# The California Low-Emission Vehicle Regulations

(With Amendments Effective February 17, 2007)

The California low-emission vehicle (LEV) regulations are administered by the California Air Resources Board (ARB) and apply to passenger cars, light-duty trucks and medium-duty vehicles. They are contained in various sections of chapter 1 (Motor Vehicle Pollution Control Devices), division 3 (Air Resources Board), title 13, California Code of Regulations (CCR), which commences with section 1900. The LEV exhaust emission standards were originally adopted in a 1990-1991 rulemaking, and generally became applicable in the 1994 model year. The LEV program also includes requirements for the introduction of zero-emission vehicles (ZEVs).

Following a November 5, 1998 hearing, the ARB adopted the California "LEV II" regulations, which generally become applicable with the 2004 model year (although earlier certification to the LEV II standards is permitted). The LEV II rulemaking also included the adoption of Compliance Assurance Program "CAP 2000" amendments which establish new motor vehicle certification and in-use test requirements – developed jointly with the U.S. Environmental Protection Agency – applicable to 2001 and subsequent model motor vehicles. The LEV II regulations were formally adopted August 5, 1999 and became operative November 27, 1999. The original LEV standards are now referred to as the "LEV I" standards. Amendments adopted December 27, 2000 require manufacturers to market federally-certified vehicle models in California in those instances where the federal model is certified to a set of federal "Tier 2" exhaust emissions standards that are more stringent than the set of California LEV exhaust emission standards to which the manufacturer would otherwise certify the equivalent California model.

## The LEV I Regulations

The LEV I standards are contained primarily in section 1960.1, which includes all of the California exhaust emission standards for 1981 through 2003 model-year passenger cars, light-duty trucks and medium-duty vehicles. The key portions of section 1960.1 pertaining to the LEV I program are:

| | |
|---|---|
| § 1960.1(e)(2) | Formaldehyde exhaust emission standards for 1993-2003 model methanol-fueled passenger cars, light-duty trucks and medium-duty vehicles. |
| § 1960.1(e)(3) | Formaldehyde exhaust emission standards for 1992-2006 model LEV I TLEVs, LEVs, ULEVs and SULEVs in the passenger car, light-duty truck, and medium-duty vehicle classes. |
| § 1960.1(f)(2) | The non-LEV so-called "Tier 1" standards for 1995 through 2003 model passenger cars and light-duty trucks. |
| § 1960.1(g)(1) | The "LEV I" TLEV, LEV and ULEV standards for passenger cars and light-duty trucks. |
| § 1960.1(g)(2) | The fleet average non-methane organic gas (NMOG) requirements for passenger cars and light-duty trucks for the 1994 through 2000 model years (the fleet average NMOG requirements for the 2001-2003 model years are now in section 1961(b)(1)(A)). The fleet average NMOG mechanism requires manufacturers to introduce an incrementally cleaner mix of Tier 1, TLEV, LEV, ULEV and ZEV vehicles each year, with the fleet average NMOG value for passenger cars and lighter light-duty trucks decreasing from 0.25 gram/mile in the 1994 model year to 0.062 gram/mile in the 2003 model year. |
| § 1960.1(h)(1) | The non-LEV so-called "Tier 1" standards for 1995-2003 medium-duty vehicles. |
| § 1960.1(h)(2) | The "LEV I" LEV, ULEV and SULEV standards for medium-duty vehicles (the phase-in requirements are in note (10) to the table in section 1960.1(h)(2)). |
| § 1960.1(p) | The cold temperature carbon monoxide standards for 1996-2000 model vehicles. |

In addition, section 1960.1(q) and (r) contain the following Supplemental Federal Test Procedure (SFTP) standards which apply to both LEV I and LEV II vehicles:

§1960.1(q) The SFTP standards for 2001 and subsequent model passenger cars and light-duty trucks other than LEVs, ULEVs, and ZEVs (the phase-in requirements are in note (9) to the table in §1960.1(q)).

§1960.1(r) The SFTP exhaust emission standards for 2001 and subsequent model LEVs and ULEVs in the passenger cars and light-duty truck classes, and 2003 and subsequent LEVs, ULEVs, and SULEVs in the medium-duty classes (the phase-in requirements are in note (10) to the table in §1960.1(r)).

Section 1956.8, which establishes exhaust emission standards for heavy-duty vehicles, contains two subsections containing optional standards for engines used in incomplete medium-duty vehicles or diesel engines used in medium-duty vehicles. Engines subject to this option are tested in accordance with the heavy-duty test procedures incorporated by reference in section 1956.8(b) and (d).

§1956.8(g) Tier 1 exhaust emission standards for 1995 and subsequent model engines used in incomplete medium-duty vehicles.

§1956.8(h) LEV, ULEV, SULEV standards for engines used in incomplete medium-duty vehicles, and for diesel engines used in medium-duty LEVs, ULEVs and SULEVs.

The LEV I standards in the subsections of section 1960.1 listed above are also contained in a comprehensive document incorporated by reference in section 1960.1(k) – the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles." This complete 135-page document is available on the ARB's Internet site. To reduce testing burdens, ARB has to the extent feasible based the California test procedures on the corresponding federal test procedures administered by U.S. EPA. The Standards and Test Procedures document accordingly incorporates the federal test procedures contained in subparts A, B, and C, Part 86, Title 40, Code of Federal Regulations with modifications for the California program.

All 2001 and subsequent model passenger cars, light-duty trucks and medium-duty vehicles certified to the LEV I or LEV II standards will be subject to the CAP 2000 certification procedures – the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles," incorporated by reference in section 1961(d). This document is also available on the ARB's Internet site, and incorporates the federal test procedures contained in subparts B, C and S, Part 86, Title 40, Code of Federal Regulations with modifications for the California program.

## The ZEV Regulation

The LEV I regulations also included standards for ZEVs, and requirements that specified percentages of 1998 and subsequent model passenger cars and light-duty trucks with a loaded vehicle weight of 0-3750 lbs. be certified as ZEVs. As originally adopted in the 1990-1991 LEV I rulemaking, the percentages were 2% for 1998-2000 model vehicles, 5% for 2001-2002 model vehicles, and 10% for 2003 and subsequent model vehicles. In a 1996 rulemaking, the ARB eliminated the requirements for the 1998-2002 model years, but maintained the 10% requirements for the 2003 and subsequent model years. The ZEV requirements were originally contained in note (9) of the table in section 1960.1(g)(2). In the LEV II rulemaking, the ARB moved all of the ZEV provisions to new section 1962, and added provisions pertaining to partial ZEV credits. At a January 25, 2001 hearing, the ARB approved major amendments to the ZEV requirements that significantly reduced the number of full function ZEVs required in the initial years of the program starting with the 2003 model year. These 2001 ZEV amendments were finally adopted on April 12, 2002, were approved by OAL on May 24, 2002, and became operative July 24, 2002. On June 11, 2002, a federal district court judge issued a preliminary injunction that enjoins the ARB's Executive Officer from enforcing the 2001 ZEV Amendments with respect to the sale of new motor vehicles in the 2003 or 2004 model years, pending final resolution of the case. The ARB appealed issuance of the preliminary injunction to

the U.S. Court of Appeals for the Ninth Circuit, where oral argument was conducted February 13, 2003. Following March 27-28 2003 and April 24, 2003 hearings, on December 19, 2003 the ARB adopted amendments to the ZEV regulation which included a restart of the program in the 2005 model year with substantial additional revisions. These amendments were approved by California's Office of Administrative Law on February 25, 2004, and became effective March 26, 2004.

Section 1962(h) incorporates by reference the "California Exhaust Emission Standards and Test Procedures for 2005 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," available on the ARB's Internet site.

**The LEV II Regulations**

The LEV II exhaust emission standards and requirements are contained in section 1961, and will be phased in over the 2004 through 2007 model years. One of the major changes made by the LEV II standards is that all light-duty trucks will be subject to the same emission standards as passenger cars, and vehicles under 8500 lbs. gross vehicle weight (including sport utility vehicles) that had previously been treated as medium-duty vehicles will start to be treated as light-duty trucks. Section 1961 includes the following subsections:

§ 1961(a) The LEV II exhaust emission standards.

§ 1961(b) The LEV II emissions standards phase-in requirements (including fleet average NMOG requirements for passenger cars and light-duty trucks in section 1961(b)(1), a schedule containing the minimum percentages of 2004-2007 passenger cars and light-duty trucks that must be certified to the LEV II rather than LEV I standards in section 1961(b)(2), and medium-duty vehicle phase-in requirements in section 1961(b)(3)). The amendments adopted in December 2001 on the instances in which federally-certified Tier 2 vehicles are required in California are contained largely in section 1961(a)(14).

§ 1961(c) Calculation of NMOG credits and debits.

§ 1961(d) Test Procedures, incorporating the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" and, with respect to hybrid-electric vehicles, reference the "California Exhaust Emission Standards and Test Procedures for 2005 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," both of which are available on the ARB's Internet site.

§ 1961(e) Abbreviations.

Another element of the LEV II regulations is the LEV II evaporative emission standards, which are contained in section 1976(b)(1)(F) and are phased in during the 2004 - 2006 model years. The preexisting evaporative emission standards are in section 1976(b)(1)(B) and (C).

**The Greenhouse Gas Regulations**

In September 2004, the ARB approved regulations to control greenhouse gas emissions from new LEV II vehicles beginning with the 2009 model year. These Greenhouse Gas Regulations add four greenhouse gas air contaminants to the vehicular criteria and toxic air contaminant emissions that California was already regulating – carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), and hydrofluorocarbons (air conditioner refrigerants). The Rulemaking established a declining fleet average standard for these gases, with separate standards for the lighter and heavier portions of the passenger vehicle fleet. The greenhouse gas regulations delay compliance for small, independent low volume, and intermediate size manufacturers. The regulations also provide alternative compliance methods including credit generation from alternatively-fueled vehicles, and averaging, banking, and trading of credits within and among manufacturers. To ensure compliance with the adopted standards, the Rulemaking also requires additional certification emissions testing for the covered greenhouse gases.

The Greenhouse Gas Regulations, approved by OAL on September 15, 2005, consist primarily of a new section 1961.1 that becomes effective January 1, 2006. Section 1961.1 includes the following subsections:

| | |
|---|---|
| § 1961.1(a) | The Greenhouse Gas Emission Requirements (including fleet average greenhouse gas requirements for passenger cars, light-duty trucks, and medium-duty passenger vehicles in section 1961.1(a)(1)(A), procedures for calculating fleet average greenhouse gas values in section 1961.1(a)(1)(B), requirements specific to intermediate volume manufacturers in section 1961.1(a)(1)(C), and requirements specific to small volume manufacturers and independent low volume manufacturers in section 1961.1(a)(1)(D)). |
| § 1961.1(b) | Calculation of Greenhouse Gas credits and debits. |
| § 1961.1(c) | Test Procedures, referencing the incorporated "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" and, with respect to hybrid-electric vehicles and on-board fuel-fired heaters, referencing the incorporated "California Exhaust Emission Standards and Test Procedures for 2005 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," both of which are available on the ARB's Internet site. |
| § 1961.1(d) | Abbreviations. |
| § 1961.1(e) | Definitions specific to section 1961.1 |
| § 1961.1(f) | Severability. |
| § 1961.1(g) | Effective date of section 1961.1 |

**Related Requirements**

In addition to the LEV exhaust emission standards in sections 1960.1 and 1961, and the fleet average greenhouse gas emission standards in section 1961.1, a number of other ARB requirements apply to LEVs. Included in this document are title 13, California Code of Regulations, sections 1965 (Emission Control and Smog Index Labels - 1979 and Subsequent Model-Year Motor Vehicles), 1978 (Standards and Test Procedures for Vehicle Refueling Emissions), 2062 (Assembly-Line Test Procedures - 1998 and Subsequent Model Years), and 2101 (Compliance Testing and Inspection - New Vehicle Selection, Evaluation, and Enforcement). Other requirements not set forth in this document include requirements for on-board diagnostic (OBDII) systems (§§1968.1, 1968.2 and 1968.5), fill pipes (§2235), emission warranties (§§2037 and 2038), recalls (§§2111 and following) and related provisions.

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# Title 13, California Code of Regulations

**§ 1900. Definitions.**

(a) The definitions in this section supplement and are governed by the definitions set forth in chapter 2 (commencing with section 39010), part 1, division 26 of the Health and Safety Code. The definitions set forth in the applicable model-year new vehicle certification and assembly-line test procedures adopted in this chapter are hereby incorporated by reference.

(b) In addition to the definitions incorporated under subdivision (a), the following definitions shall govern the provisions of this chapter.

*[Definitions applicable only to warranty or recall provisions not in this compilation are not set forth]*

* * * *

(4) "Gaseous fuels" means any liquefied petroleum gas, liquefied natural gas, or compressed natural gas fuels for use in motor vehicles.

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

(6) "Heavy-duty vehicle" means any motor vehicle having a manufacturer's gross vehicle weight rating greater than 6,000 pounds, except passenger cars.

* * * *

(8) "Independent low volume manufacturer" means a manufacturer with California annual sales of less than 10,000 new passenger cars, light-duty trucks and medium-duty vehicles following aggregation of sales pursuant to this section 1900(b)(8). Annual sales shall be determined as the average number or sales sold for the three previous consecutive model years for which a manufacturer seeks certification; however, for a manufacturer certifying for the first time in California, annual sales shall be based on projected California sales for the model year. 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. The annual sales from different firms shall be aggregated in the following situations: (1) vehicles produced by two or more firms, one of which is 10% or greater part owned by another; or (2) vehicles produced by any two or more firms if a third party has equity ownership of 10% or more in each of the firms; or (3) vehicles produced by two or more firms having a common corporate officer(s) who is (are) responsible for the overall direction of the companies; or (4) vehicles imported or distributed by all firms where the vehicles are manufactured by the same entity and the importer or distributor is an authorized agent of the entity.

(9) "Intermediate volume manufacturer" means any pre-2001 model year manufacturer with California sales between 3,001 and 60,000 new light- and medium-duty vehicles per model year based on the average number of vehicles sold by the manufacturer each model year from

1989 to 1993; any 2001 through 2002 model year manufacturer with California sales between 4,501 and 60,000 new light- and medium-duty vehicles per model year based on the average number of vehicles sold by the manufacturer each model year from 1989 to 1993; and any 2003 and subsequent model year manufacturer with California sales between 4,501 and 60,000 new light- and medium-duty vehicles based on the average number of vehicles sold for the three previous consecutive model years for which a manufacturer seeks certification. For a manufacturer certifying for the first time in California, model year sales shall be based on projected California sales. 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. For purposes of applying the 2005 and subsequent model year zero-emission vehicle requirements for intermediate-volume manufacturers under section 1962(b), the annual sales from different firms shall be aggregated in the case of (1) vehicles produced by two or more firms, each one of which either has a greater than 50% equity ownership in another or is more than 50% owned by another; or (2) vehicles produced by any two or more firms if a third party has equity ownership of greater than 50% in each firm.

For purposes of applying the 2009 and subsequent model year Greenhouse Gas requirements for intermediate volume manufacturers under section 1961.1, the annual sales from different firms shall be aggregated in the following situations: (1) vehicles produced by two or more firms, each one of which either has a greater than 10% equity ownership in another or is more than 10% owned by another; or (2) vehicles produced by any two or more firms if a third party has equity ownership of greater than 10% in each firm.

(10) "Large volume manufacturer" means any 2000 and subsequent model year manufacturer that is not a small volume manufacturer, or an independent low volume manufacturer, or an intermediate volume manufacturer.

(11) "Light-duty truck" means any 2000 and subsequent model motor vehicle certified to the standards in section 1961(a)(1) 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, 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.

(12) "Medium-duty passenger vehicle" means any medium-duty vehicle with a gross vehicle weight rating of less than 10,000 pounds that is designed primarily for the transportation of persons. The medium-duty passenger vehicle definition does not include any vehicle which: (1) is an "incomplete truck" i.e., is a truck that does not have the primary load carrying device or container attached; or (2) has a seating capacity of more than 12 persons; or (3) is designed for more than 9 persons in seating rearward of the driver's seat; or (4) is equipped with an open cargo area of 72.0 inches in interior length or more. A covered box not readily accessible from the passenger compartment will be considered an open cargo area, for purposes of this definition.

(13) “Medium-duty vehicle” 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 1960.1(h)(2) having a manufacturer’s gross vehicle weight rating of 14,000 pounds or less; any 1995 through 2003 model year heavy-duty vehicle certified to the standards in section 1960.1(h)(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 1961(a)(1) or 1962 having a manufacturer’s gross vehicle weight rating between 8,501 and 14,000 pounds.

* * * *

(17) “Passenger car” means any motor vehicle designed primarily for transportation of persons and having a design capacity of twelve persons or less.

(18) “Reactivity adjustment factor” means a fraction applied to the NMOG emissions from a vehicle powered by a fuel other than conventional gasoline for the purpose of determining a gasoline-equivalent NMOG level. The reactivity adjustment factor is defined as the ozone-forming potential of clean fuel vehicle exhaust divided by the ozone-forming potential of gasoline vehicle exhaust.

* * * *

(21) “Subgroup” means a set of vehicles within an engine family distinguishable by characteristics contained in the manufacturer’s application for certification.

(22) “Small volume manufacturer” means, with respect to the 2001 and subsequent model-years, a manufacturer with California sales less than 4,500 new passenger cars, light-duty trucks, medium-duty vehicles, heavy-duty vehicles and heavy-duty engines based on the average number of vehicles sold for the three previous consecutive model years for which a manufacturer seeks certification as a small volume manufacturer; however, for manufacturers certifying for the first time in California model-year sales shall be based on projected California sales. 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. Except as provided in the next paragraph, beginning with the 2009 model year, the annual sales from different firms shall be aggregated in the following situations: (1) vehicles produced by two or more firms, one of which is 10% or greater part owned by another; or (2) vehicles produced by any two or more firms if a third party has equity ownership of 10% or more in each of the firms; or (3) vehicles produced by two or more firms having a common corporate officer(s) who is (are) responsible for the overall direction of the companies; or (4) vehicles imported or distributed by all firms where the vehicles are manufactured by the same entity and the importer or distributor is an authorized agent of the entity.

For purposes of compliance with the zero-emission vehicle requirements, heavy-duty vehicles and engines shall not be counted as part of a manufacturer's sales. For purposes of applying the 2005 and subsequent model year zero-emission vehicle requirements for small-volume manufacturers under section 1962(b), the annual sales from different firms shall be aggregated in the case of (1) vehicles produced by two or more firms, each one of which either has a greater than 50% equity ownership in another or is more than 50% owned by another; or (2) vehicles produced by any two or more firms if a third party has equity ownership of greater than 50% in each firm.

Note: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, and 43104 Health and Safety Code. Reference: Sections 39002, 39003, 39010, 39500, 40000, 43000, 43013, 43018.5, 43100, 43101, 43101.5, 43102, 43103, 43104, 43106, and 43204, Health and Safety Code.

**§ 1956.8. Exhaust Emission Standards and Test Procedures - 1985 and Subsequent Model Heavy-Duty Engines and Vehicles.**

(a) *[Exhaust emission standards for heavy-duty diesel engines and heavy-duty natural-gas-fueled, liquefied-petroleum-gas-fueled and methanol-fueled engines derived from diesel-cycle engines; not applicable to passenger cars, light-duty trucks and medium-duty vehicles and accordingly not set forth.]*

(b) The test procedures for determining compliance with standards applicable to 1985 and subsequent model heavy-duty diesel engines and vehicles and the requirements for participating in the averaging, banking and trading programs, are set forth in the "California Exhaust Emission Standards and Test Procedures for 1985 through 2003 Model Heavy-Duty Diesel Engines and Vehicles, " adopted April 8, 1985, as last amended December 12, 2002, the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles," adopted December 12, 2002, as last amended September 1, 2006, and the "California Interim Certification Procedures for 2004 and Subsequent Model Hybrid-Electric Vehicles, in the Urban Bus and Heavy-Duty Vehicle Classes," adopted October 24, 2002, which are incorporated by reference herein.

(c)(1)(A) The exhaust emissions from (i) new 1987 through 2004 model heavy-duty Otto-cycle engines (except methanol-fueled engines and except heavy-duty Otto-cycle natural-gas-fueled and liquefied-petroleum-gas-fueled Otto-cycle engines derived from diesel-cycle engines) and (ii) from new 1993 through 2004 model heavy-duty methanol-fueled Otto-cycle engines (except in all cases engines used in medium-duty vehicles) shall not exceed:

## Exhaust Emission Standards for Heavy-Duty Otto-Cycle Engines

(grams per brake horsepower-hour or g/bhp-hr)

| *Model Year* | *Total Hydrocarbons or OMHCE*[A] | *Optional Non-Methane Hydrocarbons*[A] | *Carbon Monoxide*[B] | *Oxides of Nitrogen* |
|---|---|---|---|---|
| 1987[C] | 1.1[D] | -- | 14.4[D] | 10.6 |
| | 1.9[E] | -- | 37.1[E] | 10.6 |
| 1988-1989 | 1.1[D] | -- | 14.4[D] | 6.0 |
| | 1.9[E] | -- | 37.1[E] | 6.0 |
| 1990 | 1.1 | 0.9[D] | 14.4[D] | 6.0 |
| | 1.9[E] | 1.7[E] | 37.1[E] | 6.0 |
| 1991 – 1994 | 1.1[D] | 0.9[D] | 14.4[D] | 5.0 |
| | 1.9[E] | 1.7[E] | 37.1[E] | 5.0 |
| 1995 – 1997 | 1.9[E] | 1.7[E] | 37.1[E] | 5.0 |
| | 1.9[E] | 1.7[E] | 37.1[E] | 2.5 to 5.0[F] |
| 1998 – 2003[G] | 1.9[E] | 1.7[E] | 37.1[E] | 4.0 |
| | 1.9[E] | 1.7[E] | 37.1[E] | 1.5 to 0.5[F] |
| | *Non-Methane Hydrocarbons plus Oxides of Nitrogen (NMHC + NOx)* | | *Carbon Monoxide* | |
| 2004[G] | 2.4 g/bhp-hr; or 2.5 with 0.5 g/bhp-hr cap on NMHC | | 37.1 | |

A The total or optional non-methane hydrocarbon standards apply to petroleum-fueled, natural-gas-fueled and liquefied-petroleum-gas-fueled engines and methanol-fueled engines beginning in 2004. The Organic Material Hydrocarbon Equivalent, or OMHCE, standards apply to 1987 through 2003 methanol-fueled engines.

B Prior to the 2002 model year, carbon monoxide emissions from engines utilizing exhaust after treatment technology shall also not exceed 0.5 percent of the exhaust gas flow at curb idle.

C Manufacturers with existing heavy-duty Otto-cycle engines certified to the California 1986 steady-state emission standards and test procedures may as an option certify those engines, for the 1987 model year only, in accordance with the standards and test procedures for 1986 heavy-duty Otto-cycle engines established in Section 1956.7.

D These standards are applicable to Otto-cycle engines intended for use in all heavy-duty vehicles.

E Applicable to heavy-duty Otto-cycle engines intended for use only in vehicles with a gross vehicle weight rating greater than 14,000 pounds. Also, as an option, a manufacturer may certify one or more 1988 through 1994 model Otto-cycle heavy-duty engine configurations intended for use in all heavy-duty vehicles to these emission standards, provided that the total model-year sales of such configuration(s) being certified to these emission

standards represent no more than 5 percent of total model-year sales of all Otto-cycle heavy-duty engines intended for use in vehicles with a Gross Vehicle Weight Rating of up to 14,000 pounds by the manufacturer.

F These are optional standards and apply to all heavy-duty engines intended for use only in vehicles with a gross vehicle weight rating greater than 14,000 pounds. A manufacturer may elect to certify to an optional standard between the values, inclusive, by 0.5 grams per brake horsepower-hour increments.

G A manufacturer may request to certify to Option 1 or Option 2 federal NMHC + NOx standards as set forth in 40 CFR § 86.005-10(f), as adopted October 6, 2000.

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(B) The exhaust emissions from new 2005 and subsequent model heavy-duty Otto-cycle engines, except for Otto-cycle medium- and heavy-duty engines subject to the alternative standards in 40 CFR §86.005-10(f), shall not exceed:

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**California Emission Standards for 2005 and Subsequent Model Heavy-Duty Otto-Cycle Engines[A]**
(in g/bhp-hr)

| *Model Year* | *Emission Category* | *NMHC + NOx* | *NMHC* | *NOx* | *CO[F]* | *HCHO* | *PM* |
|---|---|---|---|---|---|---|---|
| **Standards for Heavy-Duty Otto-Cycle Engines Used In Incomplete Medium-Duty Vehicles 8,501 to 14,000 pounds GVW[B]** | | | | | | | |
| 2005 through 2007 | ULEV | 1.0[C,E] | n/a | n/a | 14.4 | 0.05 | n/a |
| | SULEV | 0.5 | n/a | n/a | 7.2 | 0.025 | n/a |
| 2008 and subsequent | ULEV | n/a | 0.14[E] | 0.20[E] | 14.4 | 0.01 | 0.01 |
| | SULEV | n/a | 0.07[E] | 0.10[E] | 7.2 | 0.005 | 0.005 |
| **Standards for Heavy-Duty Otto-Cycle Engines Used In Heavy-Duty Vehicles Over 14,000 pounds GVW** | | | | | | | |
| 2005 through 2007 | n/a | 1.0[C,E] | n/a | n/a | 37.1 | 0.05[D] | n/a |
| 2008 and subsequent | n/a | n/a | 0.14[E] | 0.20[E] | 14.4 | 0.01 | 0.01 |

A These standards apply to petroleum-fueled, alcohol-fueled, liquefied petroleum gas-fueled and natural gas-fueled Otto-cycle engines.

B. A manufacturer of engines used in incomplete medium-duty vehicles may choose to comply with these standards as an alternative to the primary emission standards and test procedures for complete vehicles specified in section 1961, title 13, CCR. A manufacturer that chooses to comply with these optional heavy-duty engine standards and test procedures shall specify, in the Part I application for certification, an in-use compliance test procedure, as provided in section 2139(c), title 13 CCR.

C A manufacturer may request to certify to the Option 1 or Option 2 federal NMHC + NOx standards as set forth in 40 CFR § 86.005-10(f). However, for engines used in medium-duty vehicles, the formaldehyde level must meet the standard specified above.

D This standard only applies to methanol-fueled Otto-cycle engines.

[E] A manufacturer may elect to include any or all of its medium- and heavy-duty Otto-cycle engine families in any or all of the emissions ABT programs for HDEs, within the restrictions described in section I.15 of the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Otto-Cycle Engines," incorporated by reference in section 1956.8(d). For engine families certified to the Option 1 or 2 federal standards, the FEL must not exceed 1.5 g/bhp-hr. If a manufacturer elects to include engine families certified to the 2005 and subsequent model year standards, the NOx plus NMHC FEL must not exceed 1.0 g/bhp-hr. For engine families certified to the 2008 and subsequent model year standards, the FEL is the same as set forth in 40 CFR 86.008-10(a)(1).

[F] Idle carbon monoxide: For all Otto-cycle heavy-duty engines utilizing aftertreatment technology, and not certified to the on-board diagnostics requirements of section 1968, et seq, as applicable, the CO emissions shall not exceed 0.50 percent of exhaust gas flow at curb idle.

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(c)(2) Formaldehyde exhaust emissions from new 1993 and subsequent model methanol-fueled Otto-cycle engines shall not exceed:

| *Model Year* | *Formaldehyde (g/bhp-hr)* |
|---|---|
| 1993-1995 | 0.10 |
| 1996 and Subsequent | 0.05 |

(d) The test procedures for determining compliance with standards applicable to 1987 and subsequent model heavy-duty Otto-cycle engines and vehicles are set forth in the "California Exhaust Emission Standards and Test Procedures for 1987 through 2003 Model Heavy-Duty Otto-Cycle Engines and Vehicles," adopted April 25, 1986, as last amended December 27, 2000, the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Otto-Cycle Engines," adopted December 27, 2000, as last amended December 12, 2002, the "California Non-Methane Organic Gas Test Procedures," adopted July 12, 1991, as last amended July 30, 2002, and the "California Interim Certification Procedures for 2004 and Subsequent Model Hybrid-Electric Vehicles, in the Urban Bus and Heavy-Duty Vehicle Classes," adopted October 24, 2002, which are incorporated by reference herein.

(e) A manufacturer may elect to certify complete heavy-duty vehicles of 14,000 pounds or less maximum gross vehicle weight rating as medium-duty vehicles under section 1960.1 or section 1961 of this chapter, in which event the heavy-duty emission standards and test procedures in this section shall not apply.

(f) *[Use of engines certified to meet federal emission standards, or which are demonstrated to meet appropriate federal emission standards, in up to a total of 100 heavy-duty vehicles in a calendar year when the executive officer has determined that no engine certified to meet California emission standards exists which is suitable for use in the vehicles; not applicable to passenger cars, light-duty trucks and medium-duty vehicles and accordingly not set forth.]*

(g) The exhaust emissions from new 1995 through 2003 model-year engines used in incomplete medium-duty vehicles or diesel engines used in medium-duty vehicles shall not exceed:

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**Exhaust Emission Standards[A]**
(grams per brake horsepower-hour, or g/bhp-hr)

| *Model Year* | *Carbon Monoxide* | *NMHC + NOx[B]* | *Particulates[C]* |
|---|---|---|---|
| 1995[D] through 2003 | 14.4 | 3.9 | 0.10 |

[A] This set of standards is optional. Manufacturers of engines used in incomplete medium-duty vehicles or diesel engines used in medium-duty vehicles from 8501-14,000 pounds, gross vehicle weight may choose to comply with these standards as a alternative to the primary emission standards and test procedures specified in section 1960.1, Title 13, California Code of Regulations. Manufacturers that choose 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 section 2139(c), Title 13, California Code of Regulations.

[B] This standard is the sum of the individual non-methane hydrocarbon emissions and oxides of nitrogen emissions. For methanol-fueled engines, non-methane hydrocarbons shall mean organic material hydrocarbon equivalent.

[C] This standard shall only apply to diesel engines and vehicles.

[D] In the 1995 model-year only, manufacturers may certify up to 50 percent of their medium-duty engines or vehicles to the applicable 1994 model-year standards and test procedures. For the 1995 through 1997 models, alternative in-use compliance is available for medium-duty manufacturers. A manufacturer may use alternative in-use compliance for up to 100 percent of its fleet in the 1995 and 1996 model years and up to 50 percent of its fleet in the 1997 model year. The percentages shall be determined from the manufacturers' projected California sales of medium-duty vehicles. For engines certified to the standards and test procedures of this subsection, "alternative in-use compliance" shall consist of an allowance of 25 percent over the HC + NOx standard. In-use compliance testing shall be limited to vehicles or engines with less than 90,000 miles.

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(h) The exhaust emissions from new:

(1) 1992 through 2004 model-year Otto-cycle engines used in incomplete medium-duty low-emission vehicles, ultra-low-emission vehicles, and super-ultra-low-emission vehicles, and

(2) 1992 and subsequent model diesel engines used in medium-duty low-emission vehicles, ultra-low-emission vehicles and super-ultra-low-emission vehicles shall not exceed:

**Exhaust Emission Standards for Engines Used in Incomplete Otto-Cycle Medium-Duty Low-Emission Vehicles, Ultra-Low-Emission Vehicles, and Super Ultra-Low-Emission Vehicles, and for Diesel Engines Used in Medium-Duty Low-Emission Vehicles, Ultra-Low-Emission Vehicles, and Super Ultra-Low-Emission Vehicles[A,F]**

(grams per brake horsepower-hour)

| *Model Year* | *Vehicle Emissions Category[B]* | *Carbon Monoxide* | *NMHC + NOx [C]* | *Non-Methane Hydrocarbons* | *Oxides of Nitrogen* | *Formaldehyde* | *Particulates[D]* |
|---|---|---|---|---|---|---|---|
| 1992[E] - 2001 | LEV | 14.4 | 3.5 [K] | n/a | n/a | 0.050 | 0.10 [K] |
| 2002-2003[E] | LEV | 14.4 | 3.0 [K] | n/a | n/a | 0.050 | 0.10 [K] |
| 1992-2003[E,H] | ULEV | 14.4 | 2.5 [K] | n/a | n/a | 0.050 | 0.10 [K] |
| 2004 and subsequent [L] | ULEV - Opt A | 14.4 | 2.5 [I,J,K] | n/a | n/a | 0.050 | 0.10 [J,K] |
| 2004 and subsequent [L] | ULEV - Opt. B | 14.4 | 2.4 [I,J,K] | n/a | n/a | 0.050 | 0.10 [J,K] |
| 2007 and subsequent [D] | *ULEV* | 15.5 | n/a | 0.14 | 0.2 | 0.050 | 0.01 |
| 1992 and subsequent [L] | SULEV | 7.2 | 2.0 [K] | n/a | n/a | 0.025 | 0.05 [K] |
| 2007 and subsequent [D] | *SULEV* | 7.7 | n/a | 0.07 | 0.1 | 0.025 | 0.005 |

[A] This set of standards is optional. Manufacturers of engines used in incomplete medium-duty vehicles or diesel engines used in medium-duty vehicles from 8501-14,000 pounds gross vehicle weight rating may choose to comply with these standards as an alternative to the primary emission standards and test procedures specified in section 1960.1, or section 1961, Title 13, California Code of Regulations. Manufacturers that choose 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 section 2139(c), Title 13, California Code of Regulations.

[B] "LEV" means low-emission vehicle.
"ULEV" means ultra-low-emission vehicle.
"SULEV" means super ultra-low-emission vehicle.

[C] This standard is the sum of the individual non-methane hydrocarbon emissions and oxides of nitrogen emissions. For methanol-fueled engines, non-methane hydrocarbons shall mean organic material hydrocarbon equivalent ("OMHCE").

[D] These standards apply only to diesel engines and vehicles.

[E] Manufacturers may certify engines used in incomplete medium-duty vehicles or diesel engines used in medium-duty vehicles to these standards to meet the requirements of section 1956.8(g), Title 13, California Code of Regulations.

[F] In-use compliance testing shall be limited to vehicles or engines with fewer than 90,000 miles.

[G] [Reserved]

[H] For engines certified to the 3.5 grams per brake horsepower-hour (g/bhp-hr) LEV standards, the in-use compliance standard shall be 3.7 g/bhp-hr for the first two model years of introduction. For engines certified to the 2002 and 2003 model year LEV standards, the in-use compliance standard shall be 3.2 g/bhp-hr. For engines certified to the 1992 through 2003 model year ULEV standards, the in-use compliance standard shall be 2.7 g/bhp-hr for the first two model years of introduction. For engines certified to the 1992 and subsequent SULEV standards, the in-use compliance standard shall be 2.2 g/bhp-hr for the first two model years of introduction.

[I] Manufacturers have the option of certifying to either option A or B. Manufacturers electing to certify to Option A must demonstrate that the NMHC emissions do not exceed 0.5 g/bhp-hr.

[J] Emissions averaging may be used to meet these standards for diesel engines, using the requirements for participation in averaging, banking and trading programs, as set forth in the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles," incorporated by reference in section 1956.8 (b), above.

[K] Engines of 1998 and subsequent model years may be eligible to generate averaging, banking and trading credits based on these standards according to the requirements of the averaging, banking and trading programs described in the "California Exhaust Emission Standards and Test Procedures for 1985 through 2003 Model Heavy-Duty Engines and Vehicles" and the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles," incorporated by reference in section 1956.8(b), above.

[L] For 2007 and subsequent model year diesel engines used in medium-duty vehicles, these emission standards are not applicable.

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(3) 2007 and later model year engines subject to (h)(2) have the following Phase-in Options.

(A) Early NOx compliant engines. For model years 2007, 2008, and 2009, a manufacturer may, at their option, certify one or more of their engine families to the combined NOx plus NMHC standard or FEL applicable to model year 2006 engines under section 1956.8 (h)(2), in lieu of the separate NOx and NMHC standards or FELs applicable to the 2007 and subsequent model years, specified in section 1956.8 (h)(2). Each engine certified under this phase-in option must comply with all other emission requirements applicable to model year 2007 engines. To qualify for this option, a manufacturer must satisfy the U.S.-directed production requirement of certifying no more than 50 percent of engines to the NOx plus NMHC standards or FELs applicable to 2006 engines, as specified in 40 Code of Federal Regulations, part 86, section 86.007-11 (g)(1), as adopted January 18, 2001. In addition, a manufacturer may reduce the quantity of engines that are required to be phased-in using the early certification credit program specified in 40 Code of Federal Regulations, part 86, section 86.007-11 (g)(2), as adopted January 18, 2001, and the "Blue Sky" engine program specified in 40 Code of Federal Regulations, part 86, section 86.007-11 (g)(4), as adopted January 18, 2001.

(B) Early PM compliant engines. A manufacturer certifying engines to the 2007 and subsequent model year PM standard listed in section 1956.8 (h)(2) (without using credits, as determined in any averaging, banking, or trading program described in "California Exhaust

Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles," to comply with the standards) before model year 2007 may reduce the number of engines that are required to meet the 2007 and subsequent model year PM standard listed in section 1956.8 (h)(2) in model year 2007, 2008 and/or 2009. To qualify for this option, a manufacturer must satisfy the PM emission requirements pursuant to the methods detailed in 40 Code of Federal Regulations, part 86, section 86.007-11 (g)(2)(ii), as adopted January 18, 2001.

(4) No crankcase emissions shall be discharged directly into the ambient atmosphere from any new 2007 or later model year diesel heavy-duty diesel engine, with the following exception: heavy-duty diesel engines equipped with turbochargers, pumps, blowers, or superchargers for air induction may discharge crankcase emissions to the ambient atmosphere if the emissions are added to the exhaust emissions (either physically or mathematically) during all emission testing. Manufacturers taking advantage of this exception must manufacture the engines so that all crankcase emission can be routed into a dilution tunnel (or other sampling system approved in advance by the Executive Officer), and must account for deterioration in crankcase emissions when determining exhaust deterioration factors. For the purpose of section 1956.8 (h)(2), crankcase emissions that are routed to the exhaust upstream of exhaust aftertreatment during all operation are not considered to be "discharged directly into the ambient atmosphere."

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43100, 43101, 43102, 43104, 43105 and 43806, Health and Safety Code; and Section 28114, Vehicle Code. Reference: Sections 39002, 39003, 39500, 43000, 43013, 43017, 43018, 43100, 43101, 43101.5, 43102, 43104, 43106, 43202, 43204, 43205.5, 43206, 43210, 43211, 43212, 43213, and 43806, Health and Safety Code; and Section 28114, Vehicle Code.

**§ 1960.1. Exhaust Emission Standards and Test Procedures - 1981 through 2006 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.**

(a) *[Exhaust emission standards for 1981 model passenger cars, light-duty trucks and medium-duty vehicles; not set forth]*

(b) *[Exhaust emission standards for 1982 model passenger cars, light-duty trucks and medium-duty vehicles; not set forth]*

(c) *[Exhaust emission standards for 1983 model passenger cars, light-duty trucks and medium-duty vehicles; not set forth]*

(d) *[Exhaust emission standards for 1984 through 1990 model passenger cars, light-duty trucks and medium-duty vehicles; not set forth]*

(e)(1) *[Exhaust emission standards for 1989 through 1994 model passenger cars, light-duty trucks and medium-duty vehicles; not set forth]*

(e)(2) The exhaust emissions from new 1993 through 2003 model methanol-fueled vehicles, including fuel-flexible vehicles, shall meet all the applicable requirements in (e)(1), (f)(1) and (f)(2) with the following modifications and additions:

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**1993 THROUGH 2003 METHANOL-SPECIFIC EXHAUST EMISSION STANDARDS**

| *Vehicle Type*[1] | *Loaded Vehicle Weight (lbs.)*[3] | *Durability Vehicle Basis (mi)* | *Formaldehyde (mg/mi)* | |
|---|---|---|---|---|
| | | | *Certification* | *In-Use Compliance*[2] |
| PC | All | 50,000 | 15 | 23 (1993-1995) |
| | | | | 15 (1996-2003) |
| LDT, MDV | 0 - 3750 | 50,000 | 15 | 23 (1993-1995) |
| | | | | 15 (1996-2003) |
| LDT, MDV | 3751 – 5750 | 50,000 | 18 | 27 (1993-1995) |
| | | | | 18 (1996-2003) |
| MDV | 5751 – 8500 | 50,000 | 22 | 33 (1993-1995) |
| | | | | 22 (1996-2003) |
| MDV | 8501 – 10,000 | 50,000 | 28 | 36 (1995) |
| | | | | 28 (1996-2003) |
| MDV | 10,001 – 14,000 | 50,000 | 36 | 45 (1995) |
| | | | | 36 (1996-2003) |

[1] "PC" means passenger cars.
"LDT" means light-duty trucks.

"MDV" means medium-duty vehicles.

2 If the formaldehyde in-use compliance level is above the respective certification level but does not exceed the in-use compliance level, and based on a review of information derived from a statistically valid and representative sample of vehicles, the Executive Officer determines that a substantial percentage of any class or category of such vehicle exhibits, prior to 50,000 miles or 5 years, whichever occurs first, an identifiable, systematic defect in a component listed in Section 1960.1.5(c)(2), Title 13 California Code of Regulations, which causes a significant increase in emissions above those exhibited by vehicles free of such defects and of the same class or category and having the same period of use and mileage, the Executive Officer may invoke the enforcement authority under subchapter 2.5, Title 13, California Code of Regulations, commencing with Section 2111, to require remedial action by the vehicle manufacturer. Such remedial action shall be limited to owner notification and repair or replacement of the defective component. As used in this section, the term "defect" shall not include failures which are the result of abuse, neglect, or improper maintenance.

3 For 1995-2003 model year medium-duty vehicles certifying to the standards and test procedures specified in Section 1960.1(h)(1), Title 13, California Code of Regulations, "Loaded Vehicle Weight" shall mean "Test Weight", which is the average of the vehicle's curb weight and gross vehicle weight.

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(e)(3) The exhaust emissions from new 1992 through 2006 model-year "LEV I" transitional low-emission vehicles, low-emission vehicles, ultra-low-emission vehicles, and super-ultra-low-emission vehicles, including fuel-flexible and dual-fuel vehicles, shall meet all the requirements in (g)(1), and (h)(2) with the following additions:

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**FORMALDEHYDE EXHAUST EMISSION STANDARDS**
**IN THE LIGHT-DUTY AND MEDIUM-DUTY VEHICLE WEIGHT CLASSES**[5,6,7]
["milligrams per mile" (or "mg/mi")]

| *Vehicle Type*[1] | *Vehicle Weight (lbs.)*[2] | *Durability Vehicle Basis (mi)* | *Vehicle Emission Category*[3] | *Formaldehyde (mg/mi)*[4,5] |
|---|---|---|---|---|
| PC and | All | 50,000 | TLEV | 15 (23) |
| LDT | 0-3750 | | LEV | 15 (15) |
| | | | ULEV | 8 (12) |
| | | 100,000 | TLEV | 18 |
| | | | LEV | 18 |
| | | | ULEV | 11 |
| LDT | 3751-5750 | 50,000 | TLEV | 18 (27) |
| | | | LEV | 18 (18) |
| | | | ULEV | 9 (14) |
| | | 100,000 | TLEV | 23 |
| | | | LEV | 23 |
| | | | ULEV | 13 |
| MDV | 0-3750 | 50,000 | LEV | 15 (15) |
| | | | ULEV | 8 (12) |
| | | 120,000 | LEV | 22 |
| | | | ULEV | 12 |
| MDV | 3751-5750 | 50,000 | LEV | 18 (18) |

| | | | | |
|---|---|---|---|---|
| | | | ULEV | 9 (14) |
| | | | SULEV | 4 (7) |
| | | 120,000 | LEV | 27 |
| | | | ULEV | 13 |
| | | | SULEV | 6 |
| MDV | 5751-8500 | 50,000 | LEV | 22 (22) |
| | | | ULEV | 11 (17) |
| | | | SULEV | 6 (8) |
| | | 120,000 | LEV | 32 |
| | | | ULEV | 16 |
| | | | SULEV | 8 |
| MDV | 8501-10,000 | 50,000 | LEV | 28 (28) |
| | | | ULEV | 14 (21) |
| | | | SULEV | 7 (10) |
| | | 120,000 | LEV | 40 |
| | | | ULEV | 21 |
| | | | SULEV | 10 |
| MDV | 10,001-14,000 | 50,000 | LEV | 36 (36) |
| | | | ULEV | 18 (27) |
| | | | SULEV | 9 (14) |
| | | 120,000 | LEV | 52 |
| | | | ULEV | 26 |
| | | | SULEV | 13 |

[1] "PC" means passenger cars.
"LDT" means light-duty trucks.
"MDV" means medium-duty vehicles.

[2] For light-duty or medium-duty vehicles, Vehicle Weight shall mean "Loaded Vehicle Weight" (or "LVW") or "Test Weight" (or "TW"), respectively.

[3] "TLEV" means transitional low-emission vehicle.
"LEV" means low-emission vehicle.
"ULEV" means ultra-low-emission vehicle.
"SULEV" means super-ultra-low-emission vehicle.

[4] Formaldehyde exhaust emission standards apply to vehicles certified to operate on any available fuel, including fuel-flexible and dual-fuel vehicles.

[5] The standards in parentheses are intermediate in-use compliance standards for 50,000 miles.

a. For PCs and LDTs from 0-5750 lbs. LVW, including fuel-flexible and dual-fuel vehicles, intermediate in-use compliance standards shall apply to TLEVs through the 1995 model year, and LEVs and ULEVs through the 1998 model year. In-use compliance with standards beyond 50,000 miles shall be waived through the 1995 model year for TLEVs, and through the 1998 model year for LEVs and ULEVs.

b. For MDVs from 0-14,000 lbs. TW, including fuel-flexible and dual-fuel vehicles, intermediate in-use compliance standards shall apply to LEVs, ULEVs, and SULEVs through the 1999 model year. In-use compliance with standards beyond 50,000 miles shall be waived through the 1999 model year for LEVs, ULEVs, and SULEVs.

[6] Manufacturers shall demonstrate compliance with the above standards for formaldehyde at $50^{o}$ F, according to the procedure specified in section 11k of the "California Exhaust Emission Standards and Test Procedures for 1988 through 2000 Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k) or section E.1.4 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 section 1961(d). Hybrid electric, natural gas, and diesel-fueled vehicles shall be exempt from 50°F test requirements.

7 In-use compliance testing shall be limited to PCs and LDTs with fewer than 75,000 miles and MDVs with fewer than 90,000 miles.

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(f)(1) *[Exhaust emission standards for new 1993 and 1994 model passenger cars and light-duty trucks, except those produced by a small volume manufacturer; not set forth]*

(f)(2) *"Tier 1" Exhaust Emission Standards for PCs and LDTs.* The exhaust emissions from new 1995 through 2003 model Tier 1 passenger cars and light-duty trucks shall not exceed:

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**1995-2003 MODEL-YEAR TIER 1 PASSENGER CAR AND LIGHT-DUTY TRUCK EXHAUST EMISSIONS STANDARDS**[5,6,8,10]

(grams per mile)

| *Vehicle Type*[1] | *Loaded Vehicle Weight (lbs.)* | *Durability Vehicle Basis (mi.)* | *Non-Methane Hydrocarbons*[2,7] | *Carbon Monoxide*[7] | *Oxides of Nitrogen*[1,3] |
|---|---|---|---|---|---|
| PC | All | 50,000 | 0.25 | 3.4 | 0.4[4] |
| PC | All | 100,000 | 0.31 | 4.2 | 0.6[9] |
| Diesel PC (Option 2) | All | 100,000 | 0.31 | 4.2 | 1.0 |
| LDT | 0 - 3750 | 50,000 | 0.25 | 3.4 | 0.4[4] |
| LDT | 0 – 3750 | 100,000 | 0.31 | 4.2 | 0.6[9] |
| Diesel LDT (Option 2) | 0 - 3750 | 100,000 | 0.31 | 4.2 | 1.0 |
| LDT | 3751 – 5750 | 50,000 | 0.32 | 4.4 | 0.7 |
| LDT | 3751 – 5750 | 100,000 | 0.40 | 5.5 | 0.97[9] |
| Diesel LDT (Option 1) | 3751 – 5750 | 100,000 | 0.40 | 5.5 | 1.5 |

1 "PC" means passenger car. "LDT" means light-duty truck.

2 For methanol- or ethanol-fueled vehicles certifying to these standards, including fuel-flexible vehicles when certifying on methanol or ethanol, "Non-Methane Hydrocarbons" shall mean "Organic Material Non-Methane Hydrocarbon Equivalent" (or "OMNMHCE").

3 The maximum projected emissions of oxides of nitrogen measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR Part 600 Subpart B) shall be not greater than 1.33 times the applicable passenger car standards and 2.00 times the applicable light-duty truck standards shown in the table. Both the projected emissions and the HWFET standard shall be rounded in accordance with ASTM E29-67 to the nearest 0.1 g/mi before being compared.

4 Small volume manufacturers may choose to certify to an optional 0.7 g/mi NOx standard for the 1995 model year only, pursuant to the conditions set forth in sections 1960.1 (f)(1) and 1960.1.5.

5 Diesel passenger cars and light-duty trucks certifying to these standards are subject to a particulate exhaust emission standard of 0.08 g/mi, determined on a 50,000 mile durability vehicle basis.

[6] For all vehicles, except those certifying to optional diesel standards, in-use compliance with the exhaust emission standards shall be limited to vehicles with less than 75,000 miles.

[7] For the 1995 and 1996 model years, all manufacturers, except those certifying to optional diesel standards, are permitted alternative in-use compliance. Alternative in-use compliance is permitted for 60% of a manufacturer's vehicles in the 1995 model year and 20% of a manufacturer's vehicles in the 1996 model year. For the 1995 and 1996 model years, small volume manufacturers only are permitted alternative in-use compliance for 100% of the fleet. The percentages shall be applied to the manufacturer's total projected sales of California-certified passenger cars and light-duty trucks for the model year. "Alternative in-use compliance" shall consist of the following:

a For all passenger cars and those light-duty trucks from 0-3750 lbs. loaded vehicle weight, except those diesel vehicles certifying to optional 100,000 mile standards, in-use compliance standards shall be 0.32 g/mi non-methane hydrocarbon and 5.2 g/mi carbon monoxide for 50,000 miles.

b. For light-duty trucks from 3751-5750 lbs. loaded vehicle weight, except those diesel light-duty trucks certifying to optional 100,000 mile standards, in-use compliance standards shall be 0.41 g/mi non-methane hydrocarbon and 6.7 g/mi carbon monoxide for 50,000 miles.

c. In-use compliance standards shall be waived beyond 50,000 miles.

[8] All passenger cars and light-duty trucks, except those diesel vehicles certifying to optional standards, are subject to non-methane hydrocarbon, carbon monoxide, and oxides of nitrogen standards determined on a 50,000 mile durability basis and non-methane hydrocarbon and carbon monoxide standards determined on a 100,000 mile durability basis.

[9] 100,000 mile NOx standards are applicable for 1996 and subsequent model-year vehicles.

[10] Each manufacturer shall also comply with the requirements specified in section 1960.1 (g)(2).

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(g)(1) *"LEV I" Exhaust Emission Standards for PCs and LDTs.* The exhaust emissions from new 1992 through 2003 model-year "LEV I" transitional low-emission vehicles, and new 1992 through 2006 model-year "LEV I" low-emission vehicles and ultra-low-emission vehicles, in the passenger car and light-duty truck classes shall not exceed:

**LEV I EXHAUST EMISSION STANDARDS**
**FOR TRANSITIONAL LOW-EMISSION VEHICLES, LOW-EMISSION VEHICLES, ULTRA-LOW-EMISSION VEHICLES AND ZERO-EMISSION VEHICLES IN PASSENGER CAR AND LIGHT-DUTY TRUCK VEHICLE CLASSES**[6,7,8,9,10]
[grams per mile (or "g/mi")]

| *Vehicle Type*[1] | *Loaded Vehicle Weight (lbs)* | *Durability Vehicle Basis(mi)* | *Vehicle Emission Category*[2] | *Non-Methane Organic Gases*[3,4] | *Carbon Monoxide* | *Oxides of Nitrogen*[5] |
|---|---|---|---|---|---|---|
| PC and All | | 50,000 | TLEV | 0.125 | 3.4 | 0.4 |
| LDT | 0-3750 | | LEV | 0.075 | 3.4 | 0.2 |
| | | | ULEV | 0.040 | 1.7 | 0.2 |
| | | 100,000 | TLEV | 0.156 | 4.2 | 0.6 |
| | | | LEV | 0.090 | 4.2 | 0.3 |
| | | | ULEV | 0.055 | 2.1 | 0.3 |
| LDT | 3751-5750 | 50,000 | TLEV | 0.160 | 4.4 | 0.7 |
| | | | LEV | 0.100 | 4.4 | 0.4 |
| | | | ULEV | 0.050 | 2.2 | 0.4 |
| | | 100,000 | TLEV | 0.200 | 5.5 | 0.9 |
| | | | LEV | 0.130 | 5.5 | 0.5 |
| | | | ULEV | 0.070 | 2.8 | 0.5 |

1 "PC" means passenger cars.
"LDT" means light-duty trucks.
"LVW" means loaded vehicle weight.
"Non-Methane Organic Gases" or "NMOG" means the total mass of oxygenated and non-oxygenated hydrocarbon emissions.

2 "TLEV" means transitional low-emission vehicle.
"LEV" means low-emission vehicle.
"ULEV" means ultra-low-emission vehicle.

3 *Compliance with NMOG Standard.* To demonstrate compliance with an NMOG standard, NMOG emissions shall be measured in accordance with the "California Non-Methane Organic Gas Test Procedures" as adopted July 12, 1991 and last amended July 30, 2002, which is incorporated herein by reference.

a. *Reactivity Adjustment*. For TLEVs, LEVs, and ULEVs certified to operate exclusively on any fuel other than conventional gasoline, and for fuel-flexible and dual-fuel TLEVs, LEVs, and ULEVs when certifying on a fuel other than gasoline, manufacturers shall multiply NMOG exhaust certification levels by the applicable reactivity adjustment factor set forth in section 13 of the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in section I.E.5. 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 section 1961(d), or established by the

Executive Officer pursuant to Appendix VIII or section II.D. respectively of the foregoing test procedures. In addition, natural gas vehicles certifying to TLEV, LEV or ULEV standards shall calculate a reactivity-adjusted methane exhaust emission value by multiplying the methane exhaust certification level by the applicable methane reactivity adjustment factor set forth in section 13 or in section I.E.5. of the above-referenced test procedures as applicable. The product of the NMOG exhaust certification levels and the reactivity adjustment factor shall be compared to the exhaust NMOG mass emission standards established for the particular vehicle emission category to determine compliance. For natural gas vehicles, the reactivity-adjusted NMOG value shall be added to the reactivity-adjusted methane value and then compared to the exhaust NMOG mass emission standards established for the particular vehicle emission category to determine compliance.

b. *Fleet Average Requirement*. Each manufacturer shall certify PCs or LDTs to meet the exhaust mass emission standards for TLEVs, LEVs, ULEVs, or the exhaust emission standards of sections 1960.1(e)(1), 1960.1(f)(1), or 1960.1(f)(2), Title 13, California Code of Regulations, or as Zero-Emission Vehicles, such that the manufacturer's fleet average NMOG values for California-certified PCs and LDTs from 0-3750 lbs. LVW, and LDTs from 3751-5750 lbs. LVW produced and delivered for sale in California are less than or equal to the requirement for the corresponding Model Year, Vehicle Type, and LVW Class in section 1960.1(g)(2), Title 13, California Code of Regulations.

4 *NMOG Standards for Fuel-Flexible and Dual-Fuel Vehicles*. Fuel-flexible and dual-fuel PCs and LDTs from 0-5750 lbs. LVW shall be certified to exhaust mass emission standards for NMOG established for the operation of the vehicle on any available fuel other than gasoline, and gasoline.

a. *Reactivity Adjustment*. For TLEVs, LEVs, and ULEVs, when certifying for operation on a fuel other than gasoline, manufacturers shall multiply exhaust NMOG certification levels by the applicable reactivity adjustment factor. In addition to multiplying the exhaust NMOG certification levels by the applicable reactivity adjustment factor, exhaust methane certification levels for natural gas vehicles shall be multiplied by the applicable methane reactivity adjustment factor and the resulting value shall be added to the reactivity-adjusted NMOG value. The exhaust NMOG certification levels for fuel-flexible or dual-fuel vehicles when certifying on gasoline shall not be multiplied by a reactivity adjustment factor.

b. *Standards for Fuel-Flexible and Dual-Fuel Vehicles Operating on Gasoline*. For PCs and LDTs from 0-5750 lbs. LVW, the applicable exhaust mass emission standard for NMOG when certifying the vehicle for operation on gasoline shall be:

| *Vehicle Type* | *Loaded Vehicle Weight (LVW)* | *Emission Category* | *Durability Vehicle Basis (g/mi)* | |
|---|---|---|---|---|
| | | | *50,000 Mile* | *100,000 Mile* |
| PCs, LDT | All, 0-3750 | TLEV | 0.25 | 0.31 |
| | | LEV | 0.125 | 0.156 |
| | | ULEV | 0.075 | 0.090 |
| LDT | 3751-5750 | TLEV | 0.32 | 0.40 |
| | | LEV | 0.160 | 0.200 |
| | | ULEV | 0.100 | 0.130 |

5 *Highway NOx*. The maximum projected emissions of "Oxides of Nitrogen" (or "NOx") measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR 600 Subpart B) shall be not greater than 1.33 times the applicable light-duty vehicle standards shown in the table. Both the projected emissions and the HWFET standard shall be rounded in accordance with ASTM E29-67 to the nearest 0.1 g/mi before being compared.

6 *Intermediate In-Use Compliance Standards*. The following standards are intermediate in-use compliance standards for 50,000 and 100,000 miles for PCs and LDTs from 0-5750 lbs. LVW, including fuel-flexible and

dual-fuel vehicles when operating on any available fuel other than gasoline. Intermediate in-use compliance standards shall apply to TLEVs through the 1995 model year as follows:

| | NMOG (g/mi) |
|---|---|
| PCs and LDTs 0-3750 lbs. LVW | 0.188 |
| LDTs 3751-5750 lbs. LVW | 0.238 |

In-use compliance with standards beyond 50,000 miles shall be waived through the 1995 model year for TLEVs, and through the 1998 model year for LEVs and ULEVs. For LEVs and ULEVs, the following intermediate in-use standards shall apply:

| Vehicle Type | Durability Vehicle Basis | LEV (g/mi) | | | ULEV (g/mi) | | | |
|---|---|---|---|---|---|---|---|---|
| | | Model Year | NMOG | NOx | Model Year | NMOG | CO | NOx |
| PCs, 0-3750 lb. LVW LDTs | 50,000 | through 1998 | 0.100 | 0.3 | through 1998 | 0.058 | 2.6 | 0.3 |
| | 50,000 | 1999 | 0.100 | 0.3 | 1999-2002 | 0.055 | 2.1 | 0.3 |
| | 100,000 | 1999 | 0.125 | 0.4 | 1999-2002 | 0.075 | 3.4 | 0.4 |
| 3751-5750 lb. LVW LDTs | 50,000 | through 1998 | 0.128 | 0.5 | through 1998 | 0.075 | 3.3 | 0.5 |
| | 50,000 | 1999 | 0.130 | 0.5 | 1999-2002 | 0.070 | 2.8 | 0.5 |
| | 100,000 | 1999 | 0.160 | 0.7 | 1999-2002 | 0.100 | 4.4 | 0.7 |

a. *Reactivity Adjustment*. For TLEVs, LEVs, and ULEVs designed to operate on any fuel other than conventional gasoline, including fuel-flexible and dual-fuel vehicles when operating on any fuel other than gasoline, exhaust NMOG mass emission results shall be multiplied by the applicable reactivity adjustment factor to determine compliance with intermediate in-use compliance standards for NMOG. In addition to multiplying the exhaust NMOG emission results by the applicable reactivity adjustment factor, the exhaust methane emission results for natural gas vehicles shall be multiplied by the applicable methane reactivity adjustment factor and the resulting value shall be added to the reactivity-adjusted NMOG value. Exhaust NMOG mass emissions from fuel-flexible or dual-fuel vehicles when operating on gasoline shall not be multiplied by a reactivity adjustment factor.

b. *Intermediate In-Use Standards for Fuel-Flexible and Dual-Fuel Vehicles Operating on Gasoline*. For fuel-flexible and dual-fuel PCs and LDTs from 0-5750 lbs. LVW, intermediate in-use compliance standards for NMOG emissions at 50,000 miles when the vehicle is operated on gasoline shall be:

| Vehicle Type | Loaded Vehicle Weight (LVW) | Emission Category | Durability Vehicle Basis (g/mi) 50,000 mi |
|---|---|---|---|
| PCs, LDT | All, 0-3750 | TLEV | 0.32 |
| | | LEV | 0.188 |
| | | ULEV | 0.100 |
| LDT | 3751-5750 | TLEV | 0.41 |
| | | LEV | 0.238 |
| | | ULEV | 0.128 |

Intermediate in-use compliance standards shall apply to TLEVs through the 1995 model year, and to LEVs and ULEVs through the 1998 model year. In-use compliance with standards beyond 50,000 miles shall be waived through the 1995 model year for TLEVs and through the 1998 model year for LEVs and ULEVs.

7 *Diesel Standards*. Manufacturers of diesel vehicles shall also certify to particulate standards at 100,000 miles. For all PCs and LDTs from 0-3750 lbs. LVW, the particulate standard is 0.08 g/mi, 0.08 g/mi, and 0.04 g/mi for TLEVs, LEVs, and ULEVs, respectively. For LDTs from 3751-5750 lbs. LVW, the particulate standard is 0.10 g/mi, 0.10 g/mi, and 0.05 g/mi for TLEVs, LEVs and ULEVs, respectively. For diesel vehicles certifying to the standards set forth in Title 13, section 1960.1(g)(1), "NMOG" shall mean non-methane hydrocarbons.

8 *50$^{o}$F Requirement*. Manufacturers shall demonstrate compliance with the above standards for NMOG, CO, and NOx at 50$^{o}$F, according to the procedure specified in section 11k of the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or according to the procedure specified in section II.C. 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 section 1961(d), as applicable. Hybrid electric, natural gas and diesel-fueled vehicles shall be exempt from 50$^{o}$F test requirements.

9 *Limit on In-Use Testing*. In-use compliance testing shall be limited to vehicles with fewer than 75,000 miles.

10 *HEV Requirements*. Deterioration factors for hybrid electric vehicles shall be based on the emissions and mileage accumulation of the auxiliary power unit. For certification purposes only, Type A hybrid electric vehicles shall demonstrate compliance with 50,000 mile emission standards (using 50,000 mile deterioration factors), and demonstrating compliance with 100,000 mile emission standards shall not be required. For certification purposes only, Type B hybrid electric vehicles shall demonstrate compliance with 50,000 mile emission standards (using 50,000 mile deterioration factors) and 100,000 mile emission standards (using 75,000 mile deterioration factors). For certification purposes only, Type C hybrid electric vehicles shall demonstrate compliance with 50,000 mile emission standards (using 50,000 mile deterioration factors) and 100,000 mile emission standards (using 100,000 mile deterioration factors).

11 *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;
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.

(g)(2) The fleet average non-methane organic gas exhaust emission values from passenger cars and light-duty trucks produced and delivered for sale in California by a manufacturer each model year from 1994 through 2000 shall not exceed:

**FLEET AVERAGE NON-METHANE ORGANIC GAS EXHAUST MASS EMISSION REQUIREMENTS FOR LIGHT-DUTY VEHICLE WEIGHT CLASSES**[7,8,9]

[grams per mile" (or "g/mi")]

| *Vehicle Type*[1] | *Loaded Vehicle Weight (lbs.)* | *Durability Vehicle Basis (mi)*[7] | *Model Year* | *Fleet Average Non-Methane Organic Gases*[2,3,4,5,6] |
|---|---|---|---|---|
| PC and LDT | All 0-3750 | 50,000 | 1994 | 0.250 |
| | | | 1995 | 0.231 |
| | | | 1996 | 0.225 |
| | | | 1997 | 0.202 |
| | | | 1998 | 0.157 |
| | | | 1999 | 0.113 |
| | | | 2000 | 0.073 |
| LDT | 3751-5750 | 50,000 | 1994 | 0.320 |
| | | | 1995 | 0.295 |
| | | | 1996 | 0.287 |
| | | | 1997 | 0.260 |
| | | | 1998 | 0.205 |
| | | | 1999 | 0.150 |
| | | | 2000 | 0.099 |

1 "PC" means passenger cars.
"LDT" means light-duty trucks.
"TLEV" means transitional low-emission vehicle.
"LEV" means low-emission vehicle.
"ULEV" means ultra-low-emission vehicle.
"LVW" means loaded vehicle weight.

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

3 *HEV Categories*. For the purpose of calculating fleet average NMOG values, a manufacturer may adjust the certification levels of hybrid electric vehicles (or "HEVs") based on the range of the HEV without the use of the engine. For the purpose of calculating the adjusted NMOG emissions, the following definitions shall apply:

"*Type A HEV*" shall mean an HEV which achieves a minimum range of 60 miles over the All-Electric Range Test as defined in "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "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), as applicable.

"*Type B HEV*" shall mean an HEV which achieves a range of 40 - 59 miles over the All-Electric Range Test as defined in "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model

Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "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), as applicable.

"*Type C HEV*" shall mean an HEV which achieves a range of 0 - 39 miles over the All-Electric Range Test as defined in "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "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), as applicable, and all other HEVs excluding "Type A" and "Type B" HEVs.

a. For the purpose of calculating fleet average NMOG values, vehicles which have no tailpipe emissions but use fuel-fired heaters and which are not certified as ZEVs shall be treated as "Type A HEV ULEVs."

4 *Calculation of Fleet Average NMOG Value (PCs and LDTs 0-3750 lbs. LVW).* Each manufacturer's fleet average NMOG value for the total number of PCs and LDTs from 0-3750 lbs. LVW produced and delivered for sale in California shall be calculated in units of g/mi NMOG according to the following equation, where the term "Produced" means produced and delivered for sale in California:

{[(No. of Vehicles Certified to the Exhaust Emission Standards in section 1960.1 (e)(1) and Produced) x (0.39)] +
[No. of Vehicles Certified to the Phase-In Exhaust Emission Standards in section 1960.1 (f)(1) and Produced x (0.25)] +
[No. of Vehicles Certified to the Phase-Out Exhaust Emission Standards in section 1960.1 (f)(1) and Produced x (0.39)] +
[(No. of Vehicles Certified to the Exhaust Emission Standards in section 1960.1(f)(2) and Produced) x (0.25)] +
[(No. of TLEVs excluding HEVs and Produced) x (0.125)] +
[(No. of LEVs excluding HEVs and Produced) x (0.075)] +
[(No. of ULEVs excluding HEVs and Produced) x (0.040)] +
(HEV contribution factor)} ÷
(Total No. of Vehicles Produced, Including Zero-Emission Vehicles and HEVs):

a. "HEV contribution factor" shall mean the NMOG emission contribution of HEVs to the fleet average NMOG value. The HEV contribution factor shall be calculated in units of g/mi as follows, where the term "Produced" means produced and delivered for sale in California:

HEV contribution factor =

{[No. of "Type A HEV" TLEVs Produced] x (0.100) +
[No. of "Type B HEV" TLEVs Produced] x (0.113) +
[No. of "Type C HEV" TLEVs Produced] x (0.125)} +
{[No. of "Type A HEV" LEVs Produced] x (0.057) +
[No. of "Type B HEV" LEVs Produced] x (0.066) +
[No. of "Type C HEV" LEVs Produced] x (0.075)} +
{[No. of "Type A HEV" ULEVs Produced] x (0.020) +
[No. of "Type B HEV" ULEVs Produced] x (0.030) +
[No. of "Type C HEV" ULEVs Produced] x (0.040)}

b. "Zero-Emission Vehicles" (or "ZEVs") classified as LDTs 3751-5750 lbs. LVW which have been counted toward the ZEV requirements for PCs and LDTs 0-3750 lbs. LVW as specified in note (9) shall be included in the equation of note (4).

c. Beginning with the 1996 model year, manufacturers that produce and deliver for sale in California PCs and LDTs 0-3750 lbs. LVW that are certified to federal Tier I exhaust emission standards in 40 CFR 86.094-8 and 86.094-9 shall add the following term to the numerator of the fleet average NMOG equation in note (4) calculate their fleet average NMOG values accordingly:

[No. of Vehicles Certified to federal Tier I exhaust emission standards and Produced) x (0.25)]

5 *Calculation of Fleet Average NMOG Value (LDTs 3751-5750 lbs. LVW).* Manufacturers that certify LDTs from 3751-5750 lbs. LVW, shall calculate a fleet average NMOG value in units of g/mi NMOG according to the following equation, where the term "Produced" means produced and delivered for sale in California:

{[(No. of Vehicles Certified to the Exhaust Emission Standards in section 1960.1 (e)(1), and Produced x (0.50)] +
[(No. of Vehicles Certified to the Phase-In Exhaust Emission Standards in section 1960.1 (f)(1), and Produced x (0.32)] +
[(No. of Vehicles Certified to the Phase-Out Exhaust Emission Standards in section 1960.1 (f)(1), and Produced x (0.50)] +
[(No. of Vehicles Certified to the Exhaust Emission Standards in section 1960.1 (f)(2), and Produced x (0.32)] +
[(No. of TLEVs Produced excluding HEVs) x (0.160)] + [(No. of LEVs Produced excluding HEVs) x (0.100)] +
[(No. of ULEVs Produced excluding HEVs) x (0.050)] +
(HEV contribution factor)} ÷
(Total No. of Vehicles Produced, Including ZEVs and HEVs).

a. "HEV contribution factor" shall mean the NMOG emission contribution of HEVs to the fleet average NMOG. The HEV contribution factor shall be calculated in units of g/mi as follows, where the term "Produced" means produced and delivered for sale in California.
HEV contribution factor =

{[No. of "Type A HEV" TLEVs Produced] x (0.130) +
[No. of "Type B HEV" TLEVs Produced] x (0.145) +
[No. of "Type C HEV" TLEVs Produced] x (0.160)} +
{[No. of "Type A HEV" LEVs Produced] x (0.075) +
[No. of "Type B HEV" LEVs Produced] x (0.087) +
[No. of "Type C HEV" LEVs Produced] x (0.100)} +
{[No. of "Type A HEV" ULEVs Produced] x (0.025) +
[No. of "Type B HEV" ULEVs Produced] x (0.037) +
[No. of "Type C HEV" ULEVs Produced] x (0.050)}

b. Only ZEVs which have been certified as LDTs 3751-5750 lbs. LVW and which have not been counted toward the ZEV requirements for PCs and LDTs 0-3750 lbs. LVW as specified in note (9) shall be included in the equation of note (5).
c. Beginning with the 1996 model year, manufacturers that produce and deliver for sale in California LDTs 3751-5750 lbs. LVW that are certified to the Tier I exhaust emission standards in 40 CFR 86.094-9 shall add the following term to the numerator of the fleet average NMOG equation in note (5) and calculate their fleet average NMOG values accordingly:
[(No. of Vehicles Certified to federal Tier I exhaust emission standards and Produced and Delivered for Sale in California) x (0.32)]

6 *Requirements for Small Volume Manufacturers.* As used in this subsection, the term "small volume manufacturer" shall mean any vehicle manufacturer with California sales less than or equal to 3000 new PCs, LDTs and MDVs per model year based on the average number of vehicles sold by the manufacturer each model year from 1989 to 1991, except as noted below. For manufacturers certifying for the first time in California, model-year sales shall be based on projected California sales. In 2000 and subsequent model years, small volume manufacturers shall comply with the fleet average NMOG requirements set forth below.
a. Prior to the model year 2000, compliance with the specified fleet average NMOG requirements shall be waived.
b. In the 2000 model year, small volume manufacturers shall not exceed a fleet average NMOG value of 0.075 g/mi for PCs and LDTs from 0-3750 lbs. LVW calculated in accordance with note (4).
c. In the 2000 model year, small volume manufacturers shall not exceed a fleet average NMOG value of 0.100 g/mi for LDTs from 3751-5750 lbs. LVW calculated in accordance with note (5).

d. If a manufacturer's average California sales exceeds 3000 units of new PCs, LDTs, and MDVs based on the average number of vehicles sold for any three consecutive model years, the manufacturer shall no longer be treated as a small volume manufacturer and shall comply with the fleet average requirements applicable for larger manufacturers as specified in section 1960.1(g)(2) beginning with the fourth model year after the last of the three consecutive model years.

e. If a manufacturer's average California sales falls below 3000 units of new PCs, LDTs, and MDVs based on the average number of vehicles sold for any three consecutive model years, the manufacturer shall be treated as a small volume manufacturer and shall be subject to requirements for small volume manufacturers as specified in section 1960.1(g)(2) beginning with the next model year.

7 *Calculation of NMOG Credits/Debits and Procedure for Offsetting Debits.*

a. In 1992 through 2000 model years, manufacturers that achieve 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)}.

Manufacturers with 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 any given 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. LVW shall be summed together. The resulting amount shall constitute the g/mi NMOG credits or debits accrued by the manufacturer for the model year.

b. For the 1994 through 1997 model years, manufacturers shall equalize emission debits within three model years and prior to the end of the 1998 model year by earning g/mi NMOG emission credits in an amount equal to their g/mi NMOG debits, or by submitting a commensurate amount of g/mi NMOG credits to the Executive Officer that were earned previously or acquired from another manufacturer. For 1998 through 2000 model years, manufacturers shall equalize emission debits by the end of the following model year. If emission debits are not equalized within the specified time period, the manufacturer shall be subject to the Health and Safety Code section 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 section 43211, the number of vehicles 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 applicable for the model year in which the debits were first incurred.

c. The g/mi NMOG emission credits earned in any given model year shall retain full value through the subsequent model year. The g/mi NMOG value of any credits not used to equalize the previous model-year's debit, shall be discounted by 50% at the beginning of the second model year after being earned, 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.

d. In order to verify the status of a manufacturer's compliance with the fleet average requirements for a given model year, and in order to confirm the accrual of NMOG 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 completed model year.

8 *Credits for Pre-1994 Model-Year Vehicles*. Manufacturers that produce and deliver for sale in California vehicles certified to the phase-in exhaust emission standards in section 1960.1 (f)(1), or vehicles certified to the exhaust emission standards in sections 1960.1(f)(2) or 1960.1(g)(1) and/or ZEVs, in the 1992 and 1993 model years, shall receive emission credits as determined by the equations in footnotes (4), (5), and (7).

a. For PCs and LDTs from 0-3750 lbs. LVW, the fleet average NMOG requirement for calculating a manufacturer's emission credits shall be 0.390 and 0.334 g/mi NMOG for vehicles certified for the 1992 and 1993 model years, respectively.

b. For LDTs from 3751-5750 lbs. LVW, the fleet average NMOG requirement for calculating a manufacturer's emission credits shall be 0.500 and 0.428 g/mi NMOG for vehicles certified for the 1992 and 1993 model years, respectively.

c. Emission credits earned prior to the 1994 model year shall be considered as earned in the 1994 model year and discounted in accordance with the schedule specified in footnote (7).

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(h)(1) *"Tier 1" Exhaust Emission Standards for MDVs.* The exhaust emission from new 1995 through 2003 model Tier 1 medium-duty vehicles shall not exceed:

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**1995-2003 MODEL-YEAR TIER 1**
**MEDIUM-DUTY VEHICLE EXHAUST EMISION STANDARDS [1,2,3,7,8]**
(grams per mile)

| *Test Weight* (lbs.) | *Durability Vehicle Basis* (mi.) | *Non-Methane Hydrocarbons*[4] | *Carbon Monoxide* | *Oxides of Nitrogen*[5] | *Particulates*[6] |
|---|---|---|---|---|---|
| 0-3,750 | 50,000 | 0.25 | 3.4 | 0.4 | n/a |
| 0-3,750 | 120,000 | 0.36 | 5.0 | 0.55 | 0.08 |
| 3,751-5,750 | 50,000 | 0.32 | 4.4 | 0.7 | n/a |
| 3.751-5,750 | 120,000 | 0.46 | 6.4 | 0.98 | 0.10 |
| 5,751-8,500 | 50,000 | 0.39 | 5.0 | 1.1 | n/a |
| 5,751-8,500 | 120,000 | 0.56 | 7.3 | 1.53 | 0.12 |
| 8,501-10,000 | 50,000 | 0.46 | 5.5 | 1.3 | n/a |
| 8,501-10,000 | 120,000 | 0.66 | 8.1 | 1.81 | 0.12 |
| 10,001-14,000 | 50,000 | 0.60 | 7.0 | 2.0 | n/a |
| 10,001-14,000 | 120,000 | 0.86 | 10.3 | 2.77 | 0.12 |

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1 "n/a" means not applicable.
"Test Weight" shall mean the average of the vehicle's curb weight and gross vehicle weight.

2 Manufacturers have the option of certifying engines used in incomplete and diesel medium-duty vehicles from 8,501-14,000 pounds, gross vehicle weight to the heavy-duty engine standards and test procedures set forth in section 1956.8(e), Title 13, California Code of Regulations. Manufacturers certifying incomplete or diesel medium-duty vehicles to the heavy-duty engine standards and test procedures shall specify, in the application for certification, an in-use compliance test procedure, as provided in section 2139 (c), Title 13, California Code of Regulations.

3 For the 1995 model-year only, manufacturers of medium-duty vehicles may certify a maximum of 50 percent of their vehicles to the applicable 1994 model-year standards and test procedures. For the 1995 model-year only, small volume manufacturers may certify 100 percent of their vehicles to the applicable 1994 model-year standards and test procedures. The percentage shall be based upon each manufacturer's projected sales of California-certified medium-duty vehicles.

[4] For methanol- and ethanol-fueled vehicles certifying to these standards, including flexible-fueled vehicles when certifying on methanol or ethanol, "Non-Methane Hydrocarbons" shall mean "Organic Material Non-Methane Hydrocarbon Equivalent" (or "OMNMHCE").

[5] The maximum projected emissions of oxides of nitrogen measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR Part 600 Subpart B) shall be not greater than 2.00 times the applicable medium-duty vehicle standards shown in the table. Both the projected emissions and the HWFET standards shall be rounded in accordance with ASTM E29-67 to the nearest 0.1 g/mi before being compared.

[6] Particulate standards are only applicable for diesel vehicles and shall be determined on a 120,000 mile basis.

[7] In-use compliance testing shall be limited to vehicles with less than 90,000 miles. For the 1995 through 1997 models, alternative in-use compliance is available for medium-duty vehicle manufacturers. A manufacturer may use alternative in-use compliance for up to 100 percent of its fleet in the 1995 and 1996 model years and up to 50 percent of its fleet in the 1997 model year. Small volume manufacturers may use alternative in-use compliance for up to 100 percent of their fleets in the 1995 through 1997 model years. The percentages shall be determined from the manufacturers' projected California sales of medium-duty vehicles. For vehicles certified to the standards and test procedures of this subsection, "alternative in-use compliance" shall consist of an in-use allowance of 25 percent over the applicable 1995 model-year non-methane hydrocarbon, carbon monoxide, and oxides of nitrogen 50,000 mile emission standards and a waiver of the emission standards beyond 50,000 miles.

[8] All medium-duty vehicles, except diesel-fueled vehicles and those incomplete and diesel vehicles certifying to heavy-duty engine test procedures, are subject to 50,000 mile and 120,000 mile non-methane hydrocarbon, carbon monoxide, and oxides of nitrogen standards. Diesel-fueled vehicles shall be subject to 120,000 mile non-methane hydrocarbon, carbon monoxide, oxides of nitrogen, and particulate standards only.

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(h)(2) *"LEV I" Exhaust Emission Standards for MDVs.* The exhaust emissions from new 1992 through 2006 model-year medium-duty LEV I low-emission vehicles, ultra-low-emission vehicles and super-ultra-low-emission vehicles shall not exceed:

## LEV I EXHAUST EMISSION STANDARDS FOR LOW-EMISSION VEHICLES, ULTRA-LOW-EMISSION VEHICLES AND SUPER-ULTRA-LOW-EMISSION VEHICLES IN THE MEDIUM-DUTY VEHICLE WEIGHT CLASS [8,9,10,11,12,13,14,15,16]

[grams per mile (or "g/mi")]

| *Test Weight* (lbs.) | *Durability Vehicle Basis* (mi.) | *Vehicle Emission Category*[2] | *Non-Methane Organic Gases*[3,4] | *Carbon Monoxide* | *Oxides of Nitrogen*[5] | *Particulates*[6,7] |
|---|---|---|---|---|---|---|
| 0-3,750 | 50,000 | LEV | 0.125 | 3.4 | 0.4 | n/a |
| | | ULEV | 0.075 | 1.7 | 0.2 | n/a |
| | 120,000 | LEV | 0.180 | 5.0 | 0.6 | 0.08 |
| | | ULEV | 0.107 | 2.5 | 0.3 | 0.04 |
| 3,751-5,750 | 50,000 | LEV | 0.160 | 4.4 | 0.4 | n/a |
| | | ULEV | 0.100 | 4.4 | 0.4 | n/a |
| | | SULEV | 0.050 | 2.2 | 0.2 | n/a |
| | 120,000 | LEV | 0.230 | 6.4 | 0.6 | 0.10 |
| | | ULEV | 0.143 | 6.4 | 0.6 | 0.05 |
| | | SULEV | 0.072 | 3.2 | 0.3 | 0.05 |
| 5,751-8,500 | 50,000 | LEV | 0.195 | 5.0 | 0.6 | n/a |
| | | ULEV | 0.117 | 5.0 | 0.6 | n/a |
| | | SULEV | 0.059 | 2.5 | 0.3 | n/a |
| | 120,000 | LEV | 0.280 | 7.3 | 0.9 | 0.12 |
| | | ULEV | 0.167 | 7.3 | 0.9 | 0.06 |
| | | SULEV | 0.084 | 3.7 | 0.45 | 0.06 |
| 8,501-10,000 | 50,000 | LEV | 0.230 | 5.5 | 0.7 | n/a |
| | | ULEV | 0.138 | 5.5 | 0.7 | n/a |
| | | SULEV | 0.069 | 2.8 | 0.35 | n/a |
| | 120,000 | LEV | 0.330 | 8.1 | 1.0 | 0.12 |
| | | ULEV | 0.197 | 8.1 | 1.0 | 0.06 |
| | | SULEV | 0.100 | 4.1 | 0.5 | 0.06 |
| 10,001-14,000 | 50,000 | LEV | 0.300 | 7.0 | 1.0 | n/a |
| | | ULEV | 0.180 | 7.0 | 1.0 | n/a |
| | | SULEV | 0.09 | 3.5 | 0.5 | n/a |
| | 120,000 | LEV | 0.430 | 10.3 | 1.5 | 0.12 |
| | | ULEV | 0.257 | 10.3 | 1.5 | 0.06 |
| | | SULEV | 0.130 | 5.2 | 0.7 | 0.06 |

1 "Test Weight" (or "TW") shall mean the average of the vehicle's curb weight and gross vehicle weight.

2 "LEV" means low-emission vehicle.

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

3 *Compliance with NMOG Standards*. To determine compliance with an NMOG standard, NMOG emissions shall be measured in accordance with "California Non-Methane Organic Gas Test Procedures" adopted July 12, 1991 and last amended July 30, 2002, which is incorporated herein by reference.

a. *Reactivity Adjustment.* For LEVs and ULEVs certified to operate on an available fuel other than conventional gasoline, including fuel-flexible or dual-fuel vehicles when certifying on a fuel other than gasoline, manufacturers shall multiply the NMOG exhaust certification levels by the applicable reactivity adjustment factor set forth in Section 13 of the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in section I.E.5. 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 section 1961(d), or established by the Executive Officer pursuant to Appendix VIII or section II.D. respectively of the foregoing test procedures. In addition, natural gas vehicles certifying to LEV or ULEV standards shall calculate a reactivity-adjusted methane exhaust emission value by multiplying the methane exhaust certification level by the applicable methane reactivity adjustment factor set forth in section 13 or in section I.E.5. of the above-referenced test procedures as applicable. The product of the exhaust NMOG certification levels and the reactivity adjustment factor shall be compared to the exhaust NMOG mass emission standard established for the particular vehicle emission category to determine compliance. For natural gas vehicles, the reactivity-adjusted NMOG value shall be added to the reactivity-adjusted methane value and then compared to the exhaust NMOG mass emission standards established for the particular vehicle emission category to determine compliance.

b. *Pre-1998 NOx standards.* Prior to the 1998 model year, the 50,000 mile and 120,000 mile LEV exhaust mass emission standards for NOx shall be: 0.7 and 1.0 g/mi for MDVs from 3751-5750 lbs. TW, 1.1 and 1.5 g/mi for MDVs from 5751-8500 lbs. TW, 1.3 and 1.8 g/mi for MDVs from 8501-10,000 lbs. TW, and 2.0 and 2.8 g/mi for MDVs from 10,001-14,000 lbs. TW, respectively.

4 *NMOG Standards for Fuel-Flexible and Dual-Fuel Vehicles*. Fuel-flexible and dual-fuel "Medium-Duty Vehicles" (or "MDVs") from 0-14,000 lbs. TW shall be certified to exhaust mass emission standards for NMOG established for the operation of the vehicle on a fuel other than gasoline, and gasoline.

a. *Reactivity Adjustment*. For LEVs and ULEVs when certifying on the fuel other than gasoline, manufacturers shall multiply the exhaust NMOG certification levels by the applicable reactivity adjustment factor. In addition to multiplying the exhaust NMOG certification levels by the applicable reactivity adjustment factor, the exhaust methane certification level for natural gas vehicles shall be multiplied by the applicable methane reactivity adjustment factor and the resulting value shall be added to the reactivity-adjusted NMOG value. When certifying on gasoline, the exhaust NMOG certification levels of fuel-flexible and dual-fuel vehicles shall not be multiplied by a reactivity adjustment factor.

b. *Standards for Fuel-Flexible and Dual-Fuel Vehicles Operating on Gasoline.* For MDVs from 0-14,000 lbs. TW, the applicable exhaust mass emission standard for NMOG when certifying the vehicle for operation on gasoline shall be:

| *Test Weight (lbs.)* | *Vehicle Emission Category* | *50,000 (g/mi)* | *120,000 (g/mi)* |
|---|---|---|---|
| 0-3750 | LEV | 0.25 | 0.36 |
| | ULEV | 0.125 | 0.180 |
| 3751-5750 | LEV | 0.32 | 0.46 |
| | ULEV | 0.160 | 0.230 |
| | SULEV | 0.100 | 0.143 |
| 5751-8500 | LEV | 0.39 | 0.56 |
| | ULEV | 0.195 | 0.280 |
| | SULEV | 0.117 | 0.167 |
| 8501-10,000 | LEV | 0.46 | 0.66 |
| | ULEV | 0.230 | 0.330 |
| | SULEV | 0.138 | 0.197 |
| 10,001-14,000 | LEV | 0.60 | 0.86 |
| | ULEV | 0.300 | 0.430 |
| | SULEV | 0.180 | 0.257 |

[5] *Highway NOx.* The maximum projected emissions of "Oxides of Nitrogen" (or "NOx") measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR Part 600 Subpart B) shall not be greater than 2.00 times the applicable MDV standards shown in the table. Both the projected emissions and the HWFET standard shall be rounded in accordance with ASTM E29-67 to the nearest 0.1 g/mi before being compared.

[6] Particulate standards are only applicable for diesel vehicles and shall be determined on a 120,000 mile basis.

[7] "n/a" means not applicable.

[8] *Certification of Incomplete and Diesel Vehicles.* Manufacturers have the option of certifying engines used in incomplete and diesel MDVs to the heavy-duty engine standards and test procedures set forth in Section 1956.8(g) or (h), Title 13, California Code of Regulations. Manufacturers certifying incomplete or diesel MDVs to the heavy-duty engine standards and test procedures shall specify in the application for certification an in-use compliance procedure as provided in Section 2139(c), Title 13, California Code of Regulations. For diesel vehicles certifying to the standards set forth in Title 13, section 1960.1(h)(2), "NMOG" shall mean non-methane hydrocarbons.

9 *Intermediate In-Use Compliance Standards.* The following intermediate in-use compliance standards for 50,000 miles and 120,000 miles for MDVs from 3751-14,000 lbs. TW, including fuel-flexible and dual-fuel vehicles when operating on an available fuel other than gasoline, shall apply for the specified model years only:

| **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 |
| LEV | through 1997 | 50,000 | 0.238 | 0.7 | 0.293 | 1.1 | 0.345 | 1.3 | 0.450 | 2.0 |
| | 1998-1999 | 50,000 | 0.238 | 0.6 | 0.293 | 0.9 | 0.345 | 1.0 | 0.450 | 1.5 |
| | 2000 | 50,000 | -- | 0.6 | -- | 0.9 | -- | 1.0 | -- | 1.5 |
| | 2000 | 120,000 | -- | 0.8 | -- | 1.2 | -- | 1.3 | -- | 2.0 |
| ULEV | through 1999 | 50,000 | 0.128 | 0.6 | 0.156 | 0.9 | 0.184 | 1.0 | 0.240 | 1.5 |
| | 2000 | 50,000 | 0.128 | 0.6 | 0.156 | 0.9 | 0.184 | 1.0 | 0.240 | 1.5 |
| | 2000 | 120,000 | 0.160 | 0.8 | 0.195 | 1.2 | 0.230 | 1.3 | 0.300 | 2.0 |
| | 2001-2002 | 50,000 | 0.128 | -- | 0.156 | -- | 0.184 | -- | 0.240 | -- |
| | 2001-2002 | 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 |

In-use compliance with standards beyond 50,000 miles shall be waived through the 1999 model year for LEVs and ULEVs and through the 2001 model year for SULEVs.

*Dashes mean that the standard in the section (h)(2) table applies.

a. *Reactivity Adjustment.* For LEVs and ULEVs designed to operate on an available fuel other than conventional gasoline, including fuel-flexible and dual-fuel vehicles when operating on an available fuel other than gasoline, NMOG exhaust mass emission results shall be multiplied by the applicable reactivity adjustment factor to determine compliance with intermediate in-use compliance standards for NMOG. In addition to multiplying the exhaust NMOG mass emission results by the applicable reactivity adjustment factor, natural gas vehicles shall multiply the exhaust methane mass emission results by the applicable methane reactivity adjustment factor and add that value to the reactivity-adjusted NMOG value. For fuel-flexible and dual-fuel vehicles when operating on gasoline, NMOG emission results shall not be multiplied by a reactivity adjustment factor.

b. *Gasoline Standards for Fuel-Flexible and Dual-Fuel Vehicles*. For fuel-flexible and dual-fuel MDVs from 0-14,000 lbs. TW, intermediate in-use compliance standards for NMOG emissions at 50,000 miles, when the vehicle is operated on gasoline, shall be:

| Fuel-Flexible and Dual-Fuel MDVs<br>Intermediate In-Use Compliance Standards | | |
|---|---|---|
| Test Weight (lbs.) | Vehicle Emission Category | 50,000 (g/mi) |
| 0-3750 | LEV | 0.32 |
| | ULEV | 0.188 |
| 3751-5750 | LEV | 0.41 |
| | ULEV | 0.238 |
| | SULEV | 0.128 |
| 5751-8500 | LEV | 0.49 |
| | ULEV | 0.293 |
| | SULEV | 0.156 |
| 8501-10,000 | LEV | 0.58 |
| | ULEV | 0.345 |
| | SULEV | 0.184 |
| 10,001-14,000 | LEV | 0.75 |
| | ULEV | 0.450 |
| | SULEV | 0.240 |

Intermediate in-use compliance standards shall apply to LEVs and ULEVs through the 1999 model year and to SULEVs through the 2001 model year. Compliance with the standards beyond 50,000 miles shall be waived through the 1999 model year for LEVs and ULEVs and through the 2001 model year for SULEVs.

10 *Medium-Duty Vehicle Phase-In Requirements.* Each manufacturer's MDV fleet shall be defined as the total number of California certified MDVs from 0-14,000 lbs. TW produced and delivered for sale in California.

a. Manufacturers of MDVs shall certify an equivalent percentage of their MDV fleet according to the following phase-in schedule:

| Model Year | Vehicles Certified to Title 13 CCR Section 1960.1(h)(1) or (h)(2) (%) | | | Vehicles Certified to Title 13 CCR Section 1956.8(g) or (h) (%) | | |
|---|---|---|---|---|---|---|
| | Tier 1 | LEV | ULEV | Tier 1 | LEV | ULEV |
| 1998 | 73 | 25 | 2 | 100 | 0 | 0 |
| 1999 | 48 | 50 | 2 | 100 | 0 | 0 |
| 2000 | 23 | 75 | 2 | 100 | 0 | 0 |

b. [Reserved]
c. The percentages shall be applied to the manufacturers' total production of California-certified medium-duty vehicles delivered for sale in California.
d. These requirements shall not apply to small volume manufacturers. Small volume manufacturers shall comply with the requirements of note (16) below.

11 *Definition of HEV*. For the purpose of calculating "Vehicle Equivalent Credits" (or "VECs"), the contribution of hybrid electric vehicles (or "HEVs") will be calculated based on the range of the HEV without the use of the engine. For purpose of calculating the contribution of HEVs to the VECs, the following definitions shall apply:

"*Type A HEV*" shall mean an HEV which achieves a minimum range of 60 miles over the All-Electric Range Test as defined in "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "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), as applicable.

"*Type B HEV*" shall mean an HEV which achieves a range of 40 - 59 miles over the All-Electric Range Test as defined in "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "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), as applicable.

"*Type C HEV*" shall mean an HEV which achieves a range of 0 - 39 miles over the All-Electric Range Test as defined in "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "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), as applicable, and all other HEVs excluding "Type A" and "Type B" HEVs.

12 *Calculation of Vehicle Equivalent Credits.* In 1992 through 2000 model years, manufacturers that produce and deliver for sale in California MDVs in excess of the equivalent requirements for LEVs and/or ULEVs certified to the exhaust emission standards set forth in this section (h)(2) or Title 13, CCR Section 1956.8(h), shall receive 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 "Type C HEV" LEVs Produced)] +
[(No. of "Type A HEV" LEVs Produced) x (1.2)] +
[(No of "Type B HEV" LEVs Produced) x (1.1)] -
(Equivalent No. of LEVs Required to be Produced)**}** +
{(1.4) x [(No. of ULEVs Produced excluding HEVs) + (No. of "Type C HEV" ULEVs Produced)] +
[(1.7) x (No. of "Type A HEV" ULEVs Produced)] +
[(1.5) x (No. of "Type B HEV" ULEVs Produced)] -
[(1.4) x (Equivalent No. of ULEVs Required to be Produced)]**}** +
{[(1.7) x [(No. of SULEVs Produced excluding HEVs) + (No. of "Type C HEV" SULEVs Produced)] +
[(No. of "Type A HEV" SULEVs Produced) x (1.7)] +
[(No. of "Type B HEV" SULEVs) x (1.5)] -
[(1.7) x [(Equivalent No. of SULEVs Required to be Produced)]} +
[(2.0) x (No. of ZEVs Certified and Produced as MDVs)].

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

b. Manufacturers shall equalize emission debits within one model year by earning VECs in an amount equal to their previous model-year's total of VEDs, or by submitting a commensurate amount of VECs to the Executive Officer that were earned previously or acquired from another manufacturer. Any manufacturer which fails to equalize emission debits within the specified time period shall be subject to the Health and Safety Code 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 section 43211, the number of vehicles not meeting the state board's emission standards shall be equal to the amount of VEDs incurred.

c. The VECs earned in any given model year shall retain full value through the subsequent model year.

d. The value of any VECs 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, 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.

e. Any VECs earned prior to the 1998 model year shall be treated as earned in the 1998 model year and discounted in accordance with the schedule specified in note (12)(d).

f. Only ZEVs certified as MDVs shall be included in the calculation of VECs.

g. In order to verify the status of a manufacturer's compliance with the phase-in requirements of this section and in order to confirm the accrual of VECs or VEDs, 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.

13 *50°F Requirement*. Manufacturers shall demonstrate compliance with the above standards for NMOG, carbon monoxide, and oxides of nitrogen at 50°F, according to the procedure specified in section 11k of the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or according to the procedure specified in section II.C. 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 section 1961(d), as applicable. Hybrid electric, natural gas and diesel-fueled vehicles shall be exempt from 50°F test requirements.

14 In-use compliance testing shall be limited to vehicles with fewer than 90,000 miles.

15 *HEV Requirements*. Deterioration factors for hybrid electric vehicles shall be based on the emissions and mileage accumulation of the auxiliary power unit. For certification purposes only, Type A hybrid electric vehicles shall demonstrate compliance with 50,000 mile emission standards (using 50,000 mile deterioration factors), and demonstrating compliance with 120,000 mile emission standards shall not be required. For certification purposes only, Type B hybrid electric vehicles shall demonstrate compliance with 50,000 mile emission standards (using 50,000 mile deterioration factors) and 120,000 mile emission standards (using

90,000 mile deterioration factors). For certification purposes only, Type C hybrid electric vehicles shall demonstrate compliance with 50,000 mile emission standards (using 50,000 mile deterioration factors) and 120,000 mile emission standards (using 120,000 mile deterioration factors).

16 *Requirements for Small Volume Manufacturers.* As used in Section 1960.1(h)(2), the term "small volume manufacturer" shall mean any vehicle manufacturer with California sales less than or equal to 3000 new PCs, LDTs, and MDVs per model year based on the average number of vehicles sold by the manufacturer each model year from 1992 to 1994, except as otherwise noted below. For manufacturers certifying for the first time in California, model-year sales shall be based on projected California sales.

a. Prior to the model year 2001, small volume manufacturers shall not be required to certify, produce, or deliver LEVs and ULEVs for sale in California.
b. If a manufacturer's average California sales exceeds 3000 units of new PCs, LDTs, and MDVs based on the average number of vehicles sold for any three consecutive model years, the manufacturer shall no longer be treated as a small volume manufacturer and shall comply with the LEV and ULEV requirements applicable for larger manufacturers as specified in Section 1960.1(h)(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 3000 units of new PCs, LDTs, and MDVs based on the average number of vehicles sold for any three consecutive model years, the manufacturer shall be treated as a small volume manufacturer and shall be subject to requirements for small volume manufacturers as specified in Section 1960.1(h)(2) beginning with the next model year.

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(i) *[Not applicable after December 31, 1990]*

(j) For Option 1 in the tables in sections (f)(1) and (f)(2), the hydrocarbon and carbon monoxide compliance shall be determined on a 50,000-mile durability basis. For Option 2 in the table in section (f)(2), the hydrocarbon and carbon monoxide compliance shall be determined on a 100,000-mile durability basis.

(k) The test procedures for determining compliance with these standards are set forth in "California Exhaust Emission Standards and Test Procedures for 1981 through 1987 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," adopted by the state board on November 23, 1976, as last amended May 20, 1987, and in "California Exhaust Emission Standards and Test Procedures for 1988 through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," adopted by the state board on May 20, 1987 as last amended August 5, 1999, both which are incorporated herein by reference, and in "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). The test procedures for determining the compliance of 2001 through 2006 model-year hybrid electric vehicles with the standards set forth in this section are set forth in "California Exhaust Emission Standards and Test Procedures for 2005 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(h).

(l) With respect to any new vehicle required to comply with the standards set forth in paragraphs (a) through (h), the manufacturer's written maintenance instructions for in-use vehicles shall not require scheduled maintenance more frequently than or beyond the scope of maintenance permitted under the test procedures referenced in paragraph (k) above. Any failure

to perform scheduled maintenance shall not excuse an emissions violation unless the failure is related to or causative of the violation.

(m) Any 1982, 1983, and 1984 model year vehicle required to comply with the standards set forth in paragraphs (b), (c), (d), and (f) which is subject to a standard set by federal law or regulation controlling emissions of particulate matter must conform to such standard.

(n) For purposes of section 1960.1(a) through (f), section 1960.1(h)(1), and section 1960.1.5, "small volume manufacturer" for the 2000 and earlier model years is any vehicle manufacturer which was subject to "in lieu" standards pursuant to section 202(b)(1)(B) of the Federal Clean Air Act (42 U.S.C. section 7521(b)(1)(B), as amended November 16, 1977) or a vehicle manufacturer with California sales not exceeding 3,000 new motor vehicles per model year based on previous model-year sales; however, for manufacturers certifying for the first time in California model year sales shall be based on projected California sales.

(o) [Reserved]

(p) The cold temperature exhaust carbon monoxide emission levels from new 1996 through 2000 and subsequent model-year passenger cars, light-duty trucks and medium-duty vehicles shall not exceed:

**1996 AND SUBSEQUENT MODEL-YEAR COLD TEMPERATURE CARBON MONOXIDE EXHAUST EMISSIONS STANDARDS FOR PASSENGER CARS, LIGHT-DUTY TRUCKS, AND MEDIUM-DUTY VEHICLES [1,2]**
**(grams per mile)**

| *Vehicle Type* | *Loaded Vehicle Weight* (lbs.) | *Durability Vehicle Basis (mi.)* | *Carbon Monoxide* |
|---|---|---|---|
| Passenger Car | All | 50,000 | 10.0 |
| Light-Duty Truck | 0-3750 | 50,000 | 10.0 |
| Light-Duty Truck | 3751-5750 | 50,000 | 12.5 |
| Medium-Duty Vehicle | 0-3750 | 50,000 | 10.0 |
| Medium-Duty Vehicle | 3751-8500[3] | 50,000 | 12.5 |

1 These standards are applicable to vehicles tested in accordance with 40 CFR Part 86 Subpart C, at a nominal temperature of $20^0$F ($-7^0$C).

2 Natural gas vehicles, diesel-fueled vehicles, hybrid electric vehicles, and zero-emission vehicles are exempt from these standards.

3 Medium-duty vehicles with a gross vehicle weight rating greater than 8,500 lbs. are exempt from this standard.

(q) The Supplemental Federal Test Procedure (SFTP) exhaust emission levels from new 2001 and subsequent model passenger cars and light-duty trucks, other than low-emission vehicles, ultra-low-emission vehicles, and zero-emission vehicles, shall not exceed:

**SFTP EXHAUST EMISSION STANDARDS FOR 2001 AND SUBSEQUENT MODEL-YEAR PASSENGER CARS AND LIGHT-DUTY TRUCKS OTHER THAN LOW-EMISSION VEHICLES, ULTRA-LOW-EMISSION VEHICLES, AND ZERO-EMISSION VEHICLES**
(grams per mile)[4,5,6,7,8,9,10]

| Vehicle Type[1] | Loaded Vehicle Weight (lbs.) | Durability Vehicle Basis (mi) | Fuel Type | NMHC[2] + NOx[1] Composite[3] | CO[1] | | |
|---|---|---|---|---|---|---|---|
| | | | | | A/C[1] Test | US06[1] Test | Composite Option[3] |
| PC | All | 50,000 | Gasoline | 0.65 | 3.0 | 9.0 | 3.4 |
| | | | Diesel | 1.48 | NA | 9.0 | 3.4 |
| | | 100,000 | Gasoline | 0.91 | 3.7 | 11.1 | 4.2 |
| | | | Diesel | 2.07 | NA | 11.1 | 4.2 |
| LDT | 0-3750 | 50,000 | Gasoline | 0.65 | 3.0 | 9.0 | 3.4 |
| | | | Diesel | 1.48 | NA | 9.0 | 3.4 |
| | | 100,000 | Gasoline | 0.91 | 3.7 | 11.1 | 4.2 |
| | | | Diesel | 2.07 | NA | 11.1 | 4.2 |
| LDT | 3751-5750 | 50,000 | Gasoline | 1.02 | 3.9 | 11.6 | 4.4 |
| | | | Diesel | NA | NA | NA | NA |
| | | 100,000 | Gasoline | 1.37 | 4.9 | 14.6 | 5.5 |
| | | | Diesel | NA | NA | NA | NA |

1 *Abbreviations.*
"PC" means passenger car.
"LDT" means light-duty truck.
"NMHC+NOx" means non-methane hydrocarbon plus oxides of nitrogen emissions.
"CO" means carbon monoxide emissions.
"A/C" means air-conditioning.
"US06" means the test cycle designed to evaluate emissions during aggressive and microtransient driving.

2 *Non-Methane Hydrocarbon Emissions.* For PCs and LDTs certified to the FTP exhaust standards in section 1960.1(f)(2), 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 as transitional low-emission vehicles, 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 section 1960.1(g)(1), note (3). For alcohol-fueled vehicles certifying to these standards, including flexible-fuel vehicles when certifying on methanol or ethanol, "Non-Methane Hydrocarbons" shall mean "Organic Material Non-Methane Hydrocarbon Equivalent."

3 *Composite Standards.* Compliance with the composite standards shall be demonstrated using the calculations set forth in the section 86.164-00, Title 40, Code of Federal Regulations, as adopted October 22, 1996, which is incorporated herein by reference.

4 *SFTP*. SFTP means the additional test procedure designed to measure emissions during aggressive and microtransient driving, as described in section 86.159-00, Title 40, Code of Federal Regulations, as adopted October 22, 1996, over the US06 cycle, and also the test procedure designed to measure urban driving emissions while the vehicle's air conditioning system is operating, as described in section 86.160-00, Title 40, Code of Federal Regulations, as adopted October 22, 1996, over the SC03 cycle. These sections of the Code of Federal Regulations are incorporated herein by reference.

5 *Applicability to Alternative Fuel Vehicles.* These SFTP standards do not apply to vehicles certified on fuels other than gasoline and diesel fuel, but the standards do apply to the gasoline and diesel fuel operation of flexible-fuel vehicles and dual-fuel vehicles.

6 *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.

7 *A/C-on Specific Calibrations*. A/C-on specific calibrations (e.g. air to fuel ratio, spark timing, and exhaust gas recirculation), may be used which differ from A/C-off calibrations for given engine operating conditions (e.g., engine speed, manifold pressure, coolant temperature, air charge temperature, and any other parameters). Such calibrations must not unnecessarily reduce the NMHC+NOx emission control effectiveness during A/C-on operation when the vehicle is operated under conditions which may reasonably be expected to be encountered during normal operation and use. If reductions in control system NMHC+NOx effectiveness do occur as a result of such calibrations, the manufacturer shall, in the Application for Certification, specify the circumstances under which such reductions do occur, and the reason for the use of such calibrations resulting in such reductions in control system effectiveness.

A/C-on specific "open-loop" or "commanded enrichment" air-fuel enrichment strategies (as defined below), which differ from A/C-off "open-loop" or "commanded enrichment" air-fuel enrichment strategies, may not be used, with the following exceptions: cold-start and warm-up conditions, or, subject to Executive Officer approval, conditions requiring the protection of the vehicle, occupants, engine, or emission control hardware. Other than these exceptions, such strategies which are invoked based on manifold pressure, engine speed, throttle position, or other engine parameters shall use the same engine parameter criteria for the invoking of this air-fuel enrichment strategy and the same degree of enrichment regardless of whether the A/C is on or off.

"Open-loop" or "commanded" air-fuel enrichment strategy is defined as enrichment of the air to fuel ratio beyond stoichiometry for the purposes of increasing engine power output and the protection of engine or emissions control hardware. However, "closed-loop biasing," defined as small changes in the air-fuel ratio for the purposes of optimizing vehicle emissions or driveability, shall not be considered an "open-loop" or "commanded" air-fuel enrichment strategy. In addition, "transient" air-fuel enrichment strategy (or "tip-in" and "tip-out" enrichment), defined as the temporary use of an air-fuel ratio rich of stoichiometry at the beginning or duration of rapid throttle motion, shall not be considered an "open-loop" or "commanded" air-fuel enrichment strategy.

8 *"Lean-On-Cruise" Calibration Strategies.* In the Application for Certification, the manufacturer shall state whether any "lean-on-cruise" strategies are incorporated into the vehicle design. A "lean-on-cruise" air-fuel calibration strategy is defined as the use of an air-fuel ratio significantly greater than stoichiometry, during non-deceleration conditions at speeds above 40 mph. "Lean-on-cruise" air-fuel calibration strategies shall not be employed during vehicle operation in normal driving conditions, including A/C-usage, unless at least one of the following conditions is met:

1. Such strategies are substantially employed during the FTP or SFTP, or

2. Such strategies are demonstrated not to significantly reduce vehicle NMHC+NOx emission control effectiveness over the operating conditions in which they are employed, or

3. Such strategies are demonstrated to be necessary to protect the vehicle, occupants, engine, or emission control hardware.

If the manufacturer proposes to use a "lean-on-cruise" calibration strategy, the manufacturer shall specify the circumstances under which such a calibration would be used, and the reason or reasons for the proposed use of such a calibration.

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.

9 *Phase-In Requirements.* For the purposes of this section 1960.1(q) only, each manufacturer's PC and LDT fleet shall be defined as the total projected number of PCs and LDTs from 0-5750 pounds loaded vehicle weight certified to the FTP exhaust standards of section 1960.1(f)(2) and certified as transitional low-emission vehicles sold in California. As an option, a manufacturer may elect to have its total PC and LDT fleet defined, for the purposes of this section 1960.1(q) only, as the total projected number of the manufacturer's PCs and LDTs, other than zero-emission vehicles, certified and sold in California.

a. Manufacturers of PCs and of LDTs, except small volume manufacturers, shall certify a minimum percentage of their 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 |

b. Small volume manufacturers of PCs and LDTs shall certify 100% of their PC and LDT fleet in the 2004 and subsequent model years.

10 *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 the "California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), must be used for all types of emission testing to determine compliance with the associated emission standards.

(r) The Supplemental Federal Test Procedure (SFTP) standards in this section represent the maximum SFTP exhaust emissions at 4,000 miles ± 250 miles or at the mileage determined by the manufacturer for emission-data vehicles in accordance with the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as incorporated by reference in section 1960.1(k), and with 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). The SFTP exhaust emission levels from new 2001 and subsequent model low-emission vehicles, ultra-low-emission vehicles and super-ultra-low-emission vehicles in the passenger car and light-duty truck class, and new 2003 and subsequent low-emission vehicles, ultra-low-emission vehicles, and super-ultra-low-emission vehicles in the medium-duty class, shall not exceed:

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**SFTP EXHAUST EMISSION STANDARDS**
**FOR LOW-EMISSION VEHICLES, ULTRA-LOW-EMISSION VEHICLES, AND SUPER-ULTRA-LOW-EMISSION VEHICLES IN THE PASSENGER CAR, LIGHT-DUTY TRUCK, AND MEDIUM-DUTY VEHICLE CLASSES**
(grams per mile)[6,7,8,9,10,11]

| Vehicle Type[1] | Loaded Vehicle Weight (lbs.)[2] | US06 Test[1] | | A/C Test[1,5] | |
|---|---|---|---|---|---|
| | | NMHC[4] + NOx[1] | CO[1] | NMHC[4] + NOx[1] | CO[1] |
| PC | All | 0.14 | 8.0 | 0.20 | 2.7 |
| LDT | 0-3750 | 0.14 | 8.0 | 0.20 | 2.7 |
| LDT | 3751-5750 | 0.25 | 10.5 | 0.27 | 3.5 |
| MDV | 3751-5750 | 0.40 | 10.5 | 0.31 | 3.5 |
| MDV | 5751-8500[3] | 0.60 | 11.8 | 0.44 | 4.0 |

1 *Abbreviations and Definitions.* For the purposes of this SFTP standards table only, the following abbreviations and definitions apply:
"PC" means passenger car.
"LDT" means light-duty truck, defined as 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" means medium-duty truck, defined as 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.
"NMHC+NOx" means non-methane hydrocarbon plus oxides of nitrogen emissions.
"CO" means carbon monoxide emissions.
"US06" means the test cycle designed to evaluate emissions during aggressive and microtransient driving.
"A/C" means air-conditioning.

2 For MDVs, "Loaded Vehicle Weight" shall mean "Test Weight," which is the average of the vehicle's curb weight and gross vehicle weight.

3 Vehicles with a gross vehicle weight rating over 8,500 pounds are exempted from the requirements of this subsection.

4 *Non-Methane Hydrocarbon Emissions.* 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 section 1960.1(g)(1), note (3). For alcohol-fueled vehicles certifying to these standards, including flexible-fuel vehicles when certifying on methanol or ethanol, "Non-Methane Hydrocarbons" shall mean "Organic Material Non-Methane Hydrocarbon Equivalent."

5 *A/C-on Specific Calibrations*. A/C-on specific calibrations (e.g. air to fuel ratio, spark timing, and exhaust gas recirculation), may be used which differ from A/C-off calibrations for given engine operating conditions (e.g., engine speed, manifold pressure, coolant temperature, air charge temperature, and any other parameters). Such calibrations must not unnecessarily reduce the NMHC+NOx emission control effectiveness during A/C-on operation when the vehicle is operated under conditions which may reasonably be expected to be encountered during normal operation and use. If reductions in control system NMHC+NOx effectiveness do occur as a result of such calibrations, the manufacturer shall, in the Application for Certification, specify the circumstances under which such reductions do occur, and the reason for the use of such calibrations resulting in such reductions in control system effectiveness.

A/C-on specific "open-loop" or "commanded enrichment" air-fuel enrichment strategies (as defined below), which differ from A/C-off "open-loop" or "commanded enrichment" air-fuel enrichment strategies, may not be used, with the following exceptions: cold-start and warm-up conditions, or, subject to Executive Officer approval, conditions requiring the protection of the vehicle, occupants, engine, or emission control hardware. Other than these exceptions, such strategies which are invoked based on manifold pressure, engine speed, throttle position, or other engine parameters shall use the same engine parameter criteria for the invoking of this air-fuel enrichment strategy and the same degree of enrichment regardless of whether the A/C is on or off.

"Open-loop" or "commanded" air-fuel enrichment strategy is defined as enrichment of the air to fuel ratio beyond stoichiometry for the purposes of increasing engine power output and the protection of engine or emissions control hardware. However, "closed-loop biasing," defined as small changes in the air-fuel ratio for the purposes of optimizing vehicle emissions or driveability, shall not be considered an "open-loop" or "commanded" air-fuel enrichment strategy. In addition, "transient" air-fuel enrichment strategy (or "tip-in" and "tip-out" enrichment), defined as the temporary use of an air-fuel ratio rich of stoichiometry at the beginning or duration of rapid throttle motion, shall not be considered an "open-loop" or "commanded" air-fuel enrichment strategy.

6 *SFTP*. SFTP means the additional test procedure designed to measure emissions during aggressive and microtransient driving, as described in section 86.159-00, Title 40, Code of Federal Regulations, as adopted October 22, 1996, over the US06 cycle, and also the test procedure designed to measure urban driving emissions while the vehicle's air conditioning system is operating, as described in section 86.160-00, Title 40, Code of Federal Regulations, as adopted October 22, 1996, over the SC03 cycle. These sections of the Code of Federal Regulations are incorporated herein by reference.

7 *Applicability to Alternative Fuel Vehicles.* These SFTP standards do not apply to vehicles certified on fuels other than gasoline and diesel fuel, but the standards do apply to the gasoline and diesel fuel operation of flexible-fuel vehicles and dual-fuel vehicles.

8 *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.

9 *"Lean-On-Cruise" Calibration Strategies.* In the Application for Certification, the manufacturer shall state whether any "lean-on-cruise" strategies are incorporated into the vehicle design. A "lean-on-cruise" air-fuel calibration strategy is defined as the use of an air-fuel ratio significantly greater than stoichiometry, during non-deceleration conditions at speeds above 40 mph. "Lean-on-cruise" air-fuel calibration strategies shall not be employed during vehicle operation in normal driving conditions, including A/C-usage, unless at least one of the following conditions is met:

1. Such strategies are substantially employed during the FTP or SFTP, or

2. Such strategies are demonstrated not to significantly reduce vehicle NMHC+NOx emission control effectiveness over the operating conditions in which they are employed, or

3. Such strategies are demonstrated to be necessary to protect the vehicle, occupants, engine, or emission control hardware.

If the manufacturer proposes to use a "lean-on-cruise" calibration strategy, the manufacturer shall specify the circumstances under which such a calibration would be used, and the reason or reasons for the proposed use of such a calibration.

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.

10 *Phase-In Requirements***.** For the purposes of this 1960.1(r) section only, each manufacturer's PC and LDT fleet shall be defined as the total projected number of low-emission and 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.

a. Manufacturers of PCs, LDTs, and MDVs, except small volume manufacturers, shall certify a minimum percentage of their PC and LDT fleet, and a minimum percentage of their MDV fleet, according to the following phase-in schedule.

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

b. Manufacturers 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 1960.1(q) note (9), the cumulative total of model-year emission reductions as determined only for PCs and LDTs certified to this section 1960.1(r) must also be equal to or larger than the required cumulative total by end of the 2004 model year. Manufacturers 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).

c. 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.

[11] *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 the "California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), must be used for all types of emission testing to determine compliance with the associated emission standards.

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NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43104, and 43105, Health and Safety Code. Reference: Sections 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43103, 43104, 43105, 43106, 43107, and 43204 - 43205.5, Health and Safety Code.

**§ 1960.5. Certification of 1983 and Subsequent Model-Year Federally Certified Light-Duty Motor Vehicles for Sale in California.**

(a) The exhaust emissions from new 1983 and subsequent model year federally certified passenger cars and light-duty trucks, subject to registration and sold and registered in this state pursuant to section 43102(b) of the California Health and Safety Code, shall not exceed the applicable federal emission standards as determined under applicable federal test procedures.

(b) With respect to any new vehicle required to comply with the standards set forth in paragraph (a), the manufacturer's written maintenance instructions for in-use vehicles shall not require scheduled maintenance more frequently than or beyond the scope of maintenance permitted under the test procedures referenced in paragraph (a). Any failure to perform scheduled maintenance shall not excuse an emissions violation unless the failure is related to or causes the violation.

(c) The standards and procedures for certifying in California 1983 through 2002 model-year federally-certified light-duty motor vehicles are set forth in "Guidelines for Certification of 1983 through 2002 Model-Year Federally Certified Light-Duty Motor Vehicles for Sale in California," adopted July 20, 1982, as last amended July 30, 2002, which is incorporated herein by reference. The standards and procedures for certifying in California 2003 and subsequent model-year federally-certified light-duty motor vehicles are set forth in "Guidelines for Certification of 2003 and Subsequent Model-Year Federally Certified Light-Duty Motor Vehicles for Sale in California," adopted July 30, 2002, which is incorporated herein by reference.

NOTE: Authority cited: Sections 39601, 43100 and 43102, Health and Safety Code. Reference: Section 43102, Health and Safety Code.

**§ 1961. Exhaust Emission Standards and Test Procedures - 2004 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.**

*Introduction.* This section 1961 contains the California "LEV II" exhaust emission standards for 2004 and subsequent model passenger cars, light-duty trucks and medium-duty vehicles. A manufacturer must demonstrate compliance with the exhaust standards in section 1961(a) applicable to specific test groups, and with the composite phase-in requirements in section 1961(b) applicable to the manufacturer's entire fleet. Section 1961(b) also includes the manufacturer's fleet-wide composite phase-in requirements for the 2001 - 2003 model years.

Prior to the 2004 model year, a manufacturer that produces vehicles that meet the standards in section 1961(a) has the option of certifying the vehicles to those standards, in which case the vehicles will be treated as LEV II vehicles for purposes of the fleet-wide phase-in requirements. Similarly, 2004 - 2006 model-year vehicles may be certified to the "LEV I" exhaust emission standards in section 1960.1(g)(1) and (h)(2), in which case the vehicles will be treated as LEV I vehicles for purposes of the fleet-wide phase-in requirements.

A manufacturer has the option of certifying engines used in incomplete and diesel medium-duty vehicles with a gross vehicle weight rating of greater than 8,500 lbs. to the heavy-duty engine standards and test procedures set forth in title 13, CCR, sections 1956.8(c), (g) and (h).

(a) *Exhaust Emission Standards.*

(1) *"LEV II" Exhaust Standards*. The following standards represent the maximum exhaust emissions for the intermediate and full useful life from new 2004 and subsequent model-year "LEV II" 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:

| 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 8500 lbs. GVW or less<br><br>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 8501 - 10,000 lbs. GVW<br><br>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 |
| MDVs 10,001-14,000 lbs. GVW<br><br>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 |

(2) *Reactivity Adjustment in Determining Compliance with the NMOG Standard*

(A) 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. The manufacturer shall multiply measured NMOG exhaust emission results by the appropriate reactivity adjustment factor set forth in section 1961(a)(2)(B) or established in accordance with the test procedures incorporated by reference in section 1961(d). The reactivity adjustment factor represents the ratio of the NMOG specific reactivity of a low-emission vehicle designed to operate on a fuel other than conventional gasoline compared to the NMOG baseline specific reactivity of vehicles in the same vehicle emission category operated on conventional gasoline.

(B) The following reactivity adjustment factors apply:

| | *Light-Duty Vehicles 0-6000 lbs. GVW* | | | *Medium-Duty Vehicles 6001 lbs. - 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 |

(3) *NMOG Standards for Bi-Fuel, Fuel-Flexible 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 table in section 1961(a)(1) when certifying the vehicle for operation on the gaseous or alcohol fuel.

The following standards 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, in accordance with the test procedures incorporated by reference in section 1961(d).

Testing at 50 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 1961(a)(1).

| **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 |

(4) *50°F Exhaust Emission Standards.* All light- and medium-duty LEVs, ULEVs and SULEVs must demonstrate compliance with the following exhaust emission standards for NMOG and formaldehyde (HCHO) 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 the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles" incorporated by reference in section 1961(d). 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 below. A manufacturer may demonstrate compliance with the NMOG and HCHO certification standards contained in this subparagraph by measuring NMHC exhaust emissions or issuing a statement of compliance for HCHO in accordance with Section D.1, subparagraph (p) and Section G.3.1.2, respectively, of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles" incorporated by reference in section 1961(d). Emissions of CO and NOx measured at 50° F shall not exceed the standards set forth in §1961(a)(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.

| *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 |

(5) *Cold CO Standard*. 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;<br>LEV I and Tier 1 MDVs 8500 lbs. GVW and less | 12.5 |

These standards are applicable to vehicles tested at a nominal temperature of 20$^{o}$F (-7$^{o}$C) in accordance with 40 CFR Part 86 Subpart C, 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" incorporated by reference in section 1961(d). Natural gas, diesel-fueled and zero-emission vehicles are exempt from these standards.

(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 1961(a)(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.

(7) *Supplemental Federal Test Procedure (SFTP) Off-Cycle Emission Standards.* The SFTP exhaust emission levels from new 2004 and subsequent model LEVs, ULEVs, and SULEVs shall not exceed the standards set forth in section 1960.1(r).

(8) *Requirements for Vehicles Certified to the Optional 150,000 Mile Standards.*

(A) *Requirement to Generate Additional Fleet Average NMOG Credit.* A vehicle that is certified to the 150,000 mile standards in section 1961(a) shall generate additional NMOG fleet average credit as set forth in 1961(b)(1) or additional vehicle equivalent credits as set forth in 1961(b)(2) provided that the manufacturer extends the warranty on high cost parts to 8 years or 100,000 miles, whichever occurs first, and agrees to extend the limit on high mileage in-use testing to 112,500 miles.

(B) *Requirement to Generate a Partial ZEV Allowance.* A vehicle that is certified 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 2005 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.

(9) *Optional LEV II 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 1961(a)(1) based on projected sales of trucks in the LDT2 category. Passenger cars and light-duty trucks 0-3750 lbs. LVW are not eligible for this option.

(10) *Intermediate 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 8500 - 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 |

(11) *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.

(12) *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 Unified Cycle Driving Schedule;

(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.

(13) *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 1960.1(g)(1). 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 1961(a)(1) for the 2004 through 2008 model years.

(14) *When a Federally-Certified Vehicle Model is Required in California.*

(A) *General 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 emission 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 in Tables S04-1 and S04-2 of 40 CFR §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 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).

(B) *Exception for clean fuel fleet vehicles.* Section 1961(a)(14)(A) 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 requirement 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.

(C) *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 1961(a)(14)(A) prior to the 2004 model year.

(15) *Emission Standard for a Fuel-Fired Heater.* Whenever a manufacturer elects to utilize an on-board fuel-fired heater on any passenger car, light-duty truck or medium-duty vehicle, the fuel-fired heater must meet LEV II ULEV standards for passenger cars and light-duty trucks less than 8,500 pounds GVW as set forth in section 1961(a)(1). On-board fuel-fired heaters may not be operable at ambient temperatures above $40^{o}$F.

(b) *Emission Standards Phase-In Requirements for Manufacturers.*

(1) *Fleet Average NMOG Requirements for Passenger Cars and Light-Duty Trucks.*

(A) The fleet average non-methane organic gas exhaust mass emission values from the passenger cars and light-duty trucks certified to the Tier 1, LEV I and LEV II standards that are 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 (grams per mile)* | |
| | *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 |

(B) *Calculation of Fleet Average NMOG Value.*

1. *Basic Calculation.*

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:

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

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

c. 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 (§1960.5 "AB 965" vehicles only) | All | Federal Emission Standard to which Vehicle is Certified | Federal Emission Standard to which Vehicle is Certified |
| 2001 - 2003 (§1960.1(f)(2)) | Tier 1 | 0.25 | 0.32 |
| 2001 - 2006 model year vehicles certified to the "LEV I" standards in §1960.1(g)(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 |
| 2004 and subsequent model year vehicles certified to the "LEV II" standards in §1961(a)(1) | LEVs | 0.075 | 0.075 |
| | ULEVs | 0.040 | 0.040 |
| | SULEVs | 0.01 | 0.01 |
| 2004 and subsequent model year vehicles certified to the optional 150,000 mile "LEV II" standards for PCs and LDTs in 1961(a)(1) | LEVs | 0.06 | 0.06 |
| | ULEVs | 0.03 | 0.03 |
| | SULEVs | 0.0085 | 0.0085 |

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 1962.

3. *Federally-Certified Vehicles.* A vehicle certified to the federal standards for a federal exhaust emissions bin in accordance with Section H.1 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 section 1961(d), shall use the corresponding intermediate useful life NMOG standard to which the vehicle is deemed certified in the fleet average calculation.

(C) *Requirements for Small Volume Manufacturers*.

1. 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 section 1961(b)(1)(B). 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 - 8500 lbs. GVW calculated in accordance with section 1961(b)(1)(B).

2. If a manufacturer's average California sales exceed 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 1961(b)(1) beginning with the fourth model year after the last of the three consecutive model years.

3. If a manufacturer's average California sales fall 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.

(D) *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 1961(b)(1)(B). 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 1961(b)(1)(B).

(E) *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 1962 shall be included as LDT1s in the calculation of a fleet average NMOG value.

(2) *LEV II Phase-In Requirement for PCs and LDTs*. 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 1961(a) 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 and 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.

(3) *Medium-Duty Vehicle Phase-In Requirements*.

(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 §1960.1(h)(1), (h)(2), and §1961(a)(1) (%)* | | *Vehicles Certified to §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) *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 standards 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.

(C) *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 manufacturers' 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 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 subsection.

(D) 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 model years, a small volume manufacturer shall certify, produce, and deliver for sale in California vehicles or engines certified to the MDV LEV I standards in a quantity equivalent to 100% of its MDV fleet. Engines certified to these MDV LEV I standards are not be eligible for emissions averaging.

(E) For a manufacturer that elects to certify to the optional medium-duty engine standards in title 13, CCR §1956.8(c) or (h), all such 2005 and subsequent model year 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 §1956.8(b) or (d), as applicable.

(c) *Calculation of NMOG Credits/Debits*

(1) *Calculation of NMOG Credits for Passenger Cars and Light-Duty Trucks*. 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 and subsequent model years, the total g/mi NMOG credits or debits earned for PCs and LDTs 0-3750 lbs. LVW, for LDTs 3751-5750 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.

(2) *Calculation of Vehicle Equivalent NMOG Credits for Medium-Duty Vehicles.*

(A) 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 1961(a)(1) or to the exhaust emission standards set forth in Title 13, CCR, Section 1956.8(h) 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.)].

(B) *MDV HEV VEC factor.* The MDV HEV VEC factor is calculated as follows:

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

where "Zero-emission VMT Factor" for an HEV is determined in accordance with section 1962.

The HEV VEC 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 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 Factor) ÷PC LEV I ULEV standard] for MDVs meeting the ULEV I LEV standards for PCs and LDTs 0-3750 lbs. LVW.

(C) 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 equation in section 1961(c)(2)(A).

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

(3) *Procedure for Offsetting Debits.*

(A) 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 section 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 section 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 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.

(B) 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.

(d) *Test Procedures.* The certification requirements and test procedures for determining compliance with the emission standards in this section are 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 amended June 22, 2006, and the "California Non-Methane Organic Gas Test Procedures," as amended July 30, 2002, which are incorporated herein by reference. In the case of hybrid electric vehicles and on-board fuel-fired heaters, the certification requirements and test procedures for determining compliance with the emission standards in this section are set forth in the "California Exhaust Emission Standards and Test Procedures for 2005 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.

(e) *Abbreviations.* The following abbreviations are used in this section 1961:

"ALVW" means adjusted loaded vehicle weight.
"ASTM" means American Society of Testing and Materials.
"CO" means carbon monoxide.
"FTP" means Federal Test Procedure.
"g/mi" means grams per mile.
"GVW" means gross vehicle weight.
"GVWR" means gross vehicle weight rating.
"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 pounds 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.
"LPG" means liquefied petroleum gas.

“LVW” means loaded vehicle weight.
“MDV” means medium-duty vehicle.
“NMHC” means non-methane hydrocarbons.
“mg/mi” means milligrams per mile.
“NMHC” means non-methane hydrocarbons.
“Non-Methane Organic Gases” or “NMOG” means the total mass of oxygenated and non-oxygenated hydrocarbon emissions.
“NOx” means oxides of nitrogen.
“PC” means passenger car.
“SULEV” means super-ultra-low-emission vehicle.
“TLEV” means transitional low-emission vehicle.
“ULEV” means ultra-low-emission vehicle.
“VEC” means vehicle-equivalent credits.
“VED” means vehicle-equivalent debits.
“VMT” means vehicle miles traveled.
“ZEV” means zero-emission vehicle.

Note: Authority cited: Sections 39500, 39600, 39601, 43013, 43018, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43204, and 43205, Health and Safety Code.

**§ 1961.1. Greenhouse Gas Exhaust Emission Standards and Test Procedures - 2009 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.**

(a) *Greenhouse Gas Emission Requirements.* The greenhouse gas emission levels from new 2009 and subsequent model year passenger cars, light-duty trucks, and medium-duty passenger vehicles shall not exceed the following requirements. Light-duty trucks from 3751 lbs. LVW – 8500 lbs. GVW that are certified to the Option 1 LEV II NOx Standard in section 1961(a)(1) are exempt from these greenhouse gas emission requirements, however, passenger cars, light-duty trucks 0-3750 lbs. LVW, and medium-duty passenger vehicles are not eligible for this exemption.

(1) *Fleet Average Greenhouse Gas Requirements for Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles.*

(A) The fleet average greenhouse gas exhaust mass emission values from passenger cars, light-duty trucks, and medium-duty passenger vehicles that are produced and delivered for sale in California each model year by a large volume manufacturer shall not exceed:

| **FLEET AVERAGE GREENHOUSE GAS EXHAUST MASS EMISSION REQUIREMENTS FOR PASSENGER CAR, LIGHT-DUTY TRUCK, AND MEDIUM-DUTY PASSENGER VEHICLE WEIGHT CLASSES[1]** (4,000 mile Durability Vehicle Basis) | | |
|---|---|---|
| *Model Year* | *Fleet Average Greenhouse Gas Emissions (grams per mile $CO_2$-equivalent)* | |
| | *All PCs; LDTs 0-3750 lbs. LVW* | *LDTs 3751 lbs. LVW - 8500 lbs. GVW; MDPVs* |
| 2009 | 323 | 439 |
| 2010 | 301 | 420 |
| 2011 | 267 | 390 |
| 2012 | 233 | 361 |
| 2013 | 227 | 355 |
| 2014 | 222 | 350 |
| 2015 | 213 | 341 |
| 2016+ | 205 | 332 |

[1] Each manufacturer shall demonstrate compliance with these values in accordance with section 1961.1(a)(1)(B).

(B) *Calculation of Fleet Average Greenhouse Gas Value.*

1. *Basic Calculation.*

a. Each manufacturer shall calculate both a "city" grams per mile average $CO_2$-equivalent value for each GHG vehicle test group and a "highway" grams per mile average $CO_2$-equivalent value for each GHG vehicle test group, including vehicles certified in accordance with section 1960.5 and vehicles certified in accordance with section 1961(a)(14), using the following formula. Greenhouse Gas emissions used for the "city" $CO_2$-equivalent value calculation shall be measured using the "FTP" test cycle (40 CFR, Part 86, Subpart B). Greenhouse Gas emissions used for the "highway" $CO_2$-equivalent value calculation shall be based on emissions measured using the Highway Test Procedures.

$CO_2$-Equivalent Value = $CO_2 + 296 \times N_2O + 23 \times CH_4$ - A/C Direct Emissions Allowance - A/C Indirect Emissions Allowance

A manufacturer may use $N_2O = 0.006$ grams per mile in lieu of measuring $N_2O$ exhaust emissions.

b. *A/C Direct Emissions Allowance.* A manufacturer may use the following A/C Direct Emission Allowances, upon approval of the Executive Officer, if that manufacturer demonstrates that the following requirements are met. Such demonstration shall include specifications of the components used and an engineering evaluation that verifies the estimated lifetime emissions from the components and the system. A manufacturer shall also provide confirmation that the number of fittings and joints has been minimized and components have been optimized to minimize leakage. No A/C Direct Emissions Allowance is permitted if the following requirements are not met.

i. A "low-leak air conditioning system" shall be defined as one that meets all of the following criteria:

A. All pipe and hose connections are equipped with multiple o-rings, seal washers, or metal gaskets only (e.g., no single o-rings);

B. All hoses in contact with the refrigerant must be ultra-low permeability barrier or veneer hose on both the high-pressure and the low-pressure sides of the system (e.g., no rubber hoses); and

C. Only multiple-lip compressor shaft seals shall be used (with either compressor body o-rings or gaskets).

ii. For an air conditioning system that uses HFC-134a as the refrigerant:

A. An A/C Direct Emissions Allowance of 3.0 $CO_2$-equivalent grams per mile shall apply if the system meets the criteria for a "low-leak air conditioning system."

B. An A/C Direct Emissions Allowance of 3.0 $CO_2$-equivalent grams per mile shall apply if the manufacturer demonstrates alternative technology that achieves equal or lower direct emissions than a "low-leak air conditioning system."

C. An A/C Direct Emissions Allowance greater than 3.0 $CO_2$-equivalent grams per mile may apply for an air conditioning system that reduces refrigerant leakage further than would be obtained from a "low-leak air conditioning system." A maximum A/C Direct Emissions Allowance of 6.0 $CO_2$-equivalent grams per mile may be earned for an air conditioning system that has 100 percent containment of refrigerant during "normal operation." To obtain an A/C Direct Emissions Allowance greater than 3.0 $CO_2$-equivalent grams per mile, the manufacturer must provide an engineering evaluation that supports the allowance requested.

iii. For an air conditioning system that uses HFC-152a, $CO_2$ refrigerant, or any refrigerant with a GWP of 150 or less:
An A/C Direct Emissions Allowance shall be calculated using the following formula:

$$\text{A/C Direct Emissions Allowance} = A - (B \times C)$$

where: A = 9 $CO_2$-equivalent grams per mile (the lifetime vehicle emissions expected from an air conditioning system that uses refrigerant HFC-134a);

$$B = 9\,CO_2 - \text{equivalent g/mi} \times \frac{GWP}{1300}$$

where: B is the lifetime vehicle emissions expected from an air conditioning system that uses a refrigerant with a GWP of 150 or less, and

"GWP" means the GWP of this refrigerant; and

C = 1, except for an air conditioning system that meets the criteria of a "low-leak air conditioning system."

For an air conditioning system that meets or exceeds the criteria of a "low-leak air conditioning system," the following formula shall apply:

$$C = 1 - (0.12 \times \text{credit})$$

where: "credit" equals 3.0 $CO_2$-equivalent grams per mile for a "low-leak air conditioning system" that meets the criteria of section 1961.1(a)(1)(B)1.b.i., or

"credit" equals a value greater than 3.0 $CO_2$-equivalent grams per mile for an air conditioning system that reduces refrigerant leakage further than would be obtained from a "low-leak air conditioning system." A maximum credit of 6.0 $CO_2$-equivalent grams per mile may be earned for an air conditioning system that has 100 percent containment of refrigerant during normal operation. To obtain a credit greater than 3.0 $CO_2$-equivalent grams per mile, the manufacturer must provide an engineering evaluation that supports the credit requested.

c. *A/C Indirect Emissions Allowance.* A manufacturer may use the following A/C Indirect Emissions Allowances, upon approval of the Executive Officer, if the manufacturer demonstrates using data or an engineering evaluation that the air conditioning system meets the following requirements. A manufacturer may use the following A/C Indirect Emissions Allowances for other technologies, upon approval of the Executive Officer, if that manufacturer demonstrates that the air conditioning system achieves equal or greater $CO_2$-equivalent grams per mile emissions reductions.

i. An "A/C system with reduced indirect emissions" shall be defined as one that meets all of the following criteria:

A. Has managed outside and recirculated air balance to achieve comfort, demisting, and safety requirements, based on such factors as temperature, humidity, pressure, and level of fresh air in the passenger compartment to minimize compressor usage;

B. Is optimized for energy efficiency by utilizing state-of-the-art high efficiency evaporators, condensors, and other components; and

C. Has an externally controlled compressor (such as an externally controlled variable displacement or variable speed compressor or an externally controlled fully cycling fixed displacement compressor) that adjusts evaporative temperature to minimize the necessity of reheating cold air to satisfy occupant comfort.

ii. For an A/C system that meets all of the criteria for an "A/C system with reduced indirect emissions," the allowance shall be calculated using the following emission factors, up to a maximum allowance of 9.0 $CO_2$-equivalent grams per mile if the system has one evaporator and up to a maximum allowance of 11.0 $CO_2$-equivalent grams per mile if the system has two evaporators:

A. 5.0 $CO_2$-equivalent grams per mile per 100 cc of maximum compressor displacement for a system that does not use $CO_2$ as the refrigerant

B. 27.5 $CO_2$-equivalent grams per mile per 100 cc of maximum compressor displacement for a system that uses $CO_2$ as the refrigerant

iii. For an air conditioning system equipped with a refrigerant having a GWP of 150 or less, the allowance shall be calculated using the following emission factors, up to a maximum allowance of 0.5 $CO_2$-equivalent grams per mile:

A. 0.2 $CO_2$-equivalent grams per mile per 100cc of maximum compressor displacement for a system that does not use $CO_2$ as the refrigerant and

B. 1.1 $CO_2$-equivalent grams per mile per 100cc of maximum compressor displacement for a system that uses $CO_2$ as the refrigerant.

d. *Upstream Greenhouse Gas Emission Adjustment Factors for Alternative Fuel Vehicles.* A grams per mile average $CO_2$-equivalent value for each GHG vehicle test group certifying on a fuel other than conventional gasoline, including vehicles certified in accordance with section 1960.5 and vehicles certified in accordance with section 1961(a)(14), shall be calculated as follows:

$$(CO_2 + \text{A/C Indirect Emissions}) \times (\text{Fuel Adjustment Factor}) + 296 \times N_2O + 23 \times CH_4 + \text{A/C Direct Emissions}$$

where:

A/C Indirect Emissions = A - B

where: "A" represents the indirect emissions associated with an A/C system that does not incorporate any of the A/C improvements described in section 1961.1(a)(1)(B)1.c. A is determined by the following emission factors, with a maximum value of 17.0 $CO_2$-equivalent grams per mile for a system that has one evaporator and a maximum value of 21.0 $CO_2$-equivalent grams per mile for a system that has two evaporators.

A = 9.6 $CO_2$-equivalent grams per mile per 100cc of maximum compressor displacement for an A/C system that does not use $CO_2$ as the refrigerant or

A = 52.8 $CO_2$-equivalent grams per mile per 100cc of maximum compressor displacement for an A/C system that uses $CO_2$ as the refrigerant.

B = A/C Indirect Emissions Allowance as calculated per section 1961.1(a)(1)(B)1.c.

A/C Direct Emissions = 9 $CO_2$-equivalent grams per mile – A/C Direct Emissions Allowance as calculated per section 1961.1(a)(1)(B)1.b.

The Fuel Adjustment Factors are:

| **Fuel** | **Fuel Adjustment Factor** |
|---|---|
| Natural Gas | 1.03 |
| LPG | 0.89 |
| E85 | 0.74 |

e. *Calculation of $CO_2$-Equivalent Emissions for Hydrogen Internal Combustion Engine Vehicles and for Electric and Hydrogen ZEVs.* The grams per mile average $CO_2$-equivalent value for each GHG vehicle test group certifying to ZEV standards, including vehicles certified in accordance with section 1960.5 and vehicles certified in accordance with section 1961(a)(14), shall be:

A/C Direct Emissions + Upstream Emissions Factor

where: A/C Direct Emissions = 9 $CO_2$-equivalent grams per mile – A/C Direct Emissions Allowance as calculated per section 1961.1(a)(1)(B)1.b.

The Upstream Emissions Factors are:

| **Vehicle Type** | **Upstream Emissions Factor**[1] ($CO_2$-equivalent g/mi) |
|---|---|
| Electric ZEV | 130 |
| Hydrogen Internal Combustion Engine Vehicle | 290 |
| Hydrogen ZEV | 210 |

[1]The Executive Officer may approve use of a lower upstream emissions factor if a manufacturer demonstrates the appropriateness of the lower value by providing information that includes, but is not limited to, the percentage of hydrogen fuel or the percentage of electricity produced for sale in California using a "renewable energy resource."

2. *Calculation of Greenhouse Gas Values for Bi-Fuel Vehicles, Fuel-Flexible Vehicles, Dual-Fuel Vehicles, and Grid-connected Hybrid Electric Vehicles.* For bi-fuel, fuel-flexible, dual-fuel, and grid-connected hybrid electric vehicles, a manufacturer shall calculate a grams per mile average $CO_2$-equivalent value for each GHG vehicle test group, in accordance with section 1961.1(a)(1)(B)1., based on exhaust mass emission tests when the vehicle is operating on gasoline.

a. *Optional Alternative Compliance Mechanisms.* Beginning with the 2010 model year, a manufacturer that demonstrates that a bi-fuel, fuel-flexible, dual-fuel, or grid-connected hybrid electric GHG vehicle test group will be operated in use in California on the alternative fuel shall be eligible to certify those vehicles using this optional alternative compliance procedure, upon approval of the Executive Officer.

i. To demonstrate that bi-fuel, fuel-flexible, dual-fuel, or grid-connected hybrid electric vehicles within a GHG vehicle test group will be operated in use in California on the alternative fuel, the manufacturer shall provide data that shows the previous model year sales of such vehicles to fleets that provide the alternative fuel on-site or, for grid-connected hybrid electric vehicles, to end users with the capability to recharge the vehicle on-site. This data shall include both the total number of vehicles sales that were made to such fleets or end users with the capability to recharge the vehicle on-site and as the percentage of total GHG vehicle test group sales. The manufacturer shall also provide data demonstrating the percentage of total vehicle miles traveled by the bi-fuel, fuel-flexible, dual-fuel, or grid-connected hybrid electric vehicles sold to each fleet or to end users with the capability to recharge the vehicle on-site in the previous model year using the alternative fuel and using gasoline.

ii. For each GHG vehicle test group that receives approval by the Executive Officer under section 1961.1(a)(1)(B)2.a.i., a grams per mile $CO_2$-equivalent value shall be calculated as follows:

$$CO_2\text{-equivalent value} = [A \times E \times B \times C] + [(1 - (A \times E \times B)) \times D]$$

where: A = the percentage of previous model year vehicles within a GHG vehicle test group that were operated in use in California on the alternative fuel during the previous calendar year;

B = the percentage of miles traveled by “A” during the previous calendar year ;

C = the $CO_2$-equivalent value for the GHG vehicle test group, as calculated in section 1961.1(a)(1)(B)1, when tested using the alternative fuel;

D = the $CO_2$-equivalent value for the GHG vehicle test group, as calculated in section 1961.1(a)(1)(B)1, when tested using gasoline; and

E = 0.9 for grid-connected hybrid electric vehicles or

E = 1 for bi-fuel, fuel-flexible, and dual-fuel vehicles.

The Executive Officer may approve use of a higher value for "E" for a grid-connected hybrid electric vehicle GHG vehicle test group if a manufacturer demonstrates that the vehicles can reasonably be expected to maintain more than 90 percent of their original battery capacity over a 200,000 mile vehicle lifetime. The manufacturer may demonstrate the appropriateness of a higher value either by providing data from real world vehicle operation; or by showing that these vehicles are equipped with batteries that do not lose energy storage capacity until after 100,000 miles; or by offering 10 year/150,000 mile warranties on the batteries.

iii. For the first model year in which a grid-connected hybrid electric vehicle model is certified for sale in California, the manufacturer may estimate the sales and percentage of total vehicle miles traveled information requested in section 1961.1(a)(1)(B)2.a.i. in lieu of providing actual data, and provide final sales data and data demonstrating the percentage of total vehicle miles traveled using electricity by no later than March 1 of the calendar year following the close of the model year.

3. *Calculation of Fleet Average Greenhouse Gas Values.*

a. Each manufacturer's PC and LDT1 fleet average Greenhouse Gas value for the total number of PCs and LDT1s produced and delivered for sale in California, including vehicles certified in accordance with section 1960.5 and vehicles certified in accordance with section 1961(a)(14), shall be calculated as follows:

[0.55 x (Σ City Test Group Greenhouse Gas Values) + 0.45 x (Σ Highway Test Group Greenhouse Gas Values)] ÷ Total Number of PCs and LDT1s Produced, Including ZEVs and HEVs

where: City Test Group Greenhouse Gas Value = [(Total Number of Vehicles in a Test Group - Σ Number of Vehicles in Optional GHG Test Vehicle Configurations) x "worst-case" calculated $CO_2$-equivalent value + Σ (Number of vehicles in Optional GHG Test Vehicle Configurations x applicable calculated $CO_2$-equivalent value)] measured using the FTP test cycle; and

Highway Test Group Greenhouse Gas Value = [(Total Number of Vehicles in a Test Group - Σ Number of Vehicles in Optional GHG Test Vehicle Configurations) x "worst-case" calculated $CO_2$-equivalent value + Σ (Number of vehicles in Optional GHG Test Vehicle Configurations x applicable calculated $CO_2$-equivalent value)] measured using the Highway Test Procedures.

b. Each manufacturer's LDT2 and MDPV fleet average Greenhouse Gas value for the total number of LDT2s and MDPVs produced and delivered for sale in California, including vehicles certified in accordance with section 1960.5 and vehicles certified in accordance with section 1961(a)(14), shall be calculated as follows:

[0.55 x (Σ City Test Group Greenhouse Gas Values) + 0.45 x (Σ Highway Test Group Greenhouse Gas Values)] ÷ Total Number of LDT2s and MDPVs Produced, Including ZEVs and HEVs

where: City Test Group Greenhouse Gas Value = [(Total Number of Vehicles in a Test Group - Σ Number of Vehicles in Optional GHG Test Vehicle Configurations) x "worst-case" calculated $CO_2$-equivalent value + Σ (Number of vehicles in Optional GHG Test Vehicle Configurations x applicable calculated $CO_2$-equivalent value)] measured using the FTP test cycle; and

Highway Test Group Greenhouse Gas Value = [(Total Number of Vehicles in a Test Group - Σ Number of Vehicles in Optional GHG Test Vehicle Configurations) x "worst-case" calculated $CO_2$-equivalent value + Σ (Number of vehicles in Optional GHG Test Vehicle Configurations x applicable calculated $CO_2$-equivalent value)] measured using the Highway Test Procedures.

(C) *Requirements for Intermediate Volume Manufacturers.*

1. Before the 2016 model year, compliance with this section 1961.1 shall be waived for intermediate volume manufacturers.

2. For each intermediate volume manufacturer, the manufacturer's baseline fleet average greenhouse gas value for PCs and LDT1s and baseline fleet average greenhouse gas value for LDT2s and MDPVs shall be calculated, in accordance with section 1961.1(a)(1)(B) using its 2002 model year fleet.

3. In 2016 and subsequent model years, an intermediate volume manufacturer shall either:

a. not exceed a fleet average greenhouse gas emissions value of 233 g/mi for PCs and LDT1s and 361 g/mi for LDT2s and MDPVs, or

b. not exceed a fleet average greenhouse gas value of 0.75 times the baseline fleet average greenhouse gas value for PCs and LDT1s and 0.82 times the baseline fleet average greenhouse gas value for LDT2s and MDPVs, as calculated in section 1961.1(a)(1)(C)2.

4. If a manufacturer's average annual California sales exceed 60,000 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 intermediate volume manufacturer and shall comply with the fleet average requirements applicable to large volume manufacturers as specified in section 1961.1(a)(1) beginning with the fourth model year after the last of the three consecutive model years.

5. If a manufacturer's average annual California sales fall below 60,001 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

intermediate volume manufacturer and shall be subject to the requirements for intermediate volume manufacturers beginning with the next model year.

(D) *Requirements for Small Volume Manufacturers and Independent Low Volume Manufacturers.*

1. Before the 2016 model year, compliance with this section 1961.1 shall be waived for small volume manufacturers and independent low volume manufacturers.

2. At the beginning of the 2013 model year, each small volume manufacturer and independent low volume manufacturer shall identify all 2012 model year vehicle models, certified by a large volume manufacturer that are comparable to that small volume manufacturer or independent low volume manufacturer's 2016 model year vehicle models, based on horsepower and horsepower to weight ratio. The small volume manufacturer and independent low volume manufacturer shall demonstrate to the Executive Officer the appropriateness of each comparable vehicle model selected. Upon approval of the Executive Officer, s/he shall provide to the small volume manufacturer and to the independent low volume manufacturer the $CO_2$-equivalent value for each 2012 model year vehicle model that is approved. The small volume manufacturer and independent low volume manufacturer shall calculate an average greenhouse gas emissions value for each its greenhouse gas vehicle test groups based on the $CO_2$-equivalent values provided by the Executive Officer.

3. In the 2016 and subsequent model years, a small volume manufacturer and an independent low volume manufacturer shall either:

a. not exceed the fleet average greenhouse gas emissions value calculated for each GHG vehicle test group for which a comparable vehicle is sold by a large volume manufacturer, in accordance with section 1961.1(a)(1)(D)2; or

b. not exceed a fleet average greenhouse gas emissions value of 233 g/mi for PCs and LDT1s and 361 g/mi for LDT2s and MDPVs; or

c. upon approval of the Executive Officer, if a small volume manufacturer demonstrates a vehicle model uses an engine, transmission, and emission control system that is identical to a configuration certified for sale in California by a large volume manufacturer, those small volume manufacturer vehicle models are exempt from meeting the requirements in paragraphs 3.a. and b. of this section.

4. If a manufacturer's average annual California sales exceed 4,500 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 volume manufacturers as specified in section 1961.1(a)(1) beginning with the fourth model year after the last of the three consecutive model years.

5. If a manufacturer's average annual California sales exceed 10,000 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 an

independent low volume manufacturer and shall comply with the fleet average requirements applicable to larger volume manufacturers as specified in section 1961.1(a)(1) beginning with the fourth model year after the last of the three consecutive model years.

6. If a manufacturer's average annual California sales fall below 4,501 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.

(b) *Calculation of Greenhouse Gas Credits/Debits.*

(1) *Calculation of Greenhouse Gas Credits for Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles.*

(A) In the 2000 through 2008 model years, a manufacturer that achieves fleet average Greenhouse Gas values lower than the fleet average Greenhouse Gas requirement applicable to the 2012 model year shall receive credits for each model year in units of g/mi determined as:

[(Fleet Average Greenhouse Gas Requirement for the 2012 model year)
- (Manufacturer's Fleet Average Greenhouse Gas Value)]
x (Total No. of Vehicles Produced and Delivered for Sale
in California, Including ZEVs and HEVs).

(B) In 2009 and subsequent model years, a manufacturer that achieves fleet average Greenhouse Gas values lower than the fleet average Greenhouse Gas requirement for the corresponding model year shall receive credits in units of g/mi Greenhouse Gas determined as:

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

(2) A manufacturer with 2009 and subsequent model year fleet average Greenhouse Gas values greater than the fleet average requirement for the corresponding model year shall receive debits in units of g/mi Greenhouse Gas equal to the amount of negative credits determined by the aforementioned equation. For the 2009 and subsequent model years, the total g/mi Greenhouse Gas credits or debits earned for PCs and LDT1s and for LDT2s and MDPVs shall be summed together. The resulting amount shall constitute the g/mi Greenhouse Gas credits or debits accrued by the manufacturer for the model year.

(3) *Procedure for Offsetting Greenhouse Gas Debits.*

(A) A manufacturer shall equalize Greenhouse Gas emission debits by earning g/mi Greenhouse Gas emission credits in an amount equal to the g/mi Greenhouse Gas debits, or

by submitting a commensurate amount of g/mi Greenhouse Gas credits to the Executive Officer that were earned previously or acquired from another manufacturer. A manufacturer shall equalize Greenhouse Gas debits for PCs, LDTs, and MDPVs within five model years after they are earned. If emission debits are not equalized within the specified time period, the manufacturer shall be subject to the Health and Safety Code section 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 section 43211, the number of passenger cars and LDT1s not meeting the state board's emission standards shall be determined by dividing the total amount of g/mi Greenhouse Gas emission debits for the model year by the g/mi Greenhouse Gas fleet average requirement for PCs and LDTs 0-3750 lbs. LVW applicable for the model year in which the debits were first incurred. For the purposes of Health and Safety Code section 43211, the number of LDT2s and MDPVs not meeting the state board's emission standards shall be determined by dividing the total amount of g/mi Greenhouse Gas emission debits for the model year by the g/mi Greenhouse Gas fleet average requirement for LDTs 3751 lbs. LVW – 8500 lbs. GVW and MDPVs applicable for the model year in which the debits were first incurred.

(B) Greenhouse Gas emission credits earned in the 2000 through 2008 model years shall be treated as if they were earned in the 2011 model year and shall retain full value through the 2012 model year. Greenhouse Gas emission credits earned in the 2009 and subsequent model years shall retain full value through the fifth model year after they are earned. The value of any credits earned in the 2000 through 2008 model years that are not used to equalize debits accrued in the 2009 through 2012 model years shall be discounted by 50% at the beginning of the 2013 model year, shall be discounted to 25% of its original value if not used by the beginning of the 2014 model year, and will have no value if not used by the beginning of the 2015 model year. Any credits earned in the 2009 and subsequent model years that are not used by the end of the fifth model year after they are accrued shall be discounted by 50% at the beginning of the sixth model year after being earned, shall be discounted to 25% of its original value if not used by the beginning of the seventh model year after being earned, and will have no value if not used by the beginning of the eighth model year after being earned.

(c) *Test Procedures.* The certification requirements and test procedures for determining compliance with the emission standards in this section are 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," incorporated by reference in section 1961(d). In the case of hybrid electric vehicles and on-board fuel-fired heaters, the certification requirements and test procedures for determining compliance with the emission standards in this section are set forth in the "California Exhaust Emission Standards and Test Procedures for 2005 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.

(d) *Abbreviations.* The following abbreviations are used in this section 1961.1:

“cc” mean cubic centimeters.
"$CH_4$" means methane.
"$CO_2$" means carbon dioxide.
“E85” means a blend of 85 percent ethanol and 15 percent gasoline.
“FTP” means Federal Test Procedure.
"GHG" means greenhouse gas.
“g/mi” means grams per mile.
“GVW” means gross vehicle weight.
“GVWR” means gross vehicle weight rating.
“GWP” means the global warming potential.
“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 pounds to a gross vehicle weight of 8500 pounds.
“LEV” means low-emission vehicle.
“LPG” means liquefied petroleum gas.
“LVW” means loaded vehicle weight.
“MDPV” means medium-duty passenger vehicle.
“MDV” means medium-duty vehicle.
“mg/mi” means milligrams per mile.
“$N_2O$” means nitrous oxide.
“PC” means passenger car.
“SULEV” means super-ultra-low-emission vehicle.
“ULEV” means ultra-low-emission vehicle.
“ZEV” means zero-emission vehicle.

(e) *Definitions Specific to this Section.* The following definitions apply to this section 1961.1:

(1) “A/C Direct Emissions” means any refrigerant released from a motor vehicle's air conditioning system.

(2) “A/C Indirect Emissions” means any increase in motor vehicle exhaust $CO_2$ emissions that can be attributed to the operation of the air conditioning system.

(3) “GHG Vehicle Test Group” means vehicles that have an identical test group, vehicle make and model, transmission class and driveline, aspiration method (e.g., naturally aspirated, turbocharged), camshaft configuration, valvetrain configuration, and inertia weight class.

(4) “Greenhouse Gas” means the following gases: carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons.

(5) "Grid-Connected Hybrid Electric Vehicle" means a hybrid electric vehicle that has the capacity for the battery to be recharged from an off-board source of electricity and has some all-electric range.

(6) "GWP" means the 100-year global warming potential specified in IPCC (Intergovernmental Panel on Climate Change) 2000: Emissions Scenarios. N. Nakicenovic et. al. editors, Special Report of Working Group III of the IPCC, Cambridge University Press, Cambridge UK, ISBN 0-521-80493-0.

(7) "Normal Operation" of an air conditioning system means typical everyday use of the A/C system to cool a vehicle. "Normal Operation" does not include car accidents, dismantling of an air conditioning system, or any other non-typical events.

(8) "Optional GHG Test Vehicle Configuration" means any GHG vehicle configuration that is selected for testing by the manufacturer as allowed by section G.2.3 of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," other than the worst-case configuration.

(9) "Renewable Energy Resource" means a facility that meets all of the criteria set forth in Public Resources Code section 25741(a), except that the facility is not required to be located in California or near the border of California.

(10) "Variable Displacement Compressor" means a compressor in which the mass flow rate of refrigerant is adjusted independently of compressor speed by the control system in response to cooling load demand.

(11)"Variable Speed Compressor" means a compressor in which the mass flow rate of refrigerant can be adjusted by control of the compressor input shaft speed, independent of vehicle engine speed. For example, a variable speed compressor can have electric drive, hydraulic drive, or mechanical drive through a variable speed transmission.

(12) "Worst-Case" means the vehicle configuration within each test group that is expected to have the highest $CO_2$-equivalent value, as calculated in section 1961.1(a)(1)(B)1.

(f) *Severability.* Each provision of this section is severable, and in the event that any provision of this section is held to be invalid, the remainder of this article remains in full force and effect.

(g) *Effective Date of this Section.* The requirements of this section 1961.1 shall become effective on January 1, 2006.

Note: Authority cited: Sections 39500, 39600, 39601, 43013, 43018, 43018.5, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43018.5, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43204, 43205, and 43211, Health and Safety Code.

**§ 1962. Zero-Emission Vehicle Standards for 2005 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.**

(a) *ZEV Emission Standard.* The Executive Officer shall certify new 2005 and subsequent model passenger cars, light-duty trucks and medium-duty vehicles as ZEVs if the vehicles produce zero exhaust emissions of any criteria pollutant (or precursor pollutant) under any and all possible operational modes and conditions. Incorporation of a fuel-fired heater shall not preclude a vehicle from being certified as a ZEV provided: (1) the fuel-fired heater cannot be operated at ambient temperatures above 40$^{o}$F, (2) the heater is demonstrated to have zero fuel evaporative emissions under any and all possible operational modes and conditions, and (3) the emissions of any pollutant from the fuel-fired heater when operated at an ambient temperature between 68$^{o}$F and 86$^{o}$F do not exceed the emission standard for that pollutant for a ULEV under section 1961(a)(1).

A vehicle that would meet the emissions standards for a ZEV except that it uses a fuel-fired heater that can be operated at ambient temperatures above 40$^{o}$F, that cannot be demonstrated to have zero fuel evaporative emissions under any and all possible operation modes and conditions, or that has emissions of any pollutant exceeding the emission standard for that pollutant for a ULEV under section 1961(a)(1), shall be certified based on the emission level of the fuel-fired heater.

(b) *Percentage ZEV Requirements.*

(1) *General Percentage ZEV Requirement.*

(A) *Basic Requirement.* The minimum percentage ZEV requirement for each manufacturer is listed in the table below as the percentage of the PCs and LDT1s, and LDT2s to the extent required by section (b)(1)(C), produced by the manufacturer and delivered for sale in California that must be ZEVs, subject to the conditions in this section 1962(b).

| *Model Years* | *Minimum ZEV Requirement* |
|---|---|
| 2005 through 2008 | 10 percent |
| 2009 through 2011 | 11 percent |
| 2012 through 2014 | 12 percent |
| 2015 through 2017 | 14 percent |
| 2018 and subsequent | 16 percent |

(B) *Calculating the Number of Vehicles to Which the Percentage ZEV Requirement is Applied.* A manufacturer's volume of PCs and LDT1s produced and delivered for sale in California will be averaged for the 1997, 1998, and 1999 model years to determine the California PC and LDT1 production volume for the model year 2005 ZEV requirements. For subsequent three-year periods following model year 2005, a manufacturer's California production volume of PCs and LDT1s, and LDT2s as applicable, will be based on a three-year

average of the manufacturer's volume of PCs and LDT1s, and LDT2s as applicable, produced and delivered for sale in California in the prior fourth, fifth and sixth years (e.g. 2006 to 2008 model-year ZEV requirements will be based on California production volumes of PCs and LDT1s, and LDT2s as applicable, for 2000 to 2002 model years). This production averaging is used to determine ZEV requirements only, and has no effect on a manufacturer's size determination. As an alternative to the three year averaging of prior year production described above, a manufacturer may during model year 2005 or the first model year of a subsequent three year period elect to base its ZEV obligation on the number of PCs and LDT1s, and LDT2s to the extent required by section (b)(1)(C), produced by the manufacturer and delivered for sale in California that same year. If a manufacturer elects to use this method after model year 2005 it must be used for each year of the three-year period. In applying the ZEV requirement, a PC, LDT1, or LDT2 (beginning in the 2007 model year) that is produced by a small volume manufacturer, but is marketed in California by another manufacturer under the other manufacturer's nameplate, shall be treated as having been produced by the marketing manufacturer.

(C) *Phase-in of ZEV Requirements for LDT2s.* Beginning with the ZEV requirements for the 2007 model year, a manufacturer's LDT2 production shall be included in determining the manufacturer's overall ZEV requirement under section (b)(1)(A) in the increasing percentages shown the table below.

| *2007* | *2008* | *2009* | *2010* | *2011* | *2012+* |
|---|---|---|---|---|---|
| 17% | 34% | 51% | 68% | 85% | 100% |

(D) *Exclusion of ZEVs in Determining a Manufacturer's Sales Volume.* In calculating for purposes of sections 1962(b)(1)(B) and 1962(b)(1)(C) the volume of PCs, LDT1s and LDT2s a manufacturer has produced and delivered for sale in California, the manufacturer shall exclude the number of ZEVs produced by the manufacturer, or by a subsidiary in which the manufacturer has a greater than 50% ownership interest, and delivered for sale in California.

(2) *Requirements for Large Volume Manufacturers.*

(A) *Primary Requirements for Large Volume Manufacturers*. In the 2005 through 2008 model years, a large-volume manufacturer must meet at least 20% of its ZEV requirement with ZEVs or ZEV credits generated by such vehicles, and at least another 20% with ZEVs, advanced technology PZEVs, or credits generated by such vehicles. The remainder of the large-volume manufacturer's ZEV requirement may be met using PZEVs or credits generated by such vehicles. As the ZEV requirement increases over time from 10% in model year 2005 to 16% in model years 2018 and subsequent, the maximum portion of a large volume manufacturer's percentage ZEV requirement that may be satisfied by PZEVs that are not advanced technology PZEVs, or credits generated by such vehicles, is limited to 6% of the manufacturer's applicable California PC, LDT1, and LDT2 production volume; advanced technology PZEVs or credits generated by such vehicles may be used to meet up to one-half of the manufacturer's remaining ZEV requirement.

(B) *Alternative Requirements for Large Volume Manufacturers.*

1. *Minimum Floor for Production of Type III ZEVs.*

a. *Requirement For the 2005-2008 Model Years.* A large volume manufacturer electing to be subject to the alternative compliance requirements during model years 2005 through 2008 must produce, deliver for sale, and place in service in California enough 2001-2008 model-year Type III ZEVs to generate ZEV credits sufficient to meet a cumulative percentage ZEV requirement of 1.09 percent of the manufacturer's average annual California sales of PCs and LDT1s over the five year period from model years 1997 through 2001, or submit an equivalent number of credits generated by such vehicles. The manufacturer may meet up to one half of this requirement with [i] 2004-2008 model-year Type I or Type II ZEVs, provided that 20 Type I ZEVs or 10 Type II ZEVs will equal one Type III ZEV, and [ii] 1997-2003 model-year Type I or Type II ZEVs that qualify for an extended service multiplier under section 1962(f) for a year primarily during calendar years 2004-2008, provided that 33 years of such a multiplier will equal one Type III ZEV.

b. *Requirement For the 2009-2011 Model Years.* A large volume manufacturer electing to be subject to the alternative compliance requirements during model years 2009 through 2011 must produce, deliver for sale, and place in service in California enough 2009-2011 model-year Type III ZEVs to generate ZEV credits sufficient to meet the 2009-2011 alternative path percentage, as calculated pursuant to section 1962(b)(2)(B)1.e., of the manufacturer's section 1962(b)(1) percentage ZEV requirement for the 2010 model year, based on the prior year method described in section 1962(b)(1)(B), or submit an equivalent number of credits generated by such vehicles. The manufacturer may meet up to one half of this requirement with [i] 2009-2011 model-year Type I or Type II ZEVs, provided that 20 Type I ZEVs or 10 Type II ZEVs will equal one Type III ZEV, and [ii] 1997-2003 model-year ZEVs that qualify for an extended service multiplier under section 1962(f) for a year primarily during calendar years 2009-2011, provided that 33 years of such a multiplier will equal one Type III ZEV.

c. *Requirement For the 2012-2014 Model Years.* A large volume manufacturer electing to be subject to the alternative compliance requirements during model years 2012 through 2014 must produce, deliver for sale, and place in service in California enough 2012-2014 model-year Type III ZEVs to generate ZEV credits sufficient to meet the 2012-2014 alternative path percentage, as calculated pursuant to section 1962(b)(2)(B)1.e., of the manufacturer's section 1962(b)(1) percentage ZEV requirement for the 2013 model year, based on the prior year method described in section 1962(b)(1)(B), or submit an equivalent number of credits generated by such vehicles. The manufacturer may meet up to one half of this requirement with 2012-2014 model-year Type I or Type II ZEVs, provided that 10 Type I ZEVs or 5 Type II ZEVs will equal one Type III ZEV.

d. *Requirement For the 2015-2017 Model Years.* A large volume manufacturer electing to be subject to the alternative compliance requirements during model

years 2015 through 2017 must produce, deliver for sale, and place in service in California enough 2015-2017 model-year Type III ZEVs to generate ZEV credits sufficient to meet the 2015-2017 alternative path percentage, as calculated in section 1962(b)(2)(B)1.e., of the manufacturer's section 1962(b)(1) percentage ZEV requirement for the 2016 model year, based on the prior year method described in section 1962(b)(1)(B), or submit an equivalent number of credits generated by such vehicles. The manufacturer may meet up to one half of this requirement with 2015-2017 model-year Type I or Type II ZEVs, provided that 10 Type I ZEVs or 5 Type II ZEVs will equal one Type III ZEV.

e. *Calculation of a Manufacturer's Alternative Path Percentage*. A manufacturer's alternative path percentage for a given time period is calculated as the target number of credits for each time period divided by the applicable combined model year ZEV obligation of all large volume manufacturers for that same time period, where:

| *Time Period (MYs)* | *Target Number of Alternative Path Type III ZEVs* | *Credits per Vehicle* | *Target Number of Credits* | *Combined Model Year ZEV Obligation* | *Alternative Path Percentage* |
|---|---|---|---|---|---|
| 2009 – 2011 | 2,500 | 4 | 10,000 | A | (10,000/A)x100 |
| 2012 – 2014 | 25,000 | 3 | 75,000 | B | (75,000/B)x100 |
| 2015 – 2017 | 50,000 | 3 | 150,000 | C | (150,000/C)x100 |

And where:

A = The combined total section 1962(b)(1) percentage ZEV requirement, based on the prior year method described in section 1962(b)(1)(B), that would apply for all large manufacturers for the 2010 model year,
B = The combined total section 1962(b)(1) percentage ZEV requirement, based on the prior year method described in section 1962(b)(1)(B), that would apply for all large manufacturers for the 2013 model year, and
C = The combined total section 1962(b)(1) percentage ZEV requirement, based on the prior year method described in section 1962(b)(1)(B), that would apply for all large manufacturers for the 2016 model year.

f. *Exclusion of Additional Credits for Transportation Systems.* Any additional credits for transportation systems generated in accordance with section 1962(g)(5) shall not be counted towards compliance with this section 1962(b)(2)(B)1.a.-d.

g. *Carry-over of Excess Credits*. Where a manufacturer generates more qualifying ZEV credits than are needed to meet the minimum floor requirement for the production of Type III ZEVs in one of the periods identified in section 1962(b)(2)(B)1.a.-c., the qualifying ZEV credits may be used towards meeting the minimum floor requirement for the production of Type III ZEVs in a subsequent period, provided that the value of these carryover credits shall be based on the model year in which the credits are used.

h. *Failure to Meet Requirement for Production of Type III ZEVs.* A manufacturer that, after electing to be subject to the alternative requirements in section 1962(b)(2)(B) for any model year from 2005 through 2017, fails to meet the requirement in section 1962(b)(2)(B)1.a..-d. by the end of the specified three or four year period in which the model year falls, shall be treated as subject to the primary requirements in section 1962(b)(2)(A) for all model years in the specified three or four year period.

i. The number of Type III ZEVs needed for a manufacturer under section 1962(b)(2)(B)1.a.-d shall be rounded to the nearest whole number.

2. *Compliance With Percentage ZEV Requirements.* In the 2005 through 2008 model years, a large volume manufacturer electing to be subject to the alternative compliance requirements in a given model year must meet at least 40 percent of its ZEV requirement for that model year with ZEVs, advanced technology PZEVs, or credits generated from such vehicles. The remainder of the large volume manufacturer's ZEV requirement may be met using PZEVs or credits generated from such vehicles. As the ZEV requirement increases over time from 11% in model year 2009 to 16% in model years 2018 and subsequent, the maximum portion of the large volume manufacturer's percentage ZEV requirement that may be satisfied by PZEVs that are not advanced technology PZEVs, or credits generated by such vehicles, is limited to 6% of the manufacturer's applicable California PC, LDT1, and LDT2 production volume; ZEVs, AT PZEVs, or credits generated by such vehicles may be used to meet the manufacturer's remaining ZEV requirement.

3. *Sunset of Alternative Requirements After the 2017 Model Year.* The alternative requirements in section 1962(b)(2)(B) are not available after the 2017 model year.

(C) *Election of the Primary or Alternative Requirements for Large Volume Manufacturers.* A large volume manufacturer shall be subject to the primary ZEV requirements for the 2005 model year unless it notifies the Executive Officer in writing prior to the start of the 2005 model year that it is electing to be subject to the alternative compliance requirements for that model year. Thereafter, a manufacturer shall be subject to the same compliance option as applied in the previous model year unless it notifies the Executive Officer in writing prior to the start of a new model year that it is electing to switch to the other compliance option for that new model year. However, a large volume manufacturer that has previously elected to be subject to the primary ZEV requirements for one or more of the model years in the three or four year periods identified in section 1961(b)(1(B)1.a.-d. may prior to the end of the three or four year period elect to become subject to the alternative compliance requirements for the full three or four year period upon a demonstration that it has complied with all of the applicable requirements for that period in section 1962(b)(2)(B)1.a.-d.

(D) *Use of Credits from Model Year 2003-2004 PZEVs.* A large volume manufacturer may produce, and deliver for sale in California, model year 2003 or 2004 PZEVs that generate credits exceeding the number of credits equal to 6 percent of the average annual volume of 1997, 1998 and 1999 PCs and LDT1s produced and delivered for sale in California by

the manufacturer. In that event, the manufacturer may use those excess credits as AT PZEV credits in the 2005 and 2006 model years.

(3) *Requirements for Intermediate Volume Manufacturers*. In the 2005 and subsequent model years, an intermediate volume manufacturer may meet its ZEV requirement with up to 100 percent PZEVs or credits generated by such vehicles.

(4) *Requirements for Small Volume Manufacturers and Independent Low Volume Manufacturers.* A small volume manufacturer or an independent low volume manufacturer is not required to meet the percentage ZEV requirements. However, a small volume manufacturer or an independent low volume manufacturer may earn and market credits for the ZEVs or PZEVs it produces and delivers for sale in California.

(5) *Counting ZEVs and PZEVs in Fleet Average NMOG Calculations*. For the purposes of calculating a manufacturer's fleet average NMOG value and NMOG credits under sections 1960.1(g)(2) and 1961(b) and (c), a vehicle certified as a ZEV is counted as one ZEV, and a PZEV is counted as one SULEV certified to the 150,000 mile standards regardless of any ZEV or PZEV multipliers.

(6) *Implementation Prior to 2005 Model Year*. Prior to the 2005 model year, a manufacturer that voluntarily produces vehicles meeting the ZEV emission standards applicable to 2005 and subsequent model year vehicles may certify the vehicles to those standards and requirements for purposes of calculating fleet average NMOG exhaust emission values and NMOG credits under sections 1960.1(g)(2) and 1961(b) and (c), and for calculating ZEV credits as set forth in section 1962(d).

(7) *Changes in Small Volume, Independent Low Volume, and Intermediate Volume Manufacturer Status.*

(A) *Increases in California Production Volume.* In the 2003 and subsequent model years, if a small volume manufacturer's average California production volume exceeds 4,500 units of new PCs, LDTs, and MDVs based on the average number of vehicles produced and delivered for sale for the three previous consecutive model years, or if an independent low volume manufacturer's average California production volume exceeds 10,000 units of new PCs, LDTs, and MDVs based on the average number of vehicles produced and delivered for sale for the three previous consecutive model years, or if an intermediate volume manufacturer's average California production volume exceeds 60,000 units of new PCs, LDTs, and MDVs based on the average number of vehicles produced and delivered for sale for the three previous consecutive model years, the manufacturer shall no longer be treated as a small volume, independent low volume, or intermediate volume manufacturer, as applicable, and shall comply with the ZEV requirements for independent low volume, intermediate volume or large volume manufacturers, as applicable, beginning with the sixth model year after the last of the three consecutive model years. The lead time shall be four rather than six years where a manufacturer ceases to be a small or intermediate volume manufacturer in the 2003 or subsequent years due to the aggregation requirements in majority ownership situations, except that if the majority ownership in the

manufacturer was acquired prior to the 2001 model year, the manufacturer must comply with the stepped-up ZEV requirements starting in the 2010 model year.

(B) *Decreases in California Production Volume.* If a manufacturer's average California production volume falls below 4,500, 10,000 or 60,000 units of new PCs, LDTs, and MDVs, as applicable, based on the average number of vehicles produced and delivered for sale for the three previous consecutive model years, the manufacturer shall be treated as a small volume, independent low volume, or intermediate volume manufacturer, as applicable, and shall be subject to the requirements for a small volume, independent low volume, or intermediate volume manufacturer beginning with the next model year.

(C) *Calculating California Production Volume in Change of Ownership Situations.* Where a manufacturer experiences a change in ownership in a particular model year, the change will affect application of the aggregation requirements on the manufacturer starting with the next model year. The manufacturer's small or intermediate volume manufacturer status for the next model year shall be based on the average California production volume in the three previous consecutive model years of those manufacturers whose production volumes must be aggregated for that next model year. For example, where a change of ownership during the 2004 model year results in a requirement that the production volume of Manufacturer A be aggregated with the production volume of Manufacturer B, Manufacturer A's status for the 2005 model year will be based on the production volumes of Manufacturers A and B in the 2002-2004 model years. Where the production volume of Manufacturer A must be aggregated with the production volumes of Manufacturers B and C for the 2004 model year, and during that model year a change in ownership eliminates the requirement that Manufacturer B's production volume be aggregated with Manufacturer A's, Manufacturer A's status for the 2005 model year will be based on the production volumes of Manufacturers A and C in the 2002-2004 model years. In either case, the lead time provisions in section 1962(b)(5)(A) and (B) will apply.

(c) *Partial ZEV Allowance Vehicles (PZEVs).*

(1) *Introduction.* This section 1962(c) sets forth the criteria for identifying vehicles delivered for sale in California as PZEVs. A PZEV is a vehicle that cannot be certified as a ZEV but qualifies for a PZEV allowance of at least 0.2.

(2) *Baseline PZEV Allowance*. In order for a vehicle to be eligible to receive a PZEV allowance, the manufacturer must demonstrate compliance with all of the following requirements. A qualifying vehicle will receive a baseline PZEV allowance of 0.2.

(A) *SULEV Standards.* Certify the vehicle to the 150,000-mile SULEV exhaust emission standards for PCs and LDTs in section 1961(a)(1) (for model years 2003 through 2006, existing SULEV intermediate in-use compliance standards shall apply to all PZEVs). Bi-fuel, fuel-flexible and dual-fuel vehicles must certify to the applicable 150,000-mile SULEV exhaust emission standards when operating on both fuels;

(B) *Evaporative Emissions.* Certify the vehicle to the evaporative emission standards in section 1976(b)(1)(E) ("zero" evaporative emissions standards);

(C) *OBD.* Certify that the vehicle will meet the applicable on-board diagnostic requirements in section 1968.1 for 150,000 miles; and

(D) *Extended Warranty.* Extend the performance and defects warranty period set forth in sections 2037(b)(2) and 2038(b)(2) to 15 years or 150,000 miles, whichever occurs first, except that the time period is to be 10 years for a zero emission energy storage device used for traction power (such as a battery, ultracapacitor, or other electric storage device).

(3) *Zero-Emission VMT PZEV Allowance.*

(A) *Calculation of Zero Emission VMT Allowance.* A vehicle that meets the requirements of section 1962(c)(2) and has zero-emission vehicle miles traveled ("VMT") capability will generate an additional zero emission VMT PZEV allowance calculated as follows:

| *Urban All-Electric Range* | *Zero-emission VMT Allowance* |
|---|---|
| < 10 miles | 0.0 |
| 10 miles to 90 miles | (33.8 + [0.5 x Urban AER])/35 |
| > 90 miles | 2.25 |

The urban all-electric range shall be determined in accordance with section E.3.(2)(a) of the "California Exhaust Emission Standards and Test Procedures for 2005 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(h).

(B) *Alternative Procedures.* As an alternative to determining the zero-emission VMT allowance in accordance with the preceding section 1962(c)(3)(A), a manufacturer may submit for Executive Officer approval an alternative procedure for determining the zero-emission VMT potential of the vehicle as a percent of total VMT, along with an engineering evaluation that adequately substantiates the zero-emission VMT determination. For example, an alternative procedure may provide that a vehicle with zero-emissions of one regulated pollutant (e.g. NOx) and not another (e.g. NMOG) will qualify for a zero-emission VMT allowance of 1.5.

(C) *Additional Allowances for Qualifying HEVs.* The Executive Officer shall approve an additional 0.1 zero-emission VMT partial ZEV allowance for an HEV with an all-electric range if the manufacturer demonstrates to the reasonable satisfaction of the Executive Officer that the HEV is equipped with software and/or other strategies that would promote maximum use of off-vehicle charging, and that the strategies employed are reasonably reliable and tamper-proof.

(4) *PZEV Allowance for Advanced ZEV Componentry*. A vehicle that meets the requirements of section 1962(c)(2) may qualify for an advanced componentry PZEV allowance as provided in this section 1962(c)(4).

(A) *Use of High Pressure Gaseous Fuel or Hydrogen Storage System*. A vehicle equipped with a high pressure gaseous fuel storage system capable of refueling at 3600 pounds per square inch or more and operating exclusively on this gaseous fuel shall qualify for an advanced componentry PZEV allowance of 0.2. A vehicle capable of operating exclusively on hydrogen stored in a high pressure system capable of refueling at 3600 pounds per square inch or more, or stored in nongaseous form, shall instead qualify for an advanced componentry PZEV allowance of 0.3.

(B) *Use of a Qualifying HEV Electric Drive System.*

1. *Classification of HEVs.* HEVs qualifying for additional allowances or allowances that may be used in the AT PZEV category are classified in one of five types of HEVs based on the criteria in the following table.

| *Characteristics* | *Type A* | *Type B* | *Type C* | *Type D* | *Type E* |
|---|---|---|---|---|---|
| Electric Drive System Peak Power Output | >= 4 kW | >= 4 kW <10 kW | >= 10 kW | >= 10 kW | >= 50 kW |
| Traction Drive System Voltage | <60 Volts | >= 60 Volts | < 60 Volts | >= 60 Volts | >= 60 volts |
| Traction Drive Boost | Yes | Yes | Yes | Yes | Yes |
| Regenerative Braking | Yes | Yes | Yes | Yes | Yes |
| Idle Start/Stop | Yes | Yes | Yes | Yes | Yes |

2. *Type A HEVs.* A 2008 or earlier model-year PZEV that the manufacturer demonstrates to the reasonable satisfaction of the Executive Officer meets all of the criteria for a Type A HEV does not receive an additional allowance for meeting those criteria but generates credits that may be used in the AT PZEV category through the 2008 model year.

3. *Type B HEVs.* A 2008 or earlier model-year PZEV that the manufacturer demonstrates to the reasonable satisfaction of the Executive Officer meets all of the criteria for a Type B HEV qualifies for an additional advanced componentry allowance of 0.2.

4. *Type C HEVs.* A 2011 or earlier model-year PZEV that the manufacturer demonstrates to the reasonable satisfaction of the Executive Officer meets all of the criteria for a Type C HEV, and that is equipped with an advanced traction energy storage system – such as nickel metal-hydride batteries, ultracapacitors, or other similar systems – with a design lifetime of at least 10 years, qualifies for an additional advanced componentry allowance of 0.2.

5. *Type D HEVs.* A PZEV that the manufacturer demonstrates to the reasonable satisfaction of the Executive Officer meets all of the criteria for a Type D HEV qualifies for an additional advanced componentry allowance of 0.4 in the 2003 through 2011 model years, 0.35 in the 2012 through 2014 model years, and 0.25 in the 2015 and subsequent model years.

6. *Type E HEVs.* A PZEV that the manufacturer demonstrates to the reasonable satisfaction of the Executive Officer meets all of the criteria for a Type E HEV qualifies for an additional advanced componentry allowance of 0.5 in the 2003 through 2011 model years, 0.45 in the 2012 through 2014 model years, and 0.35 in the 2015 and subsequent model years.

7. *Severability.* In the event that all or part of section 1962(c)(4)(B)1.-6. is found invalid, the remainder of section 1962, including the remainder of section 1962(c)(4)(B)1.-6. if any, remains in full force and effect.

(5) *PZEV Allowance for Low Fuel-Cycle Emissions*. A vehicle that uses fuel(s) with very low fuel-cycle emissions shall receive a PZEV allowance not to exceed 0.3 (0.15 in the case of an HEV that uses for propulsion any fuel that does not have very low fuel-cycle emissions). In order to receive the fuel-cycle PZEV allowance, a manufacturer must demonstrate to the Executive Officer, using peer-reviewed studies or other relevant information, that NMOG emissions associated with the fuel(s) used by the vehicle (on a grams/mile basis) are lower than or equal to 0.01 grams/mile. Fuel-cycle emissions must be calculated based on near-term production methods and infrastructure assumptions, and the uncertainty in the results must be quantified. The fuel-cycle PZEV allowance is calculated according to the following formula:

PZEV Fuel Cycle Allowance = 0.3 x [(percent of VMT using fuel(s) meeting the requirements of the preceding paragraph) / 100]

A manufacturer's demonstration to the Executive Officer that a vehicle qualifies for a fuel-cycle PZEV allowance shall include test results and/or empirical data supporting the estimate of the relative proportion of VMT while operating on fuel(s) with very low fuel-cycle emissions.

(6) *Combined PZEV Allowance.*

(A) *Calculation of Combined PZEV Allowance for a Vehicle*. The combined PZEV allowance for a qualifying vehicle in a particular model year is the sum of the PZEV allowances listed in this section 1962(c)(6), multiplied by any PZEV introduction phase-in multiplier listed in section 1962(c)(7), subject to the caps in section 1962(c)(6)(B).

1. *Baseline PZEV Allowance.* The baseline PZEV allowance of 0.2 for vehicles meeting the criteria in section 1962(c)(2);

2. *Zero-Emission VMT PZEV Allowance.* The zero-emission VMT PZEV allowance, if any, determined in accordance with section 1962(c)(3);

3. *Advanced Componentry PZEV Allowance.* The advanced ZEV componentry ZEV allowance, if any, determined in accordance with section 1962(c)(4); and

4. *Fuel-Cycle Emissions PZEV Allowance.* The fuel-cycle emissions PZEV allowance, if any, determined in accordance with section 1962(c)(5).

(B) *Caps on the Value of an AT PZEV Allowance.*

1. *Cap for 2012 and Subsequent Model-Year Vehicles.* The maximum value of AT PZEV allowances a 2012 and subsequent model-year vehicle may earn, including the baseline PZEV allowance, is 3.0.

2. *Cap Based on the Credit Value of a Type III ZEV.* In no case may the combined AT PZEV allowance for a qualifying vehicle in a particular model year, including the baseline PZEV allowance, exceed the ZEV credits for a Type III ZEV placed in service in the same model year.

(7) *PZEV Multipliers.*

(A) *PZEV Introduction Phase-In Multiplier*. Each 2000 through 2005 model-year PZEV that is produced and delivered for sale in California, other than a PZEV qualifying for a phase-in multiplier under section 1962(c)(7)(B), qualifies for a PZEV introduction phase-in multiplier as follows:

| | *MY 2000-2003* | *MY 2004* | *MY 2005* |
|---|---|---|---|
| Multiplier | 4.0 | 2.0 | 1.33 |

(B) *Introduction Phase-In Multiplier for PZEVs That Earn a Zero Emission VMT Allowance*. Each 2000 through 2011 model year PZEV that earns a zero emission VMT allowance under section 1962(c)(3) and is produced and delivered for sale in California qualifies for a phase-in multiplier as follows:

| | *MY 2000-2008* | *MY 2009-2011* |
|---|---|---|
| Multiplier | 6.0 | 3.0 |

(d) *Qualification for ZEV Multipliers and Credits*.

(1) *1996-1998 Model-Year ZEV Multipliers.*

(A) *1996-1998 Model-Year ZEV Multiplier Based on Vehicle Range.* 1996-1998 model-year ZEVs shall qualify for a ZEV multiplier based on vehicle range as follows:

| *ZEV Multiplier* | *Vehicle Range (miles)* | |
|---|---|---|
| | *Model Years 1996 and 1997* | *Model Year 1998* |
| 2 | any | ≥ 100 |
| 3 | ≥70 | ≥ 130 |

Range shall be determined in accordance with section 9.f.(2)(a) of the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," incorporated by reference in section 1960.1(k).

(B) *1996-1998 Model-Year ZEV Multiplier Based on Specific Energy of Battery.* 1996-1998 model-year ZEVs shall qualify for a ZEV multiplier based on specific energy of the battery as follows:

| *ZEV Multiplier* | *Specific Energy of Battery (w-hr/kg)* |
|---|---|
| 2 | any |
| 3 | ≥ 40 |

(C) *Election of Multiplier.* A 1996-1998 model-year ZEV may qualify for a ZEV multiplier according to section 1962(d)(1)(A) or section 1962(d)(1)(B), but not both.

(2) *1999-2000 Model-Year ZEV Multiplier Calculation for Extended Electric Range Vehicles.* Each ZEV that is produced and delivered for sale in California in the 1999-2000 model years and that has an extended electric range shall qualify for a ZEV multiplier as follows:

| *All-electric range* | *MY 1999-2000* |
|---|---|
| 100-175 | 6-10 |

ZEV multipliers under the above schedule will be determined by linear interpolation between the values shown in the above schedule. Range shall be determined in accordance with Section E.3.(2)(a) 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," incorporated by reference in section 1962(h). ZEVs that have a refueling time of less than 10 minutes and a range of 100 miles or more shall be counted as having unlimited all-electric range, and shall consequently earn the maximum allowable ZEV multiplier for a specific model

year. ZEVs that have a range of 80 to 99 miles shall qualify for ZEV multipliers in the 1999-2000 model years in accordance with the following equation:

ZEV multiplier = (6) x (AER equivalent to a 10 minute recharge/100) x 0.5.

As an option to the above mechanism, the manufacturer of a 1999 model-year ZEV may elect to have its multiplier based on the regulatory requirements pertaining to multipliers based on range or specific energy in section 1960.1(g)(2) and (h)(2). title 13, California Code of Regulations that were applicable to 1999 model-year ZEVs immediately before this section 1962 became operative on November 27, 1999 as a result of the "LEV II" rulemaking.

(3) *ZEV Multipliers for 2001-2002 Model Years*

(A) *ZEV Phase-In Multiplier.* Each 2001 and 2002 model-year ZEV that is placed in service in California by September 30, 2003 qualifies for a ZEV phase-in multiplier of 4.0. A 2001 or 2002 model-year ZEV that is placed in service in California after September 30, 2003 earns credits in accordance with section 1962(d)(5) instead of section 1962(d)(3).

(B) *ZEV Extended Electric Range Multiplier.*

1. *Basic Multiplier Schedule.* Each 2001 and 2002 model-year ZEV that is placed in service in California and that has an extended urban electric range qualifies for a ZEV extended electric range multiplier as follows:

| *Urban All-Electric Range* | *Multiplier* |
|---|---|
| < 50 miles | 1 |
| > 50 miles to < 275 miles | (Urban AER-25)/25 |
| > 275 miles | 10 |

A NEV is not eligible to earn a ZEV extended electric range multiplier. In determining ZEV range multipliers, specialty ZEVs may, upon Executive Officer approval, be tested at the parameters used to determine the ZEV multipliers for the existing ZEV.

2. *Fast refueling.*

a. *Full Fueling in 10 Minutes or Less.* A 2001-2002 model-year ZEV with the demonstrated capability to accept fuel or electric charge until achieving at least 95% SOC or rated fuel capacity in 10 minutes or less when starting from all operationally allowable SOC or fuel states is counted as having unlimited zero emission range and qualifies for the maximum allowable ZEV extended electric range multiplier.

b. *At Least 60-Mile Range in Less Than 10 Minutes.* A 2001-2002 model year ZEV with the demonstrated capacity to accept fuel or electric charge equivalent to at least

60 miles of UDDS range when starting from 20% SOC in less than 10 minutes is counted as having 60 additional miles (up to a 275 mile maximum) of UDDS range in the range multiplier determination in section 1962(d)(3)(C)1.

(C) *Combined ZEV Multiplier*. During the 2001-2002 model years, the combined ZEV multiplier for each ZEV in a specific model year is the product of:

1. The ZEV phase-in multiplier if any as set forth in section 1962(d)(3)(A), times

2. The extended electric range multiplier if any as set forth in section 1962(d)(3)(B).

(4) *Effect of ZEV Multipliers in the 1996-2002 Model Years.* In calculating the number of ZEVs produced and delivered for sale in California by a manufacturer in the 1996-2002 model years and the ZEV credits from such vehicles, the number of ZEVs qualifying for a particular ZEV multiplier shall be multiplied by the combined ZEV multiplier.

(5) *ZEV Credits for 2003 and Subsequent Model Years.*

(A) *ZEV Tiers for Credit Calculations*. Starting in the 2003 model year, ZEV credits from a particular ZEV are based on the assignment of a given ZEV into one of the following five ZEV tiers:

| *ZEV Tier* | *Common Description* | *UDDS ZEV Range* | *Fast Refueling Capability* |
|---|---|---|---|
| NEV | NEV | No minimum | N/A |
| Type 0 | Utility EV | <50 miles | N/A |
| Type I | City EV | >= 50, <100 miles | N/A |
| Type II | Full Function EV | >= 100 miles | N/A |
| Type III | Fuel Cell EV | >= 100 miles | Must be capable of replacing 95% maximum rated energy capacity in <= 10 minutes |

A specialty ZEV that has the same zero emission energy storage device and chassis as an existing ZEV from which it was modified may, upon Executive Officer approval, be categorized on the basis of that existing ZEV. A specialty vehicle that is optimized for a particular duty cycle that conflicts with optimization for maximum vehicle range may be promoted to the next higher ZEV tier upon a determination by the Executive Officer that the specialty vehicle has ZEV componentry equivalent to that utilized by ZEVs in the next tier and would meet the requirements for the next tier if optimized for maximum range.

(B) *ZEV Credits for 2003 and Subsequent Model-Year ZEVs.* A 2003 and subsequent model-year ZEV, other than a NEV, earns 1 ZEV credit when it is produced and delivered for sale in California. A 2003 and subsequent model-year ZEV earns additional credits based on the earliest model year in which the ZEV is placed in service (not earlier than the ZEV's model year). The following table identifies the credits that a ZEV in each of the five ZEV tiers will earn, including the credit not contingent on placement in service, if it is placed in service in the specified model year or by June 30 after the end of the specified model year.

| *Tier* | *Model Year in Which ZEV is Placed in Service* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *2003* | *2004* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *2011* | *2012+* |
| NEV | 1.25 | 0.625 | 0.625 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 |
| Type 0 (Utility) | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1 | 1 | 1 | 1 |
| Type 1 (City) | 8 | 8 | 8 | 7 | 7 | 7 | 2 | 2 | 2 | 2 |
| Type II | 12 | 12 | 12 | 10 | 10 | 10 | 3 | 3 | 3 | 3 |
| Type III | 40 | 40 | 40 | 40 | 40 | 40 | 4 | 4 | 4 | 3 |

(C) *Multiplier for Certain Type I and Type II ZEVs.* A 2004 through 2011 model-year Type I and Type II ZEV shall qualify for a multiplier of 1.25 if it is either sold to a motorist or is leased for three or more years to a motorist who is given the option to purchase or re-lease the vehicle for two years or more at the end of the first lease term.

(D) *Counting a Type III ZEV Placed in a Section 177 State.* Through the 2011 model year, a Type III ZEV that is certified to the California ZEV standards and is placed in service in a state that is administering the California ZEV requirements pursuant to section 177 of the federal Clean Air Act (42 U.S.C. § 7507) applicable for the ZEV's model year may be counted towards compliance with the California percentage ZEV requirements in section 1962(b), including the requirements in section 1962(b)(2)(B), as if it were delivered for sale and placed in service in California. Similarly, a 2011 and earlier model-year Type III ZEV that is certified to the California ZEV standards and is placed in service in California may be counted towards the percentage ZEV requirements of any state that is administering the California ZEV requirements pursuant to section 177 of the federal Clean Air Act, including requirements based on section 1962(b)(2)(B).

(e) [Reserved]

(f) *Extended Service Multiplier for 1997-2003 Model-Year ZEVs and PZEVs With ≥ 10 Mile Zero Emission Range.* Except in the case of a NEV, an additional ZEV or PZEV multiplier will be earned by the manufacturer of a 1997 through 2003 model-year ZEV, or PZEV

with ≥ 10 mile zero emission range, for each full year it is registered for operation on public roads in California beyond its first three years of service, through the 2011 calendar year. For additional years of service starting earlier than April 24, 2003, the manufacturer will receive 0.1 times the ZEV credit that would be earned by the vehicle if it were leased or sold new in that year, including multipliers, on a year-by-year basis beginning in the fourth year after the vehicle is initially placed in service. For additional years of service starting April 24, 2003 or later, the manufacturer will receive 0.2 times the ZEV credit that would be earned by the vehicle if it were leased or sold new in that year, including multipliers, on a year-by-year basis beginning in the fourth year after the vehicle is initially placed in service. The extended service multiplier is reported and earned in the year following each continuous year of service.

(g) *Generation and Use of ZEV Credits; Calculation of Penalties*

(1) *Introduction.* A manufacturer that produces and delivers for sale in California ZEVs or PZEVs in a given model year exceeding the manufacturer's ZEV requirement set forth in section 1962(b) shall earn ZEV credits in accordance with this section 1962(g).

(2) *ZEV Credit Calculations.*

(A) *Credits from ZEVs.* The amount of g/mi ZEV credits earned by a manufacturer in a given model year from ZEVs shall be expressed in units of g/mi NMOG, and shall be equal to the number of credits from ZEVs produced and delivered for sale in California that the manufacturer applies towards meeting the ZEV requirements for the model year subtracted from the number of ZEVs produced and delivered for sale in California by the manufacturer in the model year and then multiplied by the NMOG fleet average requirement for PCs and LDT1s for that model year.

(B) *Credits from PZEVs.* The amount of g/mi ZEV credits from PZEVs earned by a manufacturer in a given model year shall be expressed in units of g/mi NMOG, and shall be equal to the total number of PZEVs produced and delivered for sale in California that the manufacturer applies towards meeting its ZEV requirement for the model year subtracted from the total number of PZEV allowances from PZEVs produced and delivered for sale in California by the manufacturer in the model year and then multiplied by the NMOG fleet average requirement for PCs and LDT1s for that model year.

(C) *Separate Credit Accounts.* The number of credits from a manufacturer's [i] ZEVs, [ii] advanced technology PZEVs, and [iii] all other PZEVs shall each be maintained separately.

(3) *ZEV Credits for MDVs and LDTs Other Than LDT1s.* ZEVs and PZEVs classified as MDVs or as LDTs other than LDT1s may be counted toward the ZEV requirement for PCs and LDT1s, and included in the calculation of ZEV credits as specified in this section 1962(g) if the manufacturer so designates.

(4) *ZEV Credits for Advanced Technology Demonstration Programs.* A vehicle, other than a NEV, that is placed in a California advanced technology demonstration program may earn ZEV credits even if it is not "delivered for sale." To earn such credits, the manufacturer must demonstrate to the reasonable satisfaction of the Executive Officer that the vehicles will be regularly used in applications appropriate to evaluate issues related to safety, infrastructure, fuel specifications or public education, and that for more than 50 percent of the first year of placement the vehicle will be situated in California. Such a vehicle is eligible to receive the same allowances and credits that it would have earned if placed in service. To determine vehicle credit, the model-year designation for a demonstration vehicle shall be consistent with the model-year designation for conventional vehicles placed in the same timeframe.

(5) *ZEV Credits for Transportation Systems.*

(A) *General.* In model years 2001 through 2011, a ZEV, advanced technology PZEV or PZEV placed as part of a transportation system may earn additional ZEV credits, which may used in the same manner as other credits earned by vehicles of that category, except as provided in section (g)(5)(C) below. A NEV is not eligible to earn credit for transportation systems. To earn such credits, the manufacturer must demonstrate to the reasonable satisfaction of the Executive Officer that the vehicle will be used as a part of a project that uses an innovative transportation system as described in section (g)(5)(B) below.

(B) *Credits Earned.* In order to earn additional credit under this section (g)(5), a project must at a minimum demonstrate [i] shared use of ZEVs, AT PZEVs or PZEVs, and [ii] the application of "intelligent" new technologies such as reservation management, card systems, depot management, location management, charge billing and real-time wireless information systems. If, in addition to factors [i] and [ii] above, a project also features linkage to transit, the project may receive further additional credit. For ZEVs only, not including NEVs, a project that features linkage to transit, such as dedicated parking and charging facilities at transit stations, but does not demonstrate shared use or the application of intelligent new technologies, may also receive additional credit for linkage to transit. The maximum credit awarded per vehicle shall be determined by the Executive Officer, based upon an application submitted by the manufacturer and, if appropriate, the project manager. The maximum credit awarded shall not exceed the following:

| *Type of Vehicle* | *Shared Use, Intelligence* | *Linkage to Transit* |
|---|---|---|
| PZEV | 2 | 1 |
| Advanced Technology PZEV | 4 | 2 |
| ZEV | 6 | 3 |

(C) *Cap on Use of Credits.*

1. *ZEVs*. Credits earned or allocated by ZEVs pursuant to this section (g)(5), not including all credits earned by the vehicle itself, may be used to satisfy up to one-tenth of a manufacturer's ZEV obligation in any given model year.

2. *AT PZEVs*. Credits earned or allocated by AT PZEVs pursuant to this section (g)(5), not including all credits earned by the vehicle itself, may be used to satisfy up to one-twentieth of a manufacturer's ZEV obligation in any given model year, but may only be used in the same manner as other credits earned by vehicles of that category.

3. *PZEVs*. Credits earned or allocated by PZEVs pursuant to this section (g)(5), not including all credits earned by the vehicle itself, may be used to satisfy up to one-fiftieth of the manufacturer's ZEV obligation in any given model year, but may only be used in the same manner as other credits earned by vehicles of that category.

(D) *Allocation of Credits.* Credits shall be assigned by the Executive Officer to the project manager or, in the absence of a separate project manager, to the vehicle manufacturers upon demonstration that a vehicle has been placed in a project. Credits shall be allocated to vehicle manufacturers by the Executive Officer in accordance with a recommendation submitted in writing by the project manager and signed by all manufacturers participating in the project, and need not be allocated in direct proportion to the number of vehicles placed.

(6) *Submittal of ZEV Credits*. A manufacturer may meet the ZEV requirements in any given model year by submitting to the Executive Officer a commensurate amount of g/mi ZEV credits, consistent with section 1962(b). These credits may be earned previously by the manufacturer or acquired from another party, except that beginning with the 2006 model year credits earned from NEVs offered for sale or placed in service in model years 2001 through 2005 cannot be used to satisfy more than the following portion of a manufacturer's percentage ZEV obligation that may only be satisfied with credits from ZEVs and, starting with the 2009 model year, the manufacturer's percentage ZEV obligation that may be satisfied by credits from AT PZEVs but not PZEVs:

| *ZEV Category* | | *AT PZEV Category* | |
|---|---|---|---|
| *2006* | *2007 and beyond* | *2009* | *2010 and beyond* |
| 75% | 50% | 75% | 50% |

This limitation applies to credits earned in model years 2001 through 2005 by the same manufacturer or earned in model years 2001 through 2005 by another manufacturer and acquired. The amount of g/mi ZEV credits required to be submitted shall be calculated according to the criteria set forth in this section 1962(g).

(7) *Requirement to Make Up a ZEV Deficit*.

(A) *General.* A manufacturer that produces and delivers for sale in California fewer ZEVs than required in a given model year shall make up the deficit by the end of the next model year by submitting to the Executive Officer a commensurate amount of g/mi ZEV credits, except that credits generated from PZEVs may be used to offset deficits for two model years. The amount of g/mi ZEV credits required to be submitted shall be calculated by [i] adding the number of ZEVs produced and delivered for sale in California by the manufacturer for the model

year to the number of ZEV allowances from partial ZEV allowance vehicles produced and delivered for sale in California by the manufacturer for the model year (for a large volume manufacturer, not to exceed that permitted under section 1962(b)(2)), [ii] subtracting that total from the number of ZEVs required to be produced and delivered for sale in California by the manufacturer for the model year, and [iii] multiplying the resulting value by the fleet average requirements for PCs and LDT1s for the model year in which the deficit is incurred.

(8) *Penalty for Failure to Meet ZEV Requirements.* Any manufacturer that fails to produce and deliver for sale in California the required number of ZEVs or submit an appropriate amount of g/mi ZEV credits and does not make up ZEV deficits within the specified time period shall be subject to the Health and Safety Code section 43211 civil penalty applicable to a manufacturer that 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 ZEV deficits are not balanced by the end of the specified time period. For the purposes of Health and Safety Code section 43211, the number of vehicles not meeting the state board's standards shall be calculated according to the following equation, provided that the percentage of a large volume manufacturer's ZEV requirement for a given model year that may be satisfied with partial ZEV allowance vehicles or ZEV credits from such vehicles may not exceed the percentages permitted under section 1962(b)(2)(A):

> (No. of ZEVs required to be produced and delivered for sale in California for the model year) - (No. of ZEVs produced and delivered for sale in California for the model year) - (No. of ZEV allowances from partial ZEV allowance vehicles produced and delivered for sale in California for the model year) - [(Amount of ZEV credits submitted for the model year) / (the fleet average requirement for PCs and LDT1s for the model-year)].

(h) *Test Procedures.* The certification requirements and test procedures for determining compliance with this section 1962 are set forth in "California Exhaust Emission Standards and Test Procedures for 2005 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," adopted by the state board on August 5, 1999, and last amended December 19, 2003, which is incorporated herein by reference.

(i) *ZEV-Specific Definitions.* The following definitions apply to this section 1962.

(1) "Advanced technology PZEV" or "AT PZEV" means any PZEV with an allowance greater than 0.2 before application of the PZEV early introduction phase-in multiplier.

(2) "Battery electric vehicle" means any vehicle that operates solely by use of a battery or battery pack, or that is powered primarily through the use of an electric battery or battery pack but uses a flywheel or capacitor that stores energy produced by the electric motor or through regenerative braking to assist in vehicle operation.

(2.5) "Electric drive system" means an electric motor and associated power electronics which provide acceleration torque to the drive wheels sometime during normal vehicle operation.

This does not include components that could act as a motor, but are configured to act only as a generator or engine starter in a particular vehicle application.

(3) "Neighborhood electric vehicle" means a motor vehicle that meets the definition of Low-Speed Vehicle either in section 385.5 of the Vehicle Code or in 49 CFR 571.500 (as it existed on July 1, 2000), and is certified to zero-emission vehicle standards.

(4) "Placed in service" means having been sold or leased to an end-user and not to a dealer or other distribution chain entity, and having been individually registered for on-road use by the California Department of Motor Vehicles.

(4.5) "Regenerative braking" means the partial recovery of the energy normally dissipated into friction braking that is returned as electrical current to an energy storage device.

(5) "Specialty ZEV" means a ZEV that is designed for a commercial or governmental fleet application, and either [i] has the same zero emissions energy storage device and chassis as an existing ZEV from which it is modified, or [ii] in the case of a vehicle that is not based on an existing ZEV platform, is optimized for a particular duty cycle, such as urban delivery service, that conflicts with optimization for maximum vehicle range.

(6) "Type 0, I, II, and III ZEV" all have the meanings set forth in section 1962(d)(5)(A).

(j) *Abbreviations.* The following abbreviations are used in this section 1962:

"AER" means all-electric range.
"BEV" means battery electric vehicle.
"HEV" means hybrid-electric vehicle.
"LDT" means light-duty truck.
"LDT1" means a light-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 pounds to a gross vehicle weight of 8500 pounds, or a "LEV I" light-duty truck with a loaded vehicle weight of 3751-5750 pounds.
"MDV" means medium-duty vehicle.
"Non-Methane Organic Gases" or "NMOG" means the total mass of oxygenated and non-oxygenated hydrocarbon emissions.
"MY" means model year.
"NEV" means neighborhood electric vehicle.
"NOx" means oxides of nitrogen.
"PC" means passenger car.
"PZEV" means any vehicle that is delivered for sale in California and that qualifies for a partial ZEV allowance of at least 0.2.
"SOC" means state of charge.
"SULEV" means super-ultra-low-emission-vehicle.
"UDDS" means urban dynamometer driving cycle.

"ULEV" means ultra-low emission vehicle.
"VMT" means vehicle miles traveled.
"ZEV" means zero-emission vehicle.

(k) *Severability.* Each provision of this section is severable, and in the event that any provision of this section is held to be invalid, the remainder of this article remains in full force and effect.

Note: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43204, and 43205.5, Health and Safety Code.

**§ 1962.1. Electric Vehicle Charging Requirements.**

(a) *Applicability.* This section applies to (1) all battery electric vehicles that qualify for 1.0 or greater ZEV credit under section 1962, and (2) all hybrid electric vehicles that are capable of being recharged by a battery charger that transfers energy from the electricity grid to the vehicle for purposes of recharging the vehicle traction battery, other than battery electric vehicles and hybrid electric vehicles that are only capable of Level 1 charging.

(b) *Definitions.*

(1) The definitions in section 1962 apply to this section.

(2) "Level 1 charging" means a charging method that allows an electric vehicle or hybrid electric vehicle to be charged by having its charger connected to the most common grounded receptacle (NEMA 5-15R). A vehicle that is only capable of Level 1 charging is one that is charged by an on-board or off-board charger capable of accepting energy from the existing AC supply network. The maximum power is 12 amps, with a branch circuit rating of 15 amps, and continuous power of 1.44 kilowatts.

(c) *Requirements.* Beginning with the 2006 model year, all vehicles identified in subsection (a) must be equipped with a conductive charger inlet port which meets all the specifications contained in Society of Automotive Engineers (SAE) Surface Vehicle Recommended Practice SAE J1772 REV NOV 2001, SAE Electric Vehicle Conductive Charge Coupler, which is incorporated herein by reference. All such vehicles must be equipped with an on-board charger with a minimum output of 3.3 kilovolt amps.

Note: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43107, 43204, and 43205.5, Health and Safety Code.

* * * *

**§ 1965. Emission Control and Smog Index Labels - 1979 and Subsequent Model-Year Motor Vehicles.**

In addition to all other requirements, emission control labels are required by the California certification procedures contained in the "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, as last amended September 5, 2003, which is incorporated herein by reference, the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty trucks and Medium-Duty Vehicles," incorporated by reference in §1961(d), the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel-Engines and Vehicles," incorporated by reference in §1956.8(b), the "California Interim Certification Procedures for 2004 and Subsequent Model Hybrid-Electric Vehicle Classes," incorporated by reference in §1956.8(b) and (d), and the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Otto-Cycle Engines," incorporated by reference in §1956.8(d). Smog index labels for passenger cars and light-duty trucks shall conform to the "California Smog Index Label Specifications," adopted September 5, 2003, which is incorporated herein by reference. Motorcycles shall meet the requirements of Title 40 Code of Federal Regulations section 86.413-78, as last amended October 28, 1977, which is incorporated herein by reference.

Note: Authority cited: Sections 39600, 39601, and 43200, Health and Safety Code. Reference: Sections 39002, 39003, 43000, 43013, 43100, 43101, 43102, 43103, 43104, 43107, and 43200, Health and Safety Code.

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**§ 1976. Standards and Test Procedures for Motor Vehicle Fuel Evaporative Emissions.**

(a) *[Fuel evaporative emissions standards for 1970 through 1977 model passenger cars and light-duty trucks; not set forth]*

(b)(1) Evaporative emissions for 1978 and subsequent model gasoline-fueled, 1983 and subsequent model liquefied petroleum gas-fueled, and 1993 and subsequent model alcohol-fueled motor vehicles and hybrid electric vehicles subject to exhaust emission standards under this article, except petroleum-fueled diesel vehicles, compressed natural gas-fueled vehicles, hybrid electric vehicles that have sealed fuel systems which can be demonstrated to have no evaporative emissions, and motorcycles, shall not exceed the following standards:

(A) For vehicles identified below, tested in accordance with the test procedure based on the Sealed Housing for Evaporative Determination as set forth in Title 40, Code of Federal Regulations, sections 86.130-78 through 86.143-90 as they existed July 1, 1989, the evaporative emission standards are:

| *Vehicle Type* | *Model Year* | *Hydrocarbons*[(1)] *Diurnal + Hot Soak (grams/test) 50K miles* |
|---|---|---|
| Passenger cars | 1978 and 1979 | 6.0 |
| Light-duty trucks | | 6.0 |
| Medium-duty vehicles | | 6.0 |
| Heavy-duty vehicles | | 6.0 |
| Passenger cars | 1980-1994[(2)] | 2.0 |
| Light-duty trucks | | 2.0 |
| Medium-duty vehicles | | 2.0 |
| Heavy-duty vehicles | | 2.0 |

1 Organic Material Hydrocarbon Equivalent, for alcohol-fueled vehicles.

2 Other than hybrid electric vehicles.

(B) For the vehicles identified below, tested in accordance with the test procedure which includes the running loss test, the hot soak test, and the 72 hour diurnal test, the evaporative emission standards are:

| *Vehicle Type* | *Model Year* | *Hydrocarbons*[1] | |
|---|---|---|---|
| | | *Three-Day Diurnal +Hot Soak (grams/test) Useful Life*[2] | *Running Loss (grams/mile) Useful Life* [2] |
| Passenger cars | 1995 through 2005[3] | 2.0 | 0.05 |
| Light-duty trucks | | 2.0 | 0.05 |
| Medium-duty vehicles (6,001-8,500 lbs. GVWR) | | | |
| with fuel tanks < 30 gallons | | 2.0 | 0.05 |
| with fuel tanks 30 gallons | | 2.5 | 0.05 |
| (8,501-14,000 lbs. GVWR)[4] | | 3.0 | 0.05 |
| Heavy-duty vehicles (over 14,000 lbs. GVWR) | | 2.0 | 0.05 |
| Hybrid electric passenger cars | 1993 through 2005[5] | 2.0 | 0.05 |
| Hybrid electric light-duty trucks | | 2.0 | 0.05 |
| Hybrid electric medium-duty vehicles | | 2.0 | 0.05 |

1 Organic Material Hydrocarbon Equivalent for alcohol-fueled vehicles.

2 For purposes of this paragraph, "useful life" shall have the same meaning as provided in section 2112, title 13, California Code of Regulations. Approval of vehicles which are not exhaust emission tested using a chassis dynamometer pursuant to section 1960.1 or 1961, title 13, California Code of Regulations shall be based on an engineering evaluation of the system and data submitted by the applicant.

3 The running loss and useful life three-day diurnal plus hot soak evaporative emission standards (hereinafter "running loss and useful life standards") shall be phased-in beginning with the 1995 model year. Each manufacturer, except ultra-small volume and small volume manufacturers, shall certify the specified percent (a) of passenger cars and (b) of light-duty trucks, medium-duty vehicles and heavy-duty vehicles to the running loss and useful life standards according to the following schedule:

| *Model Year* | *Minimum Percentage of Vehicles Certified to Running Loss and Useful Life Standards** |
|---|---|
| 1995 | 10 percent |
| 1996 | 30 percent |
| 1997 | 50 percent |

* The minimum percentage of motor vehicles of each vehicle type required to be certified to the running loss and useful life standards shall be based on the manufacturer's projected California model-year sales (a) of passenger cars and (b) of light-duty trucks, medium-duty vehicles and heavy-duty vehicles. Optionally, the percentage of motor vehicles can also be based on the manufacturer's projected California model-year sales (a) of passenger cars and light-duty trucks and (b) of medium-duty vehicles and heavy-duty vehicles.

Beginning with the 1998 model year, all motor vehicles subject to the running loss and useful life standards, except those produced by ultra-small volume manufacturers, shall be certified to the specified standards. In the 1999 through the 2005 model years, all motor vehicles subject to the running loss and useful life standards, including those produced by ultra-small volume manufacturers, shall be certified to the specified standards.

All 1995 through 1998 model-year motor vehicles which are not subject to running loss and useful life standards pursuant to the phase-in schedule shall comply with the 50,000-mile standards in effect for 1980 through 1994 model-year vehicles.

[4] For the 1995 model year only, the evaporative emission standards for complete vehicles in this weight range shall be 2.0 grams/test and compliance with the evaporative emission standards shall be based on the SHED conducted in accordance with the procedures set forth in title 40, Code of Federal Regulations, sections 86.130-78 through 86.143-90 as they existed July 1, 1989. For the 1995 through 2005 model years, the evaporative emission standards for incomplete vehicles in this weight range shall be 2.0 grams/test and compliance with the evaporative emission standards shall be based on the test procedures specified in paragraph 4.g. of the "California Evaporative Emission Standards and Test Procedures for 1978 and Subsequent Model Motor Vehicles."

[5] The running loss and useful life standards for all hybrid electric vehicles shall be effective beginning in the 1993 model year.

(C) For vehicles identified below, tested in accordance with the test procedure which includes the hot soak test and the 48 hour diurnal test, the evaporative emission standards are:

| *Vehicle Type* | *Model Year* | *Hydrocarbons*[1] *Two-Day Diurnal + Hot Soak (grams/test) Useful Life*[2] |
|---|---|---|
| Passenger cars | 1996 through 2005[3] | 2.5 |
| Light-duty trucks | | 2.5 |
| Medium-duty vehicles (6,001-8,500 lbs. GVWR)<br>with fuel tanks < 30 gallons<br>with fuel tanks 30 gallons<br>(8,501-14,000 lbs. GVWR) | | <br><br>2.5<br>3.0<br>3.5 |
| Heavy-duty vehicles (over 14,000 lbs. GVWR) | | 4.5 |
| Hybrid electric passenger cars | 1996 through 2005[3] | 2.5 |
| Hybrid electric light-duty trucks | | 2.5 |
| Hybrid electric medium-duty vehicles | | 2.5 |

1 Organic Material Hydrocarbon Equivalent for alcohol-fueled vehicles.

2 For purposes of this paragraph, "useful life" shall have the same meaning as provided in section 2112, title 13, California Code of Regulations. Approval of vehicles which are not exhaust emission tested using a chassis dynamometer pursuant to section 1960.1 or 1961, title 13, California Code of Regulations shall be based on an engineering evaluation of the system and data submitted by the applicant.

3 The two-day diurnal plus hot soak evaporative emission standards (hereinafter "supplemental standards") shall be phased-in beginning with the 1996 model year. Those vehicles certified under the running loss and useful life standards for the 1996 through 2005 model years must also be certified under the supplemental standards.

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

(E) 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.

(F) For the 2004 and subsequent model motor vehicles identified below, tested in accordance with the test procedures described in Title 40, Code of Federal Regulations, sections 86.130-78 through 86.143-90 as they existed July 1, 1989 and as modified by the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles" incorporated by reference in section 1976(c), the evaporative emission standards are:

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| *Vehicle Type* | *Hydrocarbon[1] Standards[2][3][4]* | | |
|---|---|---|---|
| | *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 Organic Material Hydrocarbon Equivalent for alcohol-fueled vehicles.

2 For all vehicles certified to these standards, the "useful life" shall be 15 years or 150,000 miles, whichever first occurs. Approval of vehicles which are not exhaust emission tested using a chassis dynamometer pursuant to section 1960.1 or 1961, title 13, California Code of Regulations shall be based on an engineering evaluation of the system and data submitted by the applicant.

3 (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 1976(b)(1)(E) 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 §§1976(b)(1)(F) and (b)(1)(E) |
|---|---|
| 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 1976(b)(1)(E).

All 2004 through 2005 model-year motor vehicles which are not subject to these standards or the standards in section 1976(b)(1)(E) pursuant to the phase-in schedule shall comply with the requirements of sections 1976(b)(1)(B) and (C).

(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.

[4] 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.

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(b)(2) *[Evaporative emissions standards for gasoline-fueled motorcycles; not set forth]*

(c) The test procedures for determining compliance with the standards in subsection (b) above applicable to 1978 through 2000 model year vehicles are set forth in "California Evaporative Emission Standards and Test Procedures for 1978-2000 Model Motor Vehicles," adopted by the state board on April 16, 1975, as last amended August 5, 1999, which is incorporated herein by reference. The test procedures for determining compliance with standards applicable to 2001 and subsequent model year vehicles are set forth in the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles," adopted by the state board on August 5, 1999, and as last amended June 22, 2006, which is incorporated herein by reference.

(d) *[Applies to motorcycles only; not set forth]*

(e) *[Applies to motorcycles only; not set forth]*

(f)(2) For the purposes of this section, "ultra-small volume manufacturer" means any vehicle manufacturer with California sales less than or equal to 300 new vehicles per model year based on the average number of vehicles sold by the manufacturer in the previous three consecutive model years, and "small volume manufacturer" means, for 1978 through 2000 model years, any vehicle manufacturer with California sales less than or equal to 3000 new vehicles per model year based on the average number of vehicles sold by the manufacturer in the previous three consecutive model years. For 2001 and subsequent model motor vehicles, "small volume manufacturer" has the meaning set forth in section 1900(a).

Note: Authority cited: Sections 39600, 39601, 39667, 43013, 43018, 43101, 43104 and 43107, Health and Safety Code. Reference: Sections 39003, 39500, 39667, 43000, 43013, 43018, 43100, 43101, 43102, 43104 and 43107, Health and Safety Code.

**§ 1978. Standards and Test Procedures for Vehicle Refueling Emissions.**

(a)(1) Vehicle refueling emissions for 1998 and subsequent model gasoline-fueled, alcohol-fueled, diesel-fueled, liquefied petroleum gas-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 pounds, shall not exceed the following standards. Natural gas-fueled vehicles are exempt from meeting these refueling standards, but the refueling receptacles on natural gas-fueled vehicles must comply with the receptacle provisions of the American National Standards Institute/ American Gas Association Standard for Compressed Natural Gas Vehicle Fueling Connection Devices, ANSI/AGA NGV1 standard-1994, which is incorporated herein by reference. The standards apply equally to certification and in-use vehicles.

Hydrocarbons (for gasoline-fueled, diesel-fueled, and hybrid electric vehicles): 0.20 gram per gallon of fuel dispensed.

Organic Material Hydrocarbon Equivalent (for alcohol-fueled, fuel-flexible, and hybrid electric vehicles): 0.20 gram per gallon of fuel dispensed.

Hydrocarbons (for liquefied petroleum gas-fueled vehicles): 0.15 gram per gallon of fuel dispensed.

(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 (A) is provided in writing and applies for the full useful life of the vehicle, as defined in section 2112.

In addition to the above provisions, the ARB reserves the authority to require testing to enforce compliance and to prevent noncompliance with the refueling emission standard.

Vehicles certified to the refueling emission standard under this provision shall not be counted in the phase-in sales percentage compliance determinations.

(3) The manufacturer shall adhere to the following phase-in schedule, as determined by projected vehicle sales throughout the United States, with the exception of small volume manufacturers.

| *ORVR Model Year Phase-In Schedule* | | | |
|---|---|---|---|
| *Class of Vehicle* | *40% Fleet* | *80% Fleet* | *100% Fleet* |
| Passenger Cars | 1998 | 1999 | 2000 |
| Light-Duty Trucks 0-6,000 lbs. GVWR | 2001 | 2002 | 2003 |
| Light-Duty Trucks / Medium-Duty Vehicles 6,001-8,500 lbs. GVWR | 2004 | 2005 | 2006 |

(A) Prior to the 2001 model year, small volume manufacturers are defined for purposes of this section as any vehicle manufacturer with California actual sales less than or equal to 3000 new vehicles per model year based on the average number of vehicles sold by the manufacturer in the previous three consecutive years.

(B) Small volume manufacturers of passenger cars, as defined in subsection (a)(3)(A), are exempt from the implementation schedule in subsection (a)(3) for model years 1998 and 1999. For small volume manufacturers of passenger cars, the standards of subsection (a)(1), and the associated test procedures, shall not apply until model year 2000, when 100 percent compliance with the standards of this section is required. Small volume manufacturers of light-duty trucks and medium-duty vehicles are not exempt from the implementation schedule in subsection (a)(3).

(b) The test procedures for determining compliance with standards applicable to 1998 through 2000 gasoline, alcohol, diesel, and hybrid electric passenger cars, light-duty trucks, and medium-duty vehicles are set forth in the "California Refueling Emission Standards and Test Procedures for 1998-2000 Model Motor Vehicles," as amended August 5, 1999, which is incorporated herein by reference. The test procedures for determining compliance with standards applicable to 2001 and subsequent gasoline, alcohol, diesel, and hybrid electric passenger cars, light-duty trucks, and medium-duty vehicles are set forth in the "California Refueling Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles," adopted August 5, 1999, and last amended June 22, 2006, which is incorporated herein by reference.

Note: Authority cited: Sections 39600, 39667, 43013, 43018, 43101, and 43104, Health and Safety Code. Reference: Sections 39003, 39500, 39667, 43000, 43013, 43018, 43101, 43102, and 43104, Health and Safety Code.

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**§ 2062. Assembly-Line Test Procedures - 1998 and Subsequent Model Years.**

New 1998 through 2000 model-year passenger cars, light-duty trucks, and medium-duty vehicles, subject to certification and manufactured for sale in California, except for zero-emission vehicles and medium-duty vehicles certified according to the optional standards and test procedures of Section 1956.8, Title 13, California Code of Regulations, shall be tested in accordance with the "California Assembly-Line Test Procedures for 1998 Through 2000 Model-Year Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles." adopted June 24, 1996, and last amended August 5, 1999, which is incorporated herein by reference. New 2001 and subsequent model-year passenger cars, light-duty trucks, and medium-duty vehicles, subject to certification and manufactured for sale in California, except for zero-emission vehicles and medium-duty vehicles certified according to the optional standards and test procedures of Section 1956.8, Title 13, California Code of Regulations, shall be tested in accordance with the "California Assembly-Line Test Procedures for 2001 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles." adopted August 5, 1999, which is incorporated herein by reference. These test procedures shall also apply to federally certified light-duty motor vehicles, except as provided in "Guidelines for Certification of 1983 and Subsequent Model-Year Federally Certified Light-Duty Motor Vehicles for Sale in California," adopted July 20, 1982, as last amended July 12, 1991, which is incorporated herein by reference.

NOTE: Authority cited: Sections 39515, 39600, 39601, 43013, 43018, 43101, 43104 and 43210, Health and Safety Code. Reference: Sections 39002, 39003, 39500, 43000, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43204, 43210, 43211, and 43212, Health and Safety Code.

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**§2101. Compliance Testing and Inspection - New Vehicle Selection Evaluation, and Enforcement Action.**

(a) The Executive Officer may, with respect to any new vehicle engine family, test group or subgroup being sold, offered for sale, or manufactured for sale in California, order a vehicle manufacturer to make available for compliance testing and/or inspection a reasonable number of vehicles, and may direct that the vehicles be delivered to the state board at the Haagen-Smit Laboratory, 9528 Telstar Avenue, El Monte, California. Vehicles shall be selected at random from sources specified by the Executive Officer according to a method approved by him/her, which insofar as practical shall exclude (1) vehicles manufactured pursuant to the specific order of an ultimate purchaser or (2) vehicles the selection of which, if not excluded, would result in an unreasonable disruption of the manufacturer's distribution system.

A subgroup may be selected for compliance testing only if the Executive Officer has reason to believe that the emissions characteristics of that subgroup are substantially in excess of the emissions of the engine family or test group as a whole.

(b) If the vehicles are selected for compliance testing, the selection and testing of vehicles and the evaluation of data shall be made in accordance with the "California New Vehicle Compliance Test Procedures," adopted by the state board on June 13, 1976, and last amended August 5, 1999. Motorcycles scheduled for compliance testing shall be selected, tested, and evaluated in accordance with the "California New Motorcycle Compliance Test Procedures," adopted by the state board on June 30, 1977, and amended November 24, 1981.

(c) If the Executive Officer determines, in accordance with the "California New Vehicle Compliance Test Procedures," or the "California New Motorcycle Compliance Test Procedures" that an engine family, test group, or any subgroup within an engine family or test group, exceeds the emission standards for one or more pollutants, the Executive Officer shall notify the manufacturer and may invoke Section 2109. Prior to invoking Section 2109, the Executive Officer shall consider quality audit test results, if any, and any additional test data or other information provided by the manufacturer.

(d) Vehicles selected for inspection shall be checked to verify the presence of those emissions-related components specified in the manufacturer's application for certification, and for the accuracy of any adjustments, part numbers and labels specified in that application. If any vehicle selected for inspection fails to conform to any applicable law in Part 5 (commencing with Section 43000) of Division 26 of the Health and Safety Code, or any regulation adopted by the state board pursuant thereto, other than an emissions standard applied to new vehicles to determine "certification" as specified in Subchapter 1, Article 2 of this Chapter and an assembly-line test procedure specified in Subchapter 2, Article 1 of this Chapter, the executive officer shall notify the manufacturer and may invoke Section 2109. Prior to invoking Section 2109, the executive officer shall consider any information provided by the manufacturer.

NOTE: Authority cited: Sections 39600, 39601 and 43104, Health and Safety Code. Reference: Sections 39002, 39003, 39500, 43000, 43106, 43210, 43211, and 43212, Health and Safety Code.