

The California Low-Emission Vehicle Regulations

(As of February 1, 1999)

The California low-emission vehicle (LEV) regulations for passenger cars, light-duty trucks and medium-duty vehicles are administered by the California Air Resources Board (ARB). 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), commencing with section 1900. The LEV exhaust emission standards are contained in section 1960.1, which includes all of the California exhaust emission standards for 1981 and subsequent passenger cars, light-duty trucks and medium-duty vehicles. In addition, manufacturers have the option of certifying the engines used in incomplete medium-duty vehicles to the LEV exhaust emission standards contained in section 1956.8(h), title 13, CCR.

Sections 1960.1 and 1956.8 are printed below, as they were in effect February 1, 1999 (last amended March 19, 1998). The key subsections for the LEV program are:

- §1960.1(f)(2) The non-LEV so-called "Tier 1" standards for 1995 and subsequent model passenger cars and light-duty trucks.
- §1960.1(g)(1) The TLEV, LEV, ULEV and ZEV 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 1994 and subsequent model years, and the ZEV requirements (in note (9) to the table in §1960.1(g)(2)).
- §1960.1(h)(1) The non-LEV so-called "Tier 1" standards for 1995 and subsequent model medium-duty vehicles.
- §1960.1(h)(2) The LEV, ULEV, SULEV and ZEV standards for medium-duty vehicles (the phase-in requirements are in note (10) to the table in §1960.1(h)(2)).
- §1960.1(p) The cold temperature carbon monoxide standards.
- §1960.1(q) The Supplemental Federal Test Procedure (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)).
- §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 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 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles." This complete 145-page document is available on the ARB's world-wide web 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.

In addition to the LEV exhaust emission standards in section 1960.1, 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), 2101 (Compliance Testing and Inspection - New Vehicle Selection, Evaluation, and Enforcement), 2061 (Assembly-Line Test Procedures - 1983 Through 1997 Model Years), and 2062 (Assembly-Line Test Procedures - 1998 and Subsequent Model Years). Other requirements not set forth in this document include evaporative emission standards (§1976), refueling emission standards (§1978), and requirements for on-board diagnostic (OBDII) systems (§1968.1), fill pipes (§2235), emission warranties (§§2037 and 2038), recalls (§§2111 and following) and related provisions.

At a November 5, 1998 hearing, the ARB approved comprehensive new "LEV II" and "CAP 2000" amendments. They will sunset the currently-effective LEV (to be denoted "LEV I") standards that are now in section 1960.1 and establish new "LEV II" standards for passenger cars, light-duty trucks and medium-duty vehicles in a new section 1961. The LEV II standards will be phased in over the 2004 through 2007 model years. All provisions regarding ZEVs will be contained in a new section 1962. Both sections 1960.1 and 1961 will incorporate by reference the new "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles," which in turn will incorporate U.S. EPA's new subpart S of Part 86, Title 40, Code of Federal Regulations. As of February 1, 1999, the ARB was still processing the LEV II amendments. The LEV II rulemaking documents are available at www.arb.ca.gov/regact/levii/levii.htm.

At an April 23, 1998 hearing, the ARB approved amendments pertaining to heavy-duty diesel engines and vehicles in section 1956.8(a), (b) and (h). These amendments, which are not incorporated in the following text of section 1956.8, were filed with the Office of Administrative Law March 5, 1999. They will be incorporated into this document after they become effective. The heavy-duty diesel rulemaking documents are available at www.arb.ca.gov/regact/2004/2004.htm.

Title 13, California Code of Regulations, Section 1960.1. Exhaust Emission Standards and Test Procedures - 1981 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles. [As last amended March 19, 1998]

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

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

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

(d)(1) *[Standards for 1984 through 1988 model passenger cars, light-duty trucks and medium-duty vehicles; not set forth]*

(d)(2) The exhaust emissions from new 1988 model passenger cars, light-duty trucks, and medium-duty vehicles and 1988 through 1990 model passenger cars, light-duty trucks and medium-duty vehicles produced by a small volume manufacturer, subject to registration and sold and registered in this state, shall not exceed:

1988 EXHAUST EMISSIONS STANDARDS⁵
(grams per mile)

<u>Vehicle Type¹</u>	<u>Equivalent Inertia Weight (lbs.)</u>	<u>Durability Vehicle Basis (mi)</u>	<u>Non-Methane Hydrocarbons²</u>	<u>Carbon Monoxide</u>	<u>Oxides of Nitrogen³</u>
PC	All	50,000	0.39 (0.41)	7.0	0.4
PC ⁴	All	50,000	0.39 (0.41)	7.0	0.7
PC (Option 1)	All	100,000	0.39 (0.41)	7.0	1.0
PC (Option 2)	All	100,000	0.46	8.3	1.0
LDT,MDV	0-3750	50,000	0.39 (0.41)	9.0	0.4
LDT,MDV ⁴	0-3750	50,000	0.39 (0.41)	9.0	1.0
LDT,MDV (Option 1)	0-3750	100,000	0.39 (0.41)	9.0	1.0
LDT,MDV (Option 2)	0-3750	100,000	0.46	10.6	1.0
LDT,MDV	3751-5750	50,000	0.50 (0.50)	9.0	1.0
LDT,MDV (Option 1)	3751-5750	100,000	0.50 (0.50)	9.0	1.5
MDV	5751 & larger	50,000	0.60 (0.60)	9.0	1.5
MDV (Option 1)	5751 & larger	100,000	0.60 (0.60)	9.0	2.0

- (1) "PC" means passenger cars.
"LDT" means light-duty trucks.
"MDV" means medium-duty vehicles.
- (2) Hydrocarbon standards in parentheses apply to total hydrocarbons.
- (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 trucks and medium-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.
- (4) This set of standards is optional. A manufacturer may choose to certify to these optional standards pursuant to the conditions set forth in Section 1960.1.5 of Title 13, California Code of Regulations.
- (5) Diesel passenger cars, light-duty trucks, and medium-duty vehicles, except those fueled with methanol, are subject to a particulate exhaust emission standard of 0.2 g/mi for the 1988 model year. The particulate compliance shall be determined on a 50,000 mile durability vehicle basis.

(e)(1) The exhaust emissions from (A) new 1989 through 1992 model passenger cars and light-duty trucks, except those produced by a small volume manufacturer, (B) new 1991 through

1994 model passenger cars and light-duty trucks produced by a small volume manufacturer, (C) new 1989 through 1994 model medium-duty vehicles, except those produced by a small volume manufacturer, and (D) new 1991 through 1994 model medium-duty vehicles produced by a small volume manufacturer, shall not exceed:

1989 THROUGH 1994 MODEL YEAR EXHAUST EMISSIONS STANDARDS⁵
(grams per mile)

<i>Vehicle Type¹</i>	<i>Loaded Vehicle Weight (lbs.)</i>	<i>Durability</i>		<i>Carbon Monoxide</i>	<i>Oxides of Nitrogen^{3,4}</i>
		<i>Vehicle Basis (mi)</i>	<i>Non-Methane Hydrocarbon²</i>		
PC	All	50,000	0.39 (0.41)	7.0	0.4
PC ⁶	All	50,000	0.39 (0.41)	7.0	0.7
Diesel PC (Option 2)	All	100,000 ⁸	0.46	8.3	1.0
LDT,MDV	0-3750	50,000	0.39 (0.41)	9.0	0.4
LDT,MDV ⁶	0-3750	50,000	0.39 (0.41)	9.0	0.7 ⁷
Diesel LDT, MDV (Option 2)	0-3750	100,000 ⁸	0.46	10.6	1.0
LDT,MDV	3751-5750	50,000	0.50 (0.50)	9.0	1.0
LDT,MDV (Option 1)	3751-5750	100,000 ⁸	0.50 (0.50)	9.0	1.5
MDV	5751 and larger	50,000	0.60 (0.60)	9.0	1.5
MDV (Option 1)	5751 and larger	100,000 ⁸	0.60 (0.60)	9.0	2.0

- (1) "PC" means passenger cars.
"LDT" means light-duty trucks.
"MDV" means medium-duty vehicles.
- (2) Hydrocarbon standards in parentheses apply to total hydrocarbons. For 1993 through 1994 model methanol-fueled vehicles certifying to these standards, including fuel-flexible vehicles, "Non-Methane Hydrocarbons" shall mean "Organic Material Hydrocarbon Equivalent" (or "OMHCE").
- (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 trucks and medium-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.
- (4) The standard for in-use compliance for passenger cars, light-duty trucks and medium-duty vehicles certifying to the 0.4 g/mi NOx standard shall be 0.55 g/mi NOx for 50,000 miles. If the in-use compliance level is above 0.4 g/mi NOx but does not exceed 0.55 g/mi NOx, 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 vehicles 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) 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, then 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. This provision is applicable for the 1989 through 1992 model years only. For small volume manufacturers, this provision is applicable for the 1991 through 1994 model years only.

- (5) Diesel passenger cars, light-duty trucks, and medium-duty vehicles certifying to these standards are subject to a particulate exhaust emission standard of 0.08 g/mi for the 1989 and subsequent model years. The particulate compliance shall be determined on a 50,000 mile durability vehicle basis.
- (6) This set of standards is optional. A manufacturer may choose to certify to these standards pursuant to the conditions set forth in Section 1960.1.5.
- (7) Pursuant to section 1960.1.5(a)(1)(B), the optional standard for 1989 model year light-duty trucks and medium-duty vehicles only is 1.0 g/mi NO_x.
- (8) The optional 100,000 mile certification standards and provisions are not applicable to methanol vehicles.

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

**1993 AND SUBSEQUENT METHANOL-SPECIFIC
EXHAUST EMISSION STANDARDS**

<i>Vehicle Type¹</i>	<i>Loaded Vehicle Weight (lbs.)³</i>	<i>Durability Vehicle Basis (mi)</i>	<i>Formaldehyde (mg/mi)</i>	
			<i>Certification</i>	<i>In-Use Compliance²</i>
PC	All	50,000	15	23 (1993-1995) 15 (1996 and later)
LDT, MDV	0-3750	50,000	15	23 (1993-1995) 15 (1996 and later)
LDT, MDV	3751-5750	50,000	18	27 (1993-1995) 18 (1996 and later)
MDV	5751-8500	50,000	22	33 (1993-1995) 22 (1996 and later)
MDV	8501-10,000	50,000	28	36 (1995) 28 (1996 and later)
MDV	10,001-14,000	50,000	36	45 (1995) 36 (1996 and later)

- (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 defect 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 and subsequent model year medium-duty vehicles certifying to the standards specified in Section 1960.1(h)(1), "Loaded Vehicle Weight" shall mean "Test Weight," which is the average of the vehicle's curb weight and gross vehicle weight.

(e)(3) The exhaust emissions from new 1992 and subsequent model-year 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 of (g)(1) and (h)(2) with the following additions:

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

<i>Vehicle Type¹ (lbs.)²</i>	<i>Vehicle Weight</i>	<i>Durability Vehicle Basis (mi)</i>	<i>Vehicle Emission Category³</i>	<i>Formaldehyde (mg/mi)^{4,5}</i>
PC and LDT	All 0-3750	50,000	TLEV	15 (23)
			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)
			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° F, according to the procedure specified in section 11k of 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). 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) The exhaust emissions from new 1993 and 1994 model passenger cars and light-duty trucks, except those produced by a small volume manufacturer, shall not exceed:

**1993 AND 1994 MODEL-YEAR PASSENGER CAR AND LIGHT-DUTY TRUCK
EXHAUST EMISSIONS STANDARDS^{5,8,9}**
(grams per mile)

<i>Vehicle Type¹</i>	<i>Loaded Vehicle Weight (lbs)</i>	<i>Durability Vehicle Basis (mi)</i>	<i>Non-Methane Hydrocarbons^{2,7}</i>	<i>Carbon Monoxide⁷</i>	<i>Oxides of Nitrogen^{1,3,4}</i>
PC	All	50,000	0.39 (0.25)	7.0 (3.4)	0.4
PC ⁶	All	50,000	0.39 (0.25)	7.0 (3.4)	0.7
PC	All	100,000	(0.31)	(4.2)	n/a
Diesel PC (Option 2)	All	100,000	0.46 (0.31)	8.3 (4.2)	1.0
LDT	0-3750	50,000	0.39 (0.25)	9.0 (3.4)	0.4
LDT ⁶	0-3750	50,000	0.39 (0.25)	9.0 (3.4)	0.7
LDT	0-3750	100,000	(0.31)	(4.2)	n/a
Diesel LDT (Option 2)	0-3750	100,000	0.46 (0.31)	10.6 (4.2)	1.0
LDT	3751-5750	50,000	0.50 (0.32)	9.0 (4.4)	1.0
LDT	3751-5750	100,000	(0.40)	(5.5)	n/a
Diesel LDT (Option 1)	3751-5750	100,000	0.50 (0.40)	9.0 (5.5)	1.5

- (1) "PC" means passenger cars.
"LDT" means light-duty trucks.
"n/a" means not applicable.
- (2) For methanol-fueled vehicles certifying to these standards, including fuel-flexible vehicles when certifying on methanol, "Non-Methane Hydrocarbons" shall mean "Organic Material Hydrocarbon Equivalent" (or "OMHCE"). For methanol- or ethanol-fueled vehicles certifying to the phase-in standards in parenthesis, 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 and medium-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.
- (4) The standard for in-use compliance for passenger cars and light-duty trucks certifying to the 0.4 g/mi NOx standard shall be 0.55 g/mi NOx for 50,000 miles. If the in-use compliance level is above 0.4 g/mi NOx but does not exceed 0.55 g/mi NOx, 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 vehicles 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, then 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. This provision is applicable for the 1993 model year only.

- (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) This set of standards is optional. A manufacturer may choose to certify to these standards pursuant to the conditions set forth in section 1960.1.5.
 - (7) The emission standards in parenthesis are phase-in standards. For the 1993 model year, each manufacturer must certify a minimum of 40% of their vehicles to the phase-in standards or to the more stringent standards in section 1960.1(g)(1). The percentage shall be applied to the manufacturer's total projected sales of California-certified passenger cars and light-duty trucks for the 1993 model year. For 1994 and subsequent model years, each manufacturer shall comply with the fleet average requirements in section 1960.1(g)(2).
 - (8) The following conditions shall apply to the in-use compliance standards of 1993 and 1994 model-year passenger cars and light-duty trucks only.
 - a. The in-use compliance standards for those passenger cars and light-duty trucks certifying to the 0.25 g/mi non-methane hydrocarbon and 3.4 g/mi carbon monoxide standards shall be 0.32 g/mi non-methane hydrocarbon and 5.2 g/mi carbon monoxide for 50,000 miles.
 - b. The in-use compliance standards for those light-duty trucks certifying to the 0.32 g/mi non-methane hydrocarbon and 4.4 g/mi carbon monoxide 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.
 - (9) All passenger cars and light-duty trucks, except those diesel vehicles certifying to optional 100,000 mile 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 basis.
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(f)(2) The exhaust emissions from new 1995 and subsequent model passenger cars and light-duty trucks shall not exceed:

**1995 AND SUBSEQUENT MODEL-YEAR PASSENGER CAR AND
LIGHT-DUTY TRUCK EXHAUST EMISSIONS STANDARDS^{5,6,8,10}**
(grams per mile)

<i>Vehicle Type¹</i>	<i>Loaded Vehicle Weight (lbs)</i>	<i>Durability Vehicle Basis (mi)</i>	<i>Non-Methane Hydrocarbons^{2,7}</i>	<i>Carbon Monoxide⁷</i>	<i>Oxides of Nitrogen^{1,3}</i>
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 cars.
"LDT" means light-duty trucks.
- (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).
-

(g)(1) The exhaust emissions from new 1992 and subsequent model-year light-duty transitional low-emission vehicles, low-emission vehicles and ultra-low-emission vehicles, and new 2003 and subsequent model-year light-duty zero-emission vehicles in the passenger car and light-duty truck classes shall not exceed:

**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")]

<i>Vehicle Type¹</i>	<i>Loaded Vehicle Weight (lbs)</i>	<i>Durability Vehicle Basis(mi)</i>	<i>Vehicle Emission Category²</i>	<i>Non-Methane Organic Gases^{3,4}</i>	<i>Carbon Monoxide</i>	<i>Oxides of Nitrogen⁵</i>
PC and LDT	All 0-3750	50,000	TLEV	0.125	3.4	0.4
			LEV	0.075	3.4	0.2
			ULEV	0.040	1.7	0.2
			ZEV ^{2.1}	--	--	--
		100,000	TLEV	0.156	4.2	0.6
			LEV	0.090	4.2	0.3
			ULEV	0.055	2.1	0.3
			ZEV ^{2.1}	--	--	--
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
			ZEV ^{2.1}	--	--	--
		100,000	TLEV	0.200	5.5	0.9
			LEV	0.130	5.5	0.5
			ULEV	0.070	2.8	0.5
			ZEV ^{2.1}	--	--	--

- (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.
 "ZEV" means zero-emission vehicle.
- (2.1) a. The Executive Officer shall certify as ZEVs vehicles that 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 the fuel fired heater cannot be operated at ambient temperatures above 40°F and the heater is demonstrated to have zero evaporative emissions under any and all possible operational modes and conditions.

b. Prior to the 2003 model year a manufacturer that voluntarily produces vehicles that meet the ZEV emission standards applicable to 2003 and subsequent model year vehicles may certify those vehicles as ZEVs for the purposes of calculating fleet average NMOG exhaust emission values under section (g)(2), note (4) or (5); NMOG credits under section (g)(2), note (7); and ZEV credits under section (g)(2), note (9)a.

(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 June 24, 1996, 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 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or established by the Executive Officer pursuant to Appendix VIII 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 of the above-referenced test procedures. 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:

<i>Vehicle Type</i>	<i>Loaded Vehicle Weight (LVW)</i>	<i>Emission Category</i>	<i>Durability Vehicle Basis (g/mi) 50,000 mi</i>
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°F Requirement.* Manufacturers shall demonstrate compliance with the above standards for NMOG, CO, and NOx at 50°F, according to the procedure specified in section 11k of 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). Hybrid electric, natural gas and diesel-fueled vehicles shall be exempt from 50°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).

(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 shall not exceed:

**FLEET AVERAGE NON-METHANE ORGANIC GAS
EXHAUST EMISSION REQUIREMENTS
FOR LIGHT-DUTY VEHICLE WEIGHT CLASSES^{7,8,9}**
[grams per mile (or "g/mi")]

<i>Vehicle Type¹</i>	<i>Loaded Vehicle Weight (lbs)</i>	<i>Durability Vehicle Basis⁷ (mi)</i>	<i>Model Year</i>	<i>Fleet Average Non-Methane Organic Gases^{2,3,4,5,6}</i>
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
			2001	0.070
			2002	0.068
			2003 & subsequent	0.062
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
			2001	0.098
			2002	0.095
			2003 & subsequent	0.093

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

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

"*Type C HEV*" shall mean an HEV which achieves a range of 0 - 39 miles over the All-Electric Range Test and all other HEVs excluding "Type A" and "Type B" HEVs as defined in "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).

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:

$$\begin{aligned} & \{[(\text{No. of Vehicles Certified to the Exhaust Emission Standards in section 1960.1 (e)(1) and Produced}) \times (0.39)] + \\ & [(\text{No. of Vehicles Certified to the Phase-In Exhaust Emission Standards in section 1960.1 (f)(1) and Produced}) \times (0.25)] + \\ & [(\text{No. of Vehicles Certified to the Phase-Out Exhaust Emission Standards in section 1960.1 (f)(1) and Produced}) \times (0.39)] + \\ & [(\text{No. of Vehicles Certified to the Exhaust Emission Standards in section 1960.1(f)(2) and Produced}) \times (0.25)] + \\ & [(\text{No. of TLEVs excluding HEVs and Produced}) \times (0.125)] + \\ & [(\text{No. of LEVs excluding HEVs and Produced}) \times (0.075)] + \\ & [(\text{No. of ULEVs excluding HEVs and Produced}) \times (0.040)] + \\ & (\text{HEV contribution factor}) \} \div \end{aligned}$$

(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 =

$$\begin{aligned} & \{[\text{No. of "Type A HEV" TLEVs Produced}] \times (0.100) + \\ & [\text{No. of "Type B HEV" TLEVs Produced}] \times (0.113) + \end{aligned}$$

$$\begin{aligned}
& [\text{No. of "Type C HEV" TLEVs Produced}] \times (0.125) \} + \\
& \{ [\text{No. of "Type A HEV" LEVs Produced}] \times (0.057) + \\
& [\text{No. of "Type B HEV" LEVs Produced}] \times (0.066) + \\
& [\text{No. of "Type C HEV" LEVs Produced}] \times (0.075) \} + \\
& \{ [\text{No. of "Type A HEV" ULEVs Produced}] \times (0.020) + \\
& [\text{No. of "Type B HEV" ULEVs Produced}] \times (0.030) + \\
& [\text{No. of "Type C HEV" ULEVs Produced}] \times (0.040) \}
\end{aligned}$$

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:

$$[\text{No. of Vehicles Certified to federal Tier I exhaust emission standards and Produced}] \times (0.25)]$$

- (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:

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

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 =

$$\begin{aligned}
& \{ [(\text{No. of "Type A HEV" TLEVs Produced}) \times (0.130) + \\
& [(\text{No. of "Type B HEV" TLEVs Produced}) \times (0.145) + \\
& [(\text{No. of "Type C HEV" TLEVs Produced}) \times (0.160)] \} + \\
& \{ [(\text{No. of "Type A HEV" LEVs Produced}) \times (0.075) +
\end{aligned}$$

$$\begin{aligned}
& [\text{No. of "Type B HEV" LEVs Produced}] \times (0.087) + \\
& [\text{No. of "Type C HEV" LEVs Produced}] \times (0.100) \} + \\
& \{ [\text{No. of "Type A HEV" ULEVs Produced}] \times (0.025) + \\
& [\text{No. of "Type B HEV" ULEVs Produced}] \times (0.037) + \\
& [\text{No. of "Type C HEV" ULEVs Produced}] \times (0.050) \}
\end{aligned}$$

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:

$$\begin{aligned}
& [(\text{No. of Vehicles Certified to federal Tier I exhaust emission standards and Produced} \\
& \text{and Delivered for Sale in California}) \times (0.32)]
\end{aligned}$$

(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 2000 and subsequent model years, 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 2000 and subsequent model years, 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 and subsequent 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:

$$\{[(\text{Fleet Average NMOG Requirement}) - (\text{Manufacturer's Fleet Average NMOG Value})] \times (\text{Total No. of Vehicles Produced and Delivered for Sale in California, Including ZEVs and HEVs})\}.$$

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 and subsequent 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 §43211 civil penalty applicable to a manufacturer which sells a new motor vehicle that does not meet the applicable emission standards adopted by the state board. The cause of action shall be deemed to accrue when the emission debits are not equalized by the end of the specified time period. For the purposes of Health and Safety Code §43211, the number of 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).

(9) *ZEV Requirements.* While meeting the fleet average requirements, each manufacturer shall certify, produce, and deliver for sale in California at least 10% ZEVs in 2003 and subsequent model years.

These percentages shall be applied to the manufacturer's total production of PCs and LDTs 0-3750 lbs. LVW delivered for sale in California.

a. *Calculation of ZEV Credits.* Manufacturers that produce for sale in California more ZEVs than required in a given model year shall earn ZEV credits, which shall be expressed in units of g/mi NMOG. The amount of ZEV credits earned shall be equal to the number of ZEVs required to be produced and delivered for sale in California for the model year subtracted from the number of ZEVs produced and delivered for sale in California by the manufacturer for the model year and then multiplied by the fleet average NMOG requirement for PCs and LDTs 0-3750 lbs. LVW for the model year.

In calculating the number of ZEV credits under this note (9)a, each ZEV produced and delivered for sale prior to the 2003 model year may be counted as follows:

1. ZEV Credits based on vehicle range:

Number of ZEVs	Vehicle Range (miles)		
	Model Years 1996 and 1997	Model Years 1998 and 1999	Model Years 2000, 2001 and 2002
2	any	≥ 100	≥ 140
3	≥70	≥ 130	≥ 175

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

2. ZEV Credits based on the specific energy of the battery:

Number of ZEVs	Specific Energy of Battery (w-hr/kg)		
	Model Years 1996, 1997 and 1998	Model Years 1999 and 2000	Model Years 2001 and 2002
2	any	≥ 50	≥ 60
3	≥40	≥ 60	≥ 90

For model years 1999 through 2002, additional ZEV credits will be determined by linear interpolation between the values shown in the above schedule. Battery specific energy shall be determined in accordance with section 9.g. of the “California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles,” incorporated by reference in section 1960.1(k).

3. For purposes of calculating ZEV credits, a ZEV may be counted according to note (9)a.1. or (9)a.2. above, but not both.

4. For purposes of calculating manufacturer's fleet average NMOG value under note (4) or (5), each ZEV shall be counted as one vehicle.

All ZEV credits earned prior to the 2003 model year shall be treated as if earned in the 2003 model year and shall be discounted in accordance with note (7)c.

b. *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 ZEV credits. These credits may be earned previously by the manufacturer or acquired from another manufacturer. The amount of ZEV credits required to be submitted shall be calculated by subtracting the number of ZEVs produced and delivered for sale in California by the manufacturer for the model year from the number of ZEVs required to be produced by the manufacturer for the model year and then multiplying by the fleet average requirement for PCs and LDTs 0-3750 lbs. LVW for that model year.

c. *Requirement to Make Up a ZEV Deficit.* Manufacturers that certify, produce, and deliver 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 ZEV credits. The amount of ZEV credits required to be submitted shall be calculated by subtracting the number of ZEVs produced and delivered for sale in California by the manufacturer for the model year from the number of ZEVs required to be produced by the manufacturer for the model year and then multiplying by the fleet average requirements for PCs and LDTs 0-3750 lbs. LVW for the model year in which the deficit is incurred.

d. *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 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:

(No. of ZEVs required to be produced and delivered for sale in California for the model year) - (No of ZEVs actually 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 LDTs 0-3750 lbs. LVW for the model year)].

e. *ZEV Credits for MDVs and LDTs 3751-5750 lbs. LVW.* ZEVs classified as MDVs or as LDTs 3751-5750 lbs. LVW may be counted toward the ZEV requirement for PCs and LDTs 0-3750 lbs. LVW and included in the calculation of ZEV credits as specified in note (9)a, if the manufacturer so designates.

f. Small volume manufacturers as defined in note (6) shall not be required to meet the percentage ZEV requirements. However, small volume manufacturers may earn and market credits for ZEVs they produce and deliver for sale in California.

(h)(1) The exhaust emissions from new 1995 and subsequent model medium-duty vehicles shall not exceed:

**1995 AND SUBSEQUENT MODEL-YEAR MEDIUM-DUTY VEHICLE EXHAUST
EMISSIONS STANDARDS**^{1,2,3,7,8}
(grams per mile)

<i>Test Weight(lbs.)</i>	<i>Durability Vehicle Basis(mi)</i>	<i>Non-Methane Hydrocarbons⁴</i>	<i>Carbon Monoxide</i>	<i>Oxides of Nitrogen⁵</i>	<i>Particulates⁶</i>
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

- (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 8501-14,000 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 fuel-flexible 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 model years, 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 manufacturer's 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) The exhaust emissions from new 1992 and subsequent model-year medium-duty low-emission vehicles, ultra-low-emission vehicles, and super ultra-low-emission vehicles, and new 2003 and subsequent model-year medium-duty zero-emission vehicles shall not exceed:

**EXHAUST EMISSION STANDARDS FOR
LOW-EMISSION VEHICLES, ULTRA-LOW EMISSION VEHICLES,
SUPER-ULTRA-LOW-EMISSION VEHICLES AND ZERO-EMISSION VEHICLES
IN THE MEDIUM-DUTY VEHICLE WEIGHT CLASS^{8,9,10,11,12,13,14,15,16}**
[grams per mile (or "g/mi")]

<i>Test Weight (lbs)¹</i>	<i>Durability Vehicle Basis (mi)</i>	<i>Vehicle Emission Category²</i>	<i>Non-Methane Organic Gases^{1,3,4}</i>	<i>Carbon Monoxide</i>	<i>Oxides of Nitrogen^{3,5}</i>	<i>Particulates^{6,7}</i>
0-3750	50,000	LEV	0.125	3.4	0.4	n/a
		ULEV	0.075	1.7	0.2	n/a
		ZEV ^{2,1}	--	--	--	--
	120,000	LEV	0.180	5.0	0.6	0.08
		ULEV	0.107	2.5	0.3	0.04
		ZEV ^{2,1}	--	--	--	--
3751-5750	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
		ZEV ^{2,1}	--	--	--	--
	120,000	LEV	0.230	6.4	0.6	0.10
		ULEV	0.143	6.4	0.6	0.05
5751-8500	50,000	SULEV	0.072	3.2	0.3	0.05
		ZEV ^{2,1}	--	--	--	--
		LEV	0.195	5.0	0.6	n/a
		ULEV	0.117	5.0	0.6	n/a
	120,000	SULEV	0.059	2.5	0.3	n/a
		ZEV ^{2,1}	--	--	--	--
8501- 10,000	50,000	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
		ZEV ^{2,1}	--	--	--	--
	120,000	LEV	0.230	5.5	0.7	n/a
		ULEV	0.138	5.5	0.7	n/a
10,001- 14,000	50,000	SULEV	0.069	2.8	0.35	n/a
		ZEV ^{2,1}	--	--	--	--
		LEV	0.330	8.1	1.0	0.12
		ULEV	0.197	8.1	1.0	0.06
	120,000	SULEV	0.100	4.1	0.5	0.06
		ZEV ^{2,1}	--	--	--	--
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
		ZEV ^{2,1}	--	--	--	--
	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.
"Non-Methane Organic Gases" (or "NMOG") means the total mass of oxygenated and non-oxygenated hydrocarbon emissions.
- (2) "LEV" means low-emission vehicle.
"ULEV" means ultra-low-emission vehicle.
"SULEV" means super-ultra-low-emission vehicle.
"ZEV" means zero-emission vehicle.
- (2.1) a. The Executive Officer shall certify as ZEVs vehicles that 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 the fuel fired heater cannot be operated at ambient temperatures above 40°F and the heater is demonstrated to have zero evaporative emissions under any and all possible operational modes and conditions.
b. Prior to the 2003 model year a manufacturer that voluntarily produces vehicles that meet the ZEV emission standards applicable to 2003 and subsequent model year vehicles may certify those vehicles as ZEVs for the purposes of calculating ZEV credits under section (g)(2), note (9)a. and (9)e.
- (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 June 24, 1996, which is incorporated herein by reference.
a. *Reactivity Adjustment.* For LEVs and ULEVs certified to operate on any 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 exhaust NMOG certification levels by the applicable reactivity adjustment factor set forth in Section 13 of 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), or established by the Executive Officer pursuant to Appendix VIII 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 of the above-referenced test procedures. 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:

<i>Test Weight (lbs.)</i>	<i>Vehicle Emission Category</i>	<i>50,000 (g/mi)</i>	<i>120,000 (g/mi)</i>
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:

<i>Intermediate In-Use Compliance Standards*</i> (in grams per mile)										
<i>Emission Category</i>	<i>Model Year</i>	<i>Durability Vehicle Basis (mi)</i>	<i>3751-5750 lbs.</i>		<i>5751 - 8500 lbs.</i>		<i>8501-10,000 lbs.</i>		<i>10,001-14,000 lbs.</i>	
			<i>NMOG</i>	<i>NOx</i>	<i>NMOG</i>	<i>NOx</i>	<i>NMOG</i>	<i>NOx</i>	<i>NMOG</i>	<i>NOx</i>
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:

<i>Fuel-Flexible and Dual-Fuel MDVs Intermediate In-Use Compliance Standards</i>		
<i>Test Weight (lbs.)</i>	<i>Vehicle Emission Category</i>	<i>50,000 (g/mi)</i>
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 MDVs from 0-14,000 lbs. TW certified and 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:

<i>Model Year</i>	<i>Vehicles Certified to Title 13 CCR Section 1960.1(h)(1) or (h)(2) (%)</i>			<i>Vehicles Certified to Title 13 CCR Section 1956.8(g) or (h) (%)</i>		
	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
2001	0	80	20	100	0	0
2002	0	70	30	0	100	0
2003	0	60	40	0	100	0
2004 +	0	60	40	0	0	100

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

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

"Type C HEV" shall mean an HEV which achieves a range of 0 - 39 miles over the All-Electric Range Test and all other HEVs excluding "Type A" and "Type B" HEVs as defined in "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).

a. For the purpose of calculating VECs, electric vehicles which utilize fuel fired heaters and which are not otherwise certified as ZEVs shall be treated as "Type A HEV ULEVs."

- (12) *Calculation of Vehicle Equivalent Credits.* In 1992 and subsequent 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:

$$\begin{aligned} & \{[(\text{No. of LEVs Produced excluding HEVs}) + (\text{No. of "Type C HEV" LEVs Produced})] + \\ & [(\text{No. of "Type A HEV" LEVs Produced}) \times (1.2)] + \\ & [(\text{No. of "Type B HEV" LEVs Produced}) \times (1.1)] - \\ & (\text{Equivalent No. of LEVs Required to be Produced})\} + \\ & \{(1.4) \times [(\text{No. of ULEVs Produced excluding HEVs}) + (\text{No. of "Type C HEV" ULEVs Produced})] + \\ & [(1.7) \times (\text{No. of "Type A HEV" ULEVs Produced})] + \\ & [(1.5) \times (\text{No. of "Type B HEV" ULEVs Produced})] - \\ & [(1.4) \times (\text{Equivalent No. of ULEVs Required to be Produced})]\} + \\ & \{(1.7) \times [(\text{No. of SULEVs Produced excluding HEVs}) + (\text{No. of "Type C HEV" SULEVs Produced})] + \\ & [(\text{No. of "Type A HEV" SULEVs Produced}) \times (1.7)] + \\ & [(\text{No. of "Type B HEV" SULEVs}) \times (1.5)] - \\ & [(1.7) \times (\text{Equivalent No. of SULEVs Required to be Produced})]\} + \\ & [(2.0) \times (\text{No. of ZEVs Certified and Produced as MDVs})]. \end{aligned}$$

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 depleted 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 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k). Hybrid electric, natural gas and diesel-fueled vehicles are 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 1960.1(h)(2), Title 13, CCR, 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. In 2001 and subsequent model years, small volume manufacturers shall comply with the requirements set forth below.
- 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. In 2001 and subsequent model years, small volume manufacturers shall certify, produce, and deliver for sale in California LEVs in a quantity equivalent to 100% of their MDV fleet.
- c. 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.
- d. 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.
- (i) *[Not applicable after December 31, 1990]*

(j) For Option 1 the hydrocarbon and carbon monoxide compliance shall be determined on a 50,000-mile durability vehicle basis. For Option 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 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," adopted by the state board on May 20, 1987, as last amended March 19, 1998, both of which are incorporated herein by reference.

(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 this section and section 1960.1.5, "small volume manufacturer" 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) For purposes of this section, an "intermediate volume manufacturer" is any vehicle manufacturer with California sales between 3,001 and 35,000 new light- and medium-duty vehicles per model year based on the average number of vehicles sold by the manufacturer each year from 1989 to 1993; however, for manufacturers certifying for the first time in California, model year sales shall be based on projected California sales.

(p) The cold temperature exhaust carbon monoxide emission levels from new 1996 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)

<i>Vehicle Type</i>	<i>Loaded Vehicle Weight (lbs.)</i>	<i>Durability Vehicle Basis (mi)</i>	<i>Carbon Monoxide</i>
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°F (-7°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}

<i>Vehicle Type¹</i>	<i>Loaded Vehicle Weight (lbs.)</i>	<i>Durability Vehicle Basis (mi)</i>	<i>Fuel Type</i>	<i>NMHC² + NOx¹ Composite³</i>	<i>A/C¹ Test</i>	<i>CO¹</i>	
						<i>US06¹ Test</i>	<i>Composite Option³</i>
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+NO_x 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+NO_x 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+NO_x 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.

<i>Model Year</i>	<i>Percentage of PC and LDT Fleet</i>
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 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k). The SFTP exhaust emission levels from new 2001 and subsequent model low-emission vehicles and 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:

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}

<i>Vehicle Type¹</i>	<i>Loaded Vehicle Weight (lbs.)²</i>	<i>US06 Test¹</i>		<i>A/C Test^{1,5}</i>	
		<i>NMHC⁴ + NOx¹</i>	<i>CO¹</i>	<i>NMHC⁴ + NOx¹</i>	<i>CO¹</i>
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.*
“PC” means passenger car.
“LDT” means light-duty truck.
“MDV” means medium-duty truck.
“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+NO_x 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+NO_x 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+NO_x 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.

<i>Model Year</i>	<i>Percentage</i>	
	<i>PC, LDT</i>	<i>MDV</i>
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: $(25\% * 4 \text{ years}) + (50\% * 3 \text{ years}) + (85\% * 2 \text{ years}) + (100\% * 1 \text{ year}) = 520$). 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: $(10\% * 5 \text{ years})$ 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.

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.

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

(a)(1) The exhaust emissions (A) from new 1985 and subsequent model heavy-duty diesel engines (except methanol-fueled engines) and heavy-duty natural-gas-fueled and liquefied-petroleum-gas-fueled engines derived from diesel-cycle engines, (B) from new 1991 and subsequent model heavy-duty methanol-fueled diesel transit bus engines, and (C) from all new 1993 and subsequent model heavy-duty methanol-fueled, diesel engines, except in all cases engines used in medium-duty vehicles, shall not exceed:

EXHAUST EMISSION STANDARDS
(grams per brake horsepower-hour)

<u>Model Year</u>	<u>Total Hydrocarbons or OMHCE^A</u>	<u>Optional Non-methane Hydrocarbons^A</u>	<u>Carbon Monoxide</u>	<u>Oxides of Nitrogen</u>	<u>Particulates</u>
1985-1986	1.3		15.5	5.1	---
1987 ^B	1.3		15.5	5.1	---
1988-1989	1.3		15.5	6.0	0.60
1990	1.3	1.2	15.5	6.0	0.60
1991-1993 ^C	1.3	1.2	15.5	5.0	0.10
1991-1993 ^D	1.3	1.2	15.5	5.0	0.25 ^E
1994 -1997	1.3	1.2	15.5	5.0	0.10 ^E
1994-1995 ^F	1.3	1.2	15.5	5.0	0.07
1994-1995 ^G	1.3	1.2	15.5	3.5 to 0.5	0.07
1995-1997 ^J	1.3	1.2	15.5	3.5 to 0.5	0.10
1996 ^F subsequent	1.3	1.2	15.5	4.0 ^I	0.05 ^H

1996 and ^G subsequent	1.3	1.2	15.5	2.5 to 0.5	0.05 ^H
1998 and ^K subsequent	1.3	1.2	15.5	4.0	0.10
1998 and ^J subsequent	1.3	1.2	15.5	2.5 to 0.5	0.10

^A The total or optional non-methane hydrocarbon standards apply to petroleum-fueled, natural-gas-fueled and liquefied-petroleum-gas-fueled engines. The Organic Material Hydrocarbon Equivalent, or OMHCE, standards apply to methanol-fueled engines.

^B As an option a manufacturer may elect to certify to the 1988 model-year emission standards one year early, for the 1987 model year.

^C These standards apply to urban bus engines only.

^D For engines other than urban bus engines. For methanol-fueled engines, these standards shall be applicable beginning with the 1993 model year.

^E Emissions averaging may be used to meet this standard. Averaging is restricted to within each useful life subclass and is applicable only through the 1995 model year. Emissions from engines used in urban buses shall not be included in the averaging program. However, emissions from methanol-fueled, natural-gas-fueled and liquefied-petroleum-gas-fueled urban bus engines certified to a 0.10 grams per brake horsepower-hour standard for particulates for the 1991-1993 model years, and certified to a 0.07 grams per brake horsepower-hour standard for particulates for the 1994-1995 model years, may be included in the averaging program for petroleum-fueled engines other than urban bus engines.

^F These mandatory standards apply to urban bus engines only.

^G These optional standards apply to urban bus engines only. A manufacturer may elect to certify to an optional NOx standard by 0.5 grams per brake horsepower-hour increments.

^H For in-use testing, a 0.07 gram per brake horsepower-hour standard for particulates shall apply.

^I A manufacturer may apply to the Executive Officer for an exemption from the 4.0 gram per brake horsepower-hour standard for oxides of nitrogen for 1996 and 1997 model year urban bus engines for which the manufacturer can demonstrate a technological need for the exemption. The exemption or exemptions shall not exceed 10 percent of the average of the manufacturer's total urban bus engine sales in California for the three model years prior to the model year for which an exemption is requested. The manufacturer shall submit technical justification for each engine model and shall provide the number of urban bus engine sales in California for the engine model for which the exemption is requested (if any) and for all urban bus engine models for the three preceding model years, to the Executive Officer when the manufacturer applies for the exemption.

^J These are optional standards and apply to all heavy-duty engines excluding urban bus engines. A manufacturer may elect to certify to an optional NOx standard between the values, inclusive, by 0.5 grams per brake horsepower-hour increments.

^K These mandatory standards apply to all heavy-duty engines except urban bus engines.

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

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

(b) The test procedures for determining compliance with standards applicable to 1985 and subsequent heavy-duty diesel engines and vehicles are set forth in the "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles", adopted April 8, 1985, as last amended June 4, 1997, which is incorporated herein by reference.

(c)(1) The exhaust emissions from (A) new 1987 through 2003 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 (B) from new 1993 through 2003 model heavy-duty methanol-fueled Otto-cycle engines (except in all cases engines used in medium-duty vehicles) shall not exceed:

EXHAUST EMISSION STANDARDS
(grams per brake horsepower-hour)

<i>Model Year</i>	<i>Total Hydrocarbons or OMHCE^A</i>	<i>Optional Non-Methane Hydrocarbons^A</i>	<i>Carbon Monoxide^B</i>	<i>Oxides of Nitrogen</i>
1987 ^C	1.1 ^D 1.9 ^E		14.4 ^D 37.1 ^E	10.6 10.6
1988-1989	1.1 ^D 1.9 ^E		14.4 ^D 37.1 ^E	6.0 6.0
1990	1.1 ^D 1.9 ^E	0.9 ^D 1.7 ^E	14.4 ^D 37.1 ^E	6.0 6.0

1991-1994	1.1 ^D 1.9 ^E	0.9 ^D 1.7 ^E	14.4 ^D 37.1 ^E	5.0 5.0
1995 - 1997	1.9 ^E	1.7 ^E	37.1 ^E	5.0
1995-1997	1.9 ^E	1.7 ^E	37.1 ^E	2.5-0.5 ^F
1998 - 2003	1.9 ^E	1.7 ^E	37.1 ^E	4.0
1998 -2003	1.9 ^E	1.7 ^E	37.1 ^E	1.5-0.5 ^F

- A The total or optional non-methane hydrocarbon standards apply to petroleum-fueled, natural-gas-fueled and liquefied-petroleum-gas-fueled engines. The Organic Material Hydrocarbon Equivalent, or OMHCE, standards apply to methanol-fueled engines.
- B Carbon Monoxide emissions from engines utilizing exhaust aftertreatment 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 1988-1994 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 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.

(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

(3) The exhaust emissions from new 2004 and subsequent model heavy-duty Otto-cycle engines shall not exceed^A:

(a) Non-Methane Hydrocarbons plus Oxides of Nitrogen: 2.5 grams per brake horsepower-hour with non-methane hydrocarbons not to exceed 0.5 grams per brake horsepower-hour; or 2.4 grams per brake horsepower-hour;

(b) Carbon Monoxide: 37.1 grams per brake horsepower-hour.

A. [The U.S. EPA is considering the adoption of amendments to the federal emission standards for heavy-duty Otto-cycle engines as they existed June 24, 1996. If the U.S. EPA promulgates amendments to the emission standards for this category, the ARB will hold a noticed public hearing within one year of such promulgation to consider the adoption of similar or identical standards in California.]

(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 and Subsequent Model Heavy-Duty Otto-Cycle Engines and Vehicles," adopted April 25, 1986, as last amended June 24, 1996, which is incorporated by reference herein.

(e) A manufacturer may elect to certify heavy-duty vehicles of 10,000 pounds or less maximum gross vehicle weight rating as medium-duty vehicles under section 1960.1 of this chapter, in which event the heavy-duty emission standards and test procedures in this section shall not apply.

(f)(1) In 1985 and future years, the executive officer may authorize 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, including otto-cycle and diesel heavy-duty vehicles, in any one 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.

(2) In order to qualify for an exemption, the vehicle manufacturer shall submit, in writing, to the executive officer the justification for such exemption. The exemption request shall show that, due to circumstances beyond the control of the vehicle manufacturer, California certified engines are unavailable for use in the vehicle. The request shall further show that redesign or discontinuation of the vehicle will result in extreme cost penalties and disruption of business. In evaluating a request for an exemption, the executive officer shall consider all relevant factors, including the number of individual vehicles covered by the request and the anti-competitive effect, if any, of granting the request. If a request is denied, the executive officer shall state in writing the reasons for the denial.

(3) In the event the executive officer determines that an applicant may meet the criteria for an exemption under this subsection, but that granting the exemption will, together with previous

exemptions granted, result in over 100 vehicles being permitted under this subsection to use non-California engines in heavy-duty vehicles in any one calendar year, the exemption may be granted only by the state board, under the criteria set forth herein.

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

Exhaust Emission Standards^A

(grams per brake horsepower-hour)

<u>Model Year</u>	<u>Carbon Monoxide</u>	<u>Non-methane Hydrocarbon and Oxides of Nitrogen^B</u>	<u>Particulates^C</u>
1995 ^D and Subsequent	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.

(h) The exhaust emissions from new 1992 and subsequent model-year engines used in incomplete 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 shall not exceed:

Exhaust Emission Standards for Engines Used in Incomplete 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)

<i>Model Year</i>	<i>Vehicle Emissions Category^B</i>	<i>Carbon Monoxide</i>	<i>Non-Methane Hydrocarbons and Oxides of Nitrogen^C</i>	<i>Formaldehyde</i>	<i>Particulates^D</i>
1992 ^E - 2001	LEV	14.4	3.5	0.050	0.10
2002-2003 ^E	LEV	14.4	3.0	0.050	0.10
1992-2003 ^{E,H}	ULEV	14.4	2.5	0.050	0.10
2004 and subsequent	ULEV - Opt. A.	14.4	2.5 ^{G,I}	0.050	0.10
2004 and subsequent	ULEV - Opt. B	14.4	2.4 ^{G,I}	0.050	0.10
1992 and subsequent	SULEV	7.2	2.0	0.025	0.05

^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, 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 This standard shall only apply 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 [The U.S. EPA is considering the adoption of amendments to the federal emission standards for engines used in incomplete medium-duty vehicles or diesel engines used in medium-duty vehicles as they existed June 24, 1996. If the U.S. EPA promulgates amendments to the emission standards for this category, the ARB will hold a noticed public hearing within one year of such promulgation to consider the adoption of similar or identical standards in California.]
- 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.
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NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43103, 43104, and 43806, Health and Safety Code, and Vehicle Code section 28114. Reference: Sections 39002, 39003, 43000, 43013, 43018, 43100, 43101, 43101.5, 43102, 43103, 43104, 43106, 43204, and 43806, Health and Safety Code.

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

In addition to all other requirements, emission control labels required by California certification procedures and smog index labels shall conform to the "California Motor Vehicle Emission Control and Smog Index Label Specifications," adopted March 1, 1978, as last amended June 24, 1996 (as corrected September 20, 1996), 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.

Section 2061. Assembly-Line Test Procedures - 1983 Through 1997 Model Years.

New 1983 through 1997 model-year passenger cars, light-duty trucks, and medium-duty vehicles, excluding 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, subject to certification and manufactured for sale in California shall be tested in accordance with the "California Assembly-Line Test Procedures for 1983 Through 1997 Model-Year Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles," adopted November 24, 1981, as last amended June 24, 1996, which is incorporated herein by reference, including 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. For vehicles certified to NMOG standards, any reference to NMHC standards in California Assembly-Line Test Procedures for 1983 Through 1997 Model-Year Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles" shall imply NMOG standards.

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, 43103, 43104, 43105, 43106, 43204, 43210, 43211, and 43212, Health and Safety Code.

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

New 1998 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 1998 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles," adopted June 24, 1996, and last amended March 19, 1998, 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, 43103, 43104, 43105, 43106, 43204, 43210, 43211, and 43212, Health and Safety Code.

§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 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 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 March 19, 1998. 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, or any subgroup within an engine family, 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.