraph (h). [No change.]

3.4 Amend subparagraph (i) as follows: For each new diesel-fueled engine subject to the standards prescribed in title 13, CCR §1956.8(a), §1956.8(h), and Sec. 86.007-11, as applicable, the manufacturer shall furnish or cause to be furnished to the ultimate purchaser a statement that "This engine must be operated only with low sulfur diesel fuel (that is, diesel fuel meeting ARB specifications for highway diesel fuel, including a 15 ppm sulfur cap)."

3.5 Subparagraph (j). Delete; replace with: Manufacturers of heavy-duty diesel engines used in vehicles over 14,000 pounds GVW must comply with the motor vehicle service information requirements set forth in title 13, CCR §1969.

* * * *

40. Heavy-duty engine rebuilding practices. [§86.xxx-40]

A. Federal Provisions.

1. **§86.004-40** ~~October 21, 1997~~ January 18, 2001.

1.1 Add the following sentence to the introductory paragraph: Any deviation from the provisions contained in this section is also a prohibited act under California Vehicle Code section 27156, et seq.

1.2 Subparagraphs (a) through (e). [No change.]

II. TEST PROCEDURES

Subpart I - Emission Regulations for New Diesel-Fueled Heavy-Duty Engines; Smoke Exhaust Test Procedure

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86.884-8 Dynamometer and engine equipment. ~~September 5, 1997~~ July 13, 2005.

* * * *

86.884-10 Information. ~~September 5, 1997~~ July 13, 2005.
86.884-11 Instrument checks. December 1~~1~~0, 1984.
86.884-12 Test run. ~~December 16, 1987~~ July 13, 2005.

* * * *

86.884-14 Calculations. ~~September 5, 1997~~ January 15, 2004.

Subpart N - Emission Regulations for New Otto-Cycle and Diesel Heavy-Duty Engines; Gaseous and Particulate Exhaust Test Procedures

* * * *

86.1305-2010 Introduction; structure of subpart. ~~July 13, 2005~~ September 15, 2011.

* * * *

~~86.1321-90 Hydrocarbon analyzer calibration. July 13, 2005.~~

* * * *

86.1333-90 Transient test cycle generation. ~~May 4, 1998~~ February 18, 2000.
86.1333-2010 Transient test cycle generation. ~~July 13, 2005~~ June 30, 2008.

* * * *

~~86.1337-90 Engine dynamometer test run. April 11, 1989.~~
86.1337-96 Engine dynamometer test run. September 5, 1997.

* * * *

86.1360-2007 Supplemental emission test; test cycle and procedures. ~~July 13, 2005~~ June 30, 2008.

A. Federal provisions.

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4. Subparagraph (c). [~~Reserve~~ No change.]

5. Subparagraph (d). Determining the control area. [No change.]

6. Subparagraph (e). [Reserve.]

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86.1362-2007 Steady-state testing with a ramped-modal cycle. ~~July 13, 2005~~ June 30, 2008.
86.1363-2007 Steady-state testing with a discrete-mode cycle. ~~July 13, 2005~~ June 30, 2008.

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Subpart S – General Compliance Provisions for Control of Air Pollution From New and In-Use Light-Duty Vehicles, Light-Duty Trucks, and Complete Otto-Cycle Heavy-Duty Vehicles.

86.1863-07 Optional chassis certification for diesel vehicles. ~~June 17, 2003~~ September 15, 2011.

1. Amend subparagraph (a) as follows: For the 2004 through 2014 model years, aA manufacturer may optionally certify heavy-duty diesel vehicles weighing 14,000 pounds GVWR or less to the emission standards specified in title 13, CCR, §1961. Such vehicles must meet all applicable requirements of the "California 2001 through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and ~~for~~ 2009 through 2016 ~~and Subsequent~~ Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as incorporated by reference in title 13, CCR, §1961(d). For the 2015 through 2019 model years, a manufacturer may optionally certify heavy-duty diesel vehicles weighing 8,500 to 10,000 pounds GVWR or less to the emission standards specified in title 13, CCR, §1961 or §1961.2, as applicable. Such vehicles must meet all applicable requirements 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," incorporated by reference in section 1961.2, title 13, CCR. For the 2015 and subsequent model years, a manufacturer may optionally certify heavy-duty diesel vehicles weighing 10,001 to 14,000 pounds GVWR or less to the emission standards specified in title 13, CCR, §1961.2. Such vehicles must meet all applicable requirements 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," incorporated by reference in section 1961.2, title 13, CCR. For the 2020 and subsequent model years, heavy-duty diesel vehicles 8,501 to 10,000 pounds GVW must certify to the primary emission standards and test procedures for complete vehicles specified in section 1961.2, title 13, CCR.

* * * *

4. Subparagraphs (h) and (i). [n/a]

* * * *

PART 1065 – ENGINE-TESTING PROCEDURES.

Subpart A – Applicability and General Provisions

1065.1 Applicability. ~~July 13, 2005~~ September 15, 2011.

1. Amend subparagraph (a) as follows:

1.1. Introductory paragraph. [No change.]

1.2. Subparagraphs (a)(1). [n/a]

1.~~2~~3. Amend subparagraph (a)(~~1~~2) as follows: Model year 2010 and later heavy-duty highway engines we regulate under title 13, CCR, §1956.8. For earlier model years, manufacturers may use the test procedures in this part or those specified in 40 CFR part 86, subpart N, according to §1065.10, as modified by these test procedures.

1.~~3~~4. Subparagraphs (a)(~~2~~3) through (a)(~~4~~8). [n/a]

2. Subparagraph (b). [n/a]

3. Subparagraph (c) through (g). [No change.]

1065.2 Submitting information to EPA under this part. ~~July 13, 2005~~ April 30, 2010.

1. Subparagraphs (a) through (d). [No change.]

2. Amend subparagraph (e) as follows: See title 13, CCR, section 91011 for provisions related to confidential information. Note that according to this section, emission data shall not be identified as confidential.

3. Subparagraph (f). [No change.]

1065.5 Overview of this part 1065 and its relationship to the standard-setting part. ~~July 13, 2005~~ October 30, 2009.

1065.10 Other procedures. ~~July 13, 2005~~ April 30, 2010.

1065.12 Approval of alternate procedures. ~~July 13, 2005~~ June 30, 2008.

1065.15 Overview of procedures for laboratory and field testing. ~~July 13, 2005~~ September 15, 2011.

1065.20 Units of measure and overview of calculations. ~~July 13, 2005~~ September 15, 2011.

1065.25 Recordkeeping. July 13, 2005.

Subpart B – Equipment Specifications

1065.101 Overview. ~~July 13, 2005~~ June 30, 2008.

1065.110 Work inputs and outputs, accessory work, and operator demand. ~~July 13, 2005~~ June 30, 2008.

1065.120 Fuel properties and fuel temperature and pressure. ~~July 13, 2005~~ June 30, 2008.

1065.122 Engine cooling and lubrication. ~~July 13, 2005~~ June 30, 2008.

1065.125 Engine intake air. ~~July 13, 2005~~ September 15, 2011.

1065.127 Exhaust gas recirculation. July 13, 2005.
1065.130 Engine exhaust. ~~July 13, 2005~~ June 30, 2008.
1065.140 Dilution for gaseous and PM constituents. ~~*July 13, 2005*~~ ~~November 8, 2010~~ September 15, 2011.
1065.145 Gaseous and PM probes, transfer lines, and sampling system components. ~~July 13, 2005~~ April 30, 2010.
1065.150 Continuous sampling. July 13, 2005.
1065.170 Batch sampling for gaseous and PM constituents. ~~July 13, 2005~~ September 15, 2011.
1065.190 PM-stabilization and weighing environments for gravimetric analysis. ~~July 13, 2005~~ September 15, 2011.
1065.195 PM-stabilization environment for in-situ analyzers. ~~July 13, 2005~~ June 30, 2008.

Subpart C – Measurement Instruments

1065.201 Overview and general provisions. ~~July 13, 2005~~ April 30, 2010.
1065.202 Data updating, recording, and control. July 13, 2005.
1065.205 Performance specifications for measurement instruments. ~~July 13, 2005~~ September 15, 2011.

Measurement of Engine Parameters and Ambient Conditions

1065.210 Work input and output sensors. ~~July 13, 2005~~ June 30, 2008.
1065.215 Pressure transducers, temperature sensors, and dewpoint sensors. ~~July 13, 2005~~ June 30, 2008.

Flow-Related Measurements

1065.220 Fuel flow meter. ~~July 13, 2005~~ June 30, 2008.
1065.225 Intake-air flow meter. ~~July 13, 2005~~ September 15, 2011.
1065.230 Raw exhaust flow meter. July 13, 2005.
1065.240 Dilution air and diluted exhaust flow meters. ~~July 13, 2005~~ April 30, 2010.
1065.245 Sample flow meter for batch sampling. July 13, 2005.
1065.248 Gas divider. July 13, 2005.

CO and CO_2 Measurements

1065.250 Nondispersive infra-red analyzer. ~~July 13, 2005~~ September 15, 2011.

Hydrocarbon Measurements

1065.260 Flame ionization detector. ~~*July 13, 2005*~~ ~~November 8, 2010~~ September 15, 2011.
1065.265 Nonmethane cutter. ~~July 13, 2005~~ September 15, 2011.
1065.267 Gas chromatograph. ~~July 13, 2005~~ September 15, 2011.

NOx Measurements

1065.270 Chemiluminescent detector. ~~July 13, 2005~~ September 15, 2011.
1065.272 Nondispersive ultraviolet analyzer. ~~July 13, 2005~~ September 15, 2011.
1065.275 N_2O measurement devices. September 15, 2011.

O_2 Measurements

1065.280 Paramagnetic and magnetopneumatic O_2 detection analyzers. ~~July 13, 2005~~ September 15, 2011.

Air-to Fuel Ratio Measurements

1065.284 Zirconia (ZrO_2) analyzer. ~~July 13, 2005~~ September 15, 2011.

PM Measurements

1065.290 PM gravimetric balance. ~~*July 13, 2005*~~ November 8, 2010.
1065.295 PM inertial balance for field-testing analysis. ~~*July 13, 2005*~~ ~~November 8, 2010~~ September 15, 2011.

Subpart D – Calibrations and Verifications

1065.301 Overview and general provisions. July 13, 2005.
1065.303 Summary of required calibration and verifications. ~~July 13, 2005~~ September 15, 2011.
1065.305 Verifications for accuracy, repeatability, and noise. ~~July 13, 2005~~ April 30, 2010.
1065.307 Linearity verification. ~~*July 13, 2005*~~ ~~November 8, 2010~~ September 15, 2011.
1065.308 Continuous gas analyzer system-response and updating-recording verification. ~~July 13, 2005~~ October 8, 2008.
1065.309 Continuous gas analyzer uniform response verification. ~~July 13, 2005~~ April 30, 2010.

Measurement of Engine Parameters and Ambient Conditions

1065.310 Torque calibration. ~~July 13, 2005~~ June 30, 2008.
1065.315 Pressure, temperature, and dewpoint calibration. ~~July 13, 2005~~ April 30, 2010.

Flow-Related Measurements

1065.320 Fuel-flow calibration. July 13, 2005.
1065.325 Intake-flow calibration. July 13, 2005.
1065.330 Exhaust-flow calibration. July 13, 2005.
1065.340 Diluted exhaust flow (CVS) calibration. ~~*July 13, 2005*~~ ~~November 8, 2010~~ September 15, 2011.
1065.341 CVS and batch sampler verification (propane check). ~~July 13, 2005~~ September 15, 2011.
1065.342 Sample dryer verification. April 30, 2010.
1065.345 Vacuum-side leak verification. ~~July 13, 2005~~ April 30, 2010.

CO and CO_2 Measurements

1065.350 H_2O interference verification for CO_2 NDIR analyzers. ~~July 13, 2005~~ September 15, 2011.
1065.355 H_2O and CO_2 interference verification for CO NDIR analyzers. ~~July 13, 2005~~ April 30, 2010.

Hydrocarbon Measurements

1065.360 FID optimization and verification. ~~July 13, 2005~~ September 15, 2011.
1065.362 Non-stoichiometric raw exhaust FID O2 interference verification. ~~July 13, 2005~~ June 30, 2008.
1065.365 Nonmethane cutter penetration fractions. ~~July 13, 2005~~ October 30, 2009.

NOx Measurements

1065.370 CLD CO_2 and H_2O quench verification. ~~July 13, 2005~~ September 15, 2011.
1065.372 NDUV analyzer HC and H_2O interference verification. ~~July 13, 2005~~ September 15, 2011.
1065.376 Chiller NO_2 penetration. ~~July 13, 2005~~ June 30, 2008.
1065.378 NO_2-to-NO converter conversion verification. ~~July 13, 2005~~ September 15, 2011.

PM Measurements

1065.390 PM balance verifications and weighing process verification. ~~*July 13, 2005*~~ November 8, 2010.
1065.395 Inertial PM balance verifications. July 13, 2005.

Subpart E – Engine Selection, Preparation, and Maintenance

1065.401 Test engine selection. July 13, 2005.
1065.405 Test engine preparation and maintenance. ~~July 13, 2005~~ June 30, 2008.
1065.410 Maintenance limits for stabilized test engines. ~~July 13, 2005~~ June 30, 2008.
1065.415 Durability demonstration. ~~July 13, 2005~~ June 30, 2008.

Subpart F – Performing an Emission Test in the Laboratory

1065.501 Overview. ~~July 13, 2005~~ April 30, 2010.
1065.510 Engine mapping. ~~July 13, 2005~~ September 15, 2011.
1065.512 Duty cycle generation. ~~July 13, 2005~~ October 8, 2008.
1065.514 Cycle-validation criteria. ~~July 13, 2005~~ September 15, 2011.
1065.520 Pre-test verification procedures and pre-test data collection. ~~July 13, 2005~~ September 15, 2011.
1065.525 Engine starting, restarting, and shutdown. ~~*July 13, 2005*~~ ~~November 8, 2010~~ September 15, 2011.
1065.526 Repeating void modes or test intervals. November 8, 2010.
1065.530 Emission test sequence. ~~July 13, 2005~~ September 15, 2011.
1065.545 Validation of proportional flow control for batch sampling. ~~July 13, 2005~~ April 30, 2010.
1065.546 Validation of minimum dilution ratio for PM batch sampling and drift correction. September 15, 2011.
1065.550 Gas analyzer range validation, drift validation, and drift correction. ~~*July 13, 2005*~~ ~~November 8, 2010~~ September 15, 2011.
1065.590 PM sample preconditioning and tare weighing. ~~July 13, 2005~~ June 30, 2008.
1065.595 PM sample post-conditioning and total weighing. ~~July 13, 2005~~ June 30, 2008.

Subpart G – Calculations and Data Requirements

1065.601 Overview. ~~July 13, 2005~~ April 30, 2010.
1065.602 Statistics. ~~July 13, 2005~~ September 15, 2011.
1065.610 Duty cycle generation. ~~July 13, 2005~~ September 15, 2011.
1065.630 1980 international gravity formula. July 13, 2005.

1065.640 Flow meter calibration calculations. ~~*July 13, 2005*~~ ~~November 8, 2010~~ September 15, 2011.
1065.642 SSV, CFV, and PDP molar flow rate calculations. ~~*July 13, 2005*~~ ~~November 8, 2010~~ September 15, 2011.
1065.645 Amount of water in an ideal gas. ~~July 13, 2005~~ September 15, 2011.
1065.650 Emission calculations. ~~July 13, 2005~~ September 15, 2011.
1065.655 Chemical balances of fuel, intake air, and exhaust. ~~July 13, 2005~~ September 15, 2011.
1065.659 Removed water correction. ~~July 13, 2005~~ September 15, 2011.
1065.660 THC and NMHC determination. ~~*July 13, 2005*~~ ~~November 8, 2010~~ September 15, 2011.
1065.665 THCE and NMHCE determination. ~~July 13, 2005~~ June 30, 2008.
1065.667 Dilution air background emission correction. ~~July 13, 2005~~ September 15, 2011.
1065.670 NOx intake-air humidity and temperature corrections. ~~July 13, 2005~~ September 15, 2011.
1065.672 Drift correction. ~~July 13, 2005~~ April 30, 2010.
1065.675 CLD quench verification calculations. ~~July 13, 2005~~ September 15, 2011.
1065.690 Buoyancy correction for PM sample media. ~~July 13, 2005~~ April 30, 2010.
1065.695 Data requirements. ~~July 13, 2005~~ June 30, 2008.

Subpart H – Engine Fluids, Test Fuels, Analytical Gases and Other Calibration Standards

1065.701 General requirements for test fuels. ~~July 13, 2005~~ April 30, 2010.

A. Federal provisions.

1. Subparagraph (a). [No change.]

2. Amend subparagraph (b) as follows: *Fuels meeting alternative specifications.* We may allow you to use a different test fuel if you show us and we find that using it does not affect your ability to comply with all applicable emission standards using commercially available fuels.

3. Subparagraph (c). [No change.]

4. Amend subparagraph (d) as follows: *Fuel specifications*. The fuel parameters specified in this subpart depend on measurement procedures that are incorporated by reference.

5. Subparagraph (e). [No change.]

6. Subparagraph (f). [No change.]

B. California provisions.

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3. **Identification of New Clean Fuels to be Used in Certification Testing.**

Any person may petition the state board to establish by regulation certification testing specifications for a new clean fuel for which specifications for the new clean fuel are not specifically set forth in paragraph §86.1313-98 as amended herein. Prior to adopting such specifications, the state board shall consider the relative cost-effectiveness of use of the fuel in reducing emissions compared to the use of other fuels. Whenever the state board adopts specifications for a new clean fuel for certification testing, it shall also establish by regulation specifications for the fuel as it is sold commercially to the public.

(a) If the proposed new clean fuel may be used to fuel existing motor vehicles, the state board shall not establish certification specifications for the fuel unless the petitioner has demonstrated that:

(1) Use of the new clean fuel in such existing motor vehicles would not increase emissions of NMHC, NOx, and CO, and the potential risk associated with toxic air contaminants, as determined pursuant to the procedures set forth in the "California Test Procedures for Evaluating Substitute Fuels and New Clean Fuels through 2014," as ~~adopted September 17, 1993~~ amended [INSERT DATE OF AMENDMENT] or the "California Test Procedures for Evaluating Substitute Fuels and New Clean Fuels in 2015 and Subsequent Years," as adopted [INSERT DATE OF ADOPTION], as applicable. In the case of fuel-flexible vehicles or dual-fuel vehicles that were not certified on the new clean fuel but are capable of being operated on it, exhaust and evaporative emissions from the use of the new clean fuel shall not increase compared to exhaust and evaporative emissions from the use of gasoline that complies with Title 13, Division 3, Chapter 5, Article 1, California Code of Regulations.

(2) Use of the new clean fuel in such existing motor vehicles would not result in increased deterioration of the vehicle and would not void the warranties of any such vehicles.

(b) Whenever the state board designates a new clean fuel pursuant to this section, the state board shall also establish by regulation required specifications for the new clean fuel sold commercially in California.

1065.703 Distillate diesel fuel. ~~July 13, 2005~~ April 30, 2010.

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1065.705 Residual fuel. June 30, 2008. [~~Reserved~~ No change.]
1065.710 Gasoline. ~~July 13, 2005~~ June 30, 2008. [n/a]
1065.715 Natural gas. ~~July 13, 2005~~ June 30, 2008.

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2. Subparargraphs (b) through (d). [No change.]

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1065.720 Liquefied petroleum gas. July 13, 2005.

* * * *

2. Subparagraphs (b) through (d). [No change.]

1065.740 Lubricants. July 13, 2005.
1065.745 Coolants. July 13, 2005.
1065.750 Analytical gases. ~~*July 13, 2005*~~ November 8, 2010 September 15, 2011.
1065.790 Mass standards. ~~July 13, 2005~~ September 15, 2011.

Subpart I –Testing with Oxygenated Fuels

1065.801 Applicability. July 13, 2005.
1065.805 Sampling system. ~~July 13, 2005~~ June 30, 2008.
1065.845 Response factor determination. ~~July 13, 2005~~ April 30, 2010.
1065.850 Calculations. July 13, 2005.

Subpart J – Field Testing and Portable Emission Measurement Systems

1065.901 Applicability. ~~July 13, 2005~~ June 30, 2008.
1065.905 General provisions. ~~*July 13, 2005*~~ November 8, 2010.
1065.910 PEMS auxiliary equipment for field testing. ~~July 13, 2005~~ April 30, 2010.
1065.915 PEMS instruments. ~~*July 13, 2005*~~ November 8, 2010 September 15, 2011.
1065.920 PEMS calibrations and verifications. ~~*July 13, 2005*~~ November 8, 2010.
1065.925 PEMS preparation for field testing. ~~*July 13, 2005*~~ November 8, 2010 September 15, 2011.
1065.930 Engine starting, restarting, and shutdown. July 13, 2005.
1065.935 Emission test sequence for field testing. ~~July 13, 2005~~ June 30, 2008.
1065.940 Emission calculations. ~~*July 13, 2005*~~ November 8, 2010.

Subpart K – Definitions and Other Reference Information

1065.1001 Definitions. ~~July 13, 2005~~ September 15, 2011.

1. Amend the definition of "Designated Compliance Officer" as follows:

Designated Compliance Officer means the Executive Officer of the Air Resources Board or a designee of the Executive Officer.

1065.1005 Symbols, abbreviations, acronyms, and units of measure. ~~July 13, 2005~~ September 15, 2011.

1065.1010 Reference materials. ~~July 13, 2005~~ September 15, 2011.