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**BARCLAYS OFFICIAL CALIFORNIA CODE OF REGULATIONS**  
**TITLE 13. MOTOR VEHICLES**  
**DIVISION 3. AIR RESOURCES BOARD**  
**CHAPTER 1. MOTOR VEHICLE POLLUTION CONTROL DEVICES**  
**ARTICLE 1. GENERAL PROVISIONS**

This database is current through 12/26/08, Register 2008, No. 52

§ 1960.1. Exhaust Emissions Standards and Test Pro-

cedures -1981 through 2006 Model Passenger Cars, Light-Duty and Medium-Duty Vehicles.

(a) The exhaust emissions from new 1981 model passenger cars, light-duty trucks, and medium-duty vehicles, subject to registration and sold and registered in this state, shall not exceed [FN1]:

1981 EXHAUST EMISSION STANDARDS (grams per mile)

Inertia Vehicle Type [FN2]	Equivalent Durability		Non-Methane Hydrocarbons [FN4]	Vehicle Carbon Monoxide	Oxides of Nitrogen [FN5]		
	Weight (lbs.) [FN3]	Basis (mi.)					
PC	All		50,000		(0.41)	3.4	1.0
PC [FN6]	All	50,000	0.39		(0.41)	7.0	0.7
PC (Option 1)	All	100,000		0.39	[FN7]	3.4	1.5
PC (Option 2)	All	100,000		0.46	[FN7]	4.0	1.5
LDT, MDV	0-3999	50,000	0.39		(0.41)	9.0	1.0
LDT, MDV (Option 1)	0-3999	100,000	0.39	(0.41)	[FN7]	9.0	1.5
LDT, MDV (Option 2)	0-3999	100,000		0.46	[FN7]	10.6	1.5
LDT, MDV	4000-5999	50,000	0.50		(0.50)	9.0	1.5
LDT, MDV (Option 1)	4000-5999	100,000	0.50	(0.50)	[FN7]	9.0	2.0

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1)						
MDV	6000 and 50,000 larger	0.60	(0.60)	9.0	2.0	
MDV	6000 and 100,000 (Option larger	0.60	(0.60)	[FN7]	9.0	2.3
1)						

[FN1] Subsection (a) shall remain in effect until December 31, 1991, and as of that date is repealed unless a later regulation deletes or extends that date. Notwithstanding the repeal or expiration of this regulation on December 31, 1991, the provisions of the regulation as they existed prior to such repeal or expiration shall continue to be operative and effective for those events occurring prior to the repeal of expiration.

[FN2] "PC" means passenger cars.

[FN3] Equivalent inertia weights are determined under subparagraph 40 CFR 86.129-79(a).

[FN4] Hydrocarbon standards in parentheses apply to total hydrocarbons.

[FN5] 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 to the nearest 0.1 gm/mi before being compared.

[FN6] The second set of 50,000 mile passenger car standards is optional. A manufacturer must select either the primary or optional sets of 50,000 mile standards for its full product line for both 1981 and 1982 model years.

[FN7] For vehicles from evaporative emission families with projected 50,000 mile evaporative emissions values below 1.0 gm/test, an adjustment to the hydrocarbon exhaust emission standards may be granted by the Executive Officer. The adjusted standard will be calculated using the following formula:  $HC_{ex} = .75 (.185 - [(Di + 3.3 Hs) (29.4)]) + HCo$  Where:  $HC_{ex}$  = adjusted exhaust hydrocarbon standard  $HC_o$  = unadjusted exhaust hydrocarbon standard Di= diurnal evaporative emissions Hs= hot soak evaporative emissions.

(b) The exhaust emissions from new 1982 model passenger cars, light-duty trucks, and medium-duty vehicles, subject to registration and sold and registered in this state, shall not exceed [FN1]:

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1982 EXHAUST EMISSION STANDARDS (grams per  
mile)

Inertia Vehicle Type [FN2]	Equivalent	Durability	Non-Methane Hydrocarbons [FN4]	Vehicle	Oxides of Nitrogen [FN5]	
	Weight (lbs.) [FN3]	Basis (mi.)		Carbon Monoxide		
PC	All	50,000	0.39	(0.41)	7.0	0.4
PC [FN6]	All	50,000	0.39	(0.41)	7.0	0.7
PC (Option 1)	All	100,000	0.39	(0.41)	7.0	1.5
PC (Option 2)	All	100,000		0.46	8.3	1.5
LDT, MDV	0-3999	50,000	0.39	(0.41)	9.0	1.0
LDT, MDV (Option 1)	0-3999	100,000	0.39	(0.41)	9.0	1.5
LDT, MDV (Option 2)	0-3999	100,000		0.46	10.6	1.5
LDT, MDV	4000-5999	50,000	0.50	(0.50)	9.0	1.5
LDT, MDV (Option 1)	4000-5999	100,000	0.50	(0.50)	9.0	2.0
MDV	6000 and larger	50,000	0.60	(0.60)	9.0	2.0
MDV (Option 1)	6000 and larger	100,000	0.60	(0.60)	9.0	2.3

[FN1] Subsection (b) shall remain in effect until December 31, 1992, and as of that date is repealed unless a later regulation deletes or extends that date. Notwithstanding the repeal or expiration of this regulation on December 31, 1992, the provisions of the regulation as they existed prior to such repeal or expiration shall continue to be operative and effective for those events occurring prior to the repeal or expiration.

[FN2] "PC" means passenger cars. "LDT" means light-duty trucks. "MDV" means medium-duty vehicles.

[FN3] Equivalent inertia weights are determined under subparagraph 40 CFR 86.129-79(a).

[FN4] Hydrocarbon standards in parentheses apply to total hydrocarbons.

[FN5] The maximum projected emissions of oxides of nitrogen measured on the

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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 to the nearest 0.1 gm/mi before being compared.

[FN6] The second set of 50,000 mile passenger car standards is optional. A manufacturer must select either the primary or optional sets of 50,000 mile standards for its full product line for both 1981 and 1982 model years.

(c) The exhaust emissions from new 1983 model passenger cars, light-duty trucks, and medium-duty vehicles, subject to registration and sold and registered in this state, shall not exceed [FN1]:

1983 EXHAUST EMISSION STANDARDS (grams per mile)

Inertia Vehicle Type [FN2]	Equivalent Durability		Non-Methane Hydrocarbons [FN4]	Vehicle		
	Weight (lbs.) [FN3]	Basis (mi)		Carbon Monoxide	Oxides of Nitrogen	
PC	All	50,000	0.39	(0.41)	7.0	0.4
PC [FN6]	All	50,000	0.39	(0.41)	7.0	0.7
PC (Option 1)	All	100,000	0.39	(0.41)	7.0	1.5
PC (Option 2)	All	100,000		0.46	8.3	1.5
LDT, MDV	0-3999	50,000	0.39	(0.41)	9.0	0.4
LDT, MDV [FN6]	0-3999	50,000	0.39	(0.41)	9.0	1.0
LDT, MDV (Option 1)	0-3999	100,000	0.39	(0.41)	9.0	1.5
LDT, MDV (Option	0-3999	100,000		0.46	10.6	1.5

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2)							
LDT, MDV	4000-5999	50,000	0.50	(0.50)	9.0	1.0	
LDT, MDV	4000-5999	100,000	0.50	(0.50)	9.0	2.0	
(Option							
1)							
MDV	6000 and larger	50,000	0.60	(0.60)	9.0	1.5	
MDV	6000 and larger	100,000	0.60	(0.60)	9.0	2.0	
(Option							
1)							

[FN1] Subsection (C) shall remain in effect until December 31, 1993, and as of that date is repealed unless a later regulation deletes or extends that date. Notwithstanding the repeal or expiration of this regulation on December 31, 1993, the provisions of the regulation as they existed prior to such repeal or expiration shall continue to be operative and effective for those events occurring prior to the repeal or expiration.

[FN2] "PC" means passenger cars. "LDT" means light-duty trucks. "MDV" means medium-duty vehicles.

[FN3] Equivalent inertia weights are determined under subparagraph 40 CFR 86.129-79(a).

[FN4] Hydrocarbon standards in parentheses apply to total hydrocarbons.

[FN5] 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 to the nearest 0.1 gm/mi before being compared.

[FN6] This set of standards for 1983 model vehicles is optional. A manufacturer may choose to certify these optional standards pursuant to the conditions set forth in Section 1960.15.

(d)(1) The exhaust emissions from new 1984 through 1987 model passenger cars, light-duty trucks, and medium-duty vehicles subject to registration and sold and registered in this state, shall not exceed:

1984 THROUGH 1987 EXHAUST EMISSION

STANDARDS [FN6] (grams per mile)

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Inertia Vehicle Type [FN1]	Equivalent Weight (lbs.) [FN2]	Durability Basis (mi)	Non-Methane Hydrocarbons [FN3]	Vehicle Carbon Monoxide	Oxides of Nitrogen	
PC	All	50,000	0.39	(0.41)	7.0	0.4
PC [FN5]	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	0-3999	50,000	0.39	(0.41)	9.0	0.4
LDT, MDV [FN5]	0-3999	50,000	0.39	(0.41)	9.0	1.0
LDT, MDV (Option 1)	0-3999	100,000	0.39	(0.41)	9.0	1.0
LDT, MDV (Option 2)	0-3999	100,000		0.46	10.6	1.0
LDT, MDV	4000-5999	50,000	0.50	(0.50)	9.0	1.0
LDT, MDV (Option 1)	4000-5999	100,000	0.50	(0.50)	9.0	1.5
MDV	6000 and larger	50,000	0.60	(0.60)	9.0	1.5
MDV (Option 1)	6000 and larger	100,000	0.60	(0.60)	9.0	2.0

[FN1] "PC" means passenger cars. "LDT" means light-duty trucks. "MDV" means medium-duty vehicles.

[FN2] Equivalent inertia weights are determined under subparagraph 40 CFR 86.129-79(a).

[FN3] Hydrocarbon standards in parentheses apply to total hydrocarbons.

[FN4] 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 to the nearest 0.1 gm/mi before being compared.

[FN5] This set of standards for 1984 through 1987 model vehicles is optional. A manufacturer may choose to certify these optional standards pursuant to the conditions set forth in Section 1960.15.

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[FN6] Diesel-powered passenger cars, light-duty trucks, and medium-duty vehicles are subject to the following particulate exhaust emission standards: 0.4/g.mi for the 1985 model year and 0.2 g/mi for the 1986 and 1987 model years. The particulate compliance shall be determined on a 50,000 mile durability vehicle basis.

(2) The exhaust emissions from new 1988 model passenger cars, light-duty trucks, and medium-duty vehicles and new 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 EMISSION STANDARDS [FN5]  
(grams per mile)

Inertia Vehicle Type [FN1]	Equivalent Durability		Non-Methane Hydrocarbons [FN2]	Vehicle		
	Weight (lbs.)	Basis (mi)		Carbon Monoxide	Oxides of Nitrogen [FN3]	
PC	All	50,000	0.39	(0.41)	7.0	0.4
PC [FN4]	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 [FN4]	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

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LDT, MDV (Option 1)	3751-5750	100,000	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	0.60	(0.60)	9.0	2.0

[FN1] "PC" means passenger cars. "LDT" means light-duty trucks. "MDV" means medium-duty vehicles.

[FN2] Hydrocarbon standards in parentheses apply to total hydrocarbons.

[FN3] 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.

[FN4] This set of standards is optional. A manufacturer may choose to certify to these optional standards pursuant to the conditions set forth in Section 1950.1.5.

[FN5] Diesel-powered passenger cars, light-duty trucks, and medium-duty vehicles 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:

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1989 THROUGH 1994 MODEL-YEAR EXHAUST  
EMISSION STANDARDS [FN5] (grams per  
mile)



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Vehicle Vehicle Type [FN1]	Loaded Weight (lbs.)	Durability Basis (mi)	Non-Methane Hydrocarbons [FN2]	Vehicle Carbon Monoxide	Oxides of Nitrogen [FN3,- 4]	
PC	All	50,000	0.39	(0.41)	7.0	0.4
PC [FN6]	All	50,000	0.39	(0.41)	7.0	0.7
Diesel PC (Option 2)	All	100,000 [FN8]	0.46	8.3	1.0	
LDT, MDV	0-3750	50,000	0.39	(0.41)	9.0	0.4
LDT, MDV [FN6]	0-3750	50,000	0.39	(0.41)	9.0	0.7 [FN7]
Diesel LDT, MDV (Option 2)	0-3750	100,000	[FN8]	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 [FN8]	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 [FN8]	0.60	(0.60)	9.0	2.0

[FN1] "PC" means passenger cars. "LDT" means light-duty trucks. "MDV" means medium-duty vehicles.

[FN2] Hydrocarbon standards in parentheses apply to total hydrocarbons. For 1993 through 1994 model methanol-fueled vehicles certifying to these standards, including flexible-fueled vehicles, "Non-Methane Hydrocarbons" shall mean "Organic Material Hydrocarbon Equivalent" (or "OMHCE").

[FN3] 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.

[FN4] 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

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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.

[FN5] 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.

[FN6] 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.

[FN7] 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 NOx.

[FN8] The optional 100,000 mile certification standards and provisions are not applicable to methanol vehicles.

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

1993 through 2003 METHANOL-SPECIFIC EX-  
HAUST EMISSION STANDARDS

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Vehicle Type [FN1]	Loaded Weight (lbs.) [FN3]	Durability Basis (mi)	Vehicle Certification	Formaldehyde (mg/mi) In-Use Compliance [FN2]
PC	All	50,000	15	23 (1993-1995) 15 (1996-2003)
LDT, MDV	0-3750	50,000	15	23 (1993-1995) 15 (1996-2003)
LDT, MDV	3751-5750	50,000	18	27 (1993-1995) 18 (1996-2003)
MDV	5751-8500	50,000	22	33 (1993-1995) 22 (1996-2003)
MDV	8501-10,000	50,000	28	36 (1995) 28 (1996-2003)
MDV	10,001-14,000	50,000	36	45 (1995) 36 (1996-2003)

[FN1] "PC" means passenger cars. "LDT" means light-duty trucks. "MDV" means medium-duty vehicles.

[FN2] 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 statistically valid and representative sample of vehicles, the Executive Officer determines that a substantial percentage of any class or category of such vehicle exhibits, prior to 50,000 miles or 5 years, whichever occurs first, an identifiable, systematic defect in a component listed in section 1960.1.5(c)(2), Title 13, California Code of Regulations, which causes a significant increase in emissions above those exhibited by vehicles free of such defects and of the same class or category and having the same period of use and mileage, the Executive Officer may invoke the enforcement authority under subchapter 2.5, Title 13, California Code of Regulations, commencing with section 2111, to require remedial action by the vehicle manufacturer. Such remedial action shall be limited to owner notification and repair or replacement of the defective component. As used in this section, the term "defect" shall not include failures which are the result of abuse, neglect, or improper maintenance.

[FN3] For 1995-2003 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 through 2006 model-year "LEV I" transitional low-emission

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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 [FN5,6,7] [ "milligrams per mile" (or "mg/mi")]

Vehicle Type [FN1]	Vehicle Weight (lbs.) [FN2]	Durability Vehicle Basis (mi)	Emission Category [FN3]	Vehicle Formaldehyde (mg/mi) [FN4,5]	
PC and LDT	All	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)	
			120,000	LEV	22
		3751-5750	ULEV	12	
			50,000	LEV	18(18)
				ULEV	9(14)
MDV	3751-5750	120,000		SULEV	4(7)
			LEV	27	
			ULEV	13	
		50,000	SULEV	6	
			5751-8500	LEV	22(22)
				50,000	ULEV
120,000	SULEV	6(8)			
	5751-8500	50,000	LEV		32
			ULEV	16	
120,000			ULEV	16	

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			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

[FN1] "PC" means passenger cars. "LDT" means light-duty trucks. "MDV" means medium-duty vehicles.

[FN2] For light-duty or medium-duty vehicles, Vehicle Weight shall mean "Loaded Vehicle Weight" (or "LVW") or "Test Weight" (or "TW"), respectively.

[FN3] "TLEV" means transitional low-emission vehicle. "LEV" means low-emission vehicle. "ULEV" means ultra-low-emissions vehicle. "SULEV" means super ultra-low-emission vehicle.

[FN4] Formaldehyde exhaust emission standards apply to vehicles certified to operate on any available fuel, including fuel-flexible and dual-fuel vehicles.

[FN5] The standards in parentheses are intermediate in-use compliance standards for 50,000 miles.

FN 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.

FN 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.

[FN6] Manufacturers shall demonstrate compliance with the above standards for formaldehyde at 505F according to the procedures specified in section 11k of the "California Exhaust Emission Standards and Test Procedures for 1988 through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k) or section E.1.4 of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles" as incorporated by reference in section 1961(d). Hybrid electric, natural gas, and diesel-fueled vehicles shall be exempt from 505F test

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requirements.

[FN7] 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.

(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 [FN5,8,9] (grams per mile)

Vehicle Vehicle Type [FN1]	Loaded Weight (lbs.)	Durability Basis (mi)	Non-Methane Hydrocarbons [FN2,7]	Vehicle Carbon Monoxide [FN7]	Oxides of Nitrogen [FN1,3,4]
PC	All	50,000	0.39 (0.25)	7.0 (3.4)	0.4
PC [FN6]	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 [FN6]	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

[FN1] "PC" means passenger cars. "LDT" means light-duty trucks. "n/a" means not applicable.

[FN2] 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

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"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").

[FN3] 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.

[FN4] 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.

[FN5] 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.

[FN6] 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.

[FN7] 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 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 specified in section 1960.1(g)(2).

[FN8] The following conditions shall apply to the in-use compliance standards for 1993 and 1994 model-year passenger cars and light-duty trucks only.

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FNa. 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.

FNb. 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.

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

[FN9] 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.

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

1995-2003 MODEL-YEAR tier 1 PASSENGER CAR  
AND LIGHT-DUTY TRUCK EXHAUST EMISSIONS  
STANDARDS [FN5,6,8,10] (grams per mile)

Vehicle Type [FN1]	Loaded Durability		Non-Methane Hydrocarbons [FN2, 7]	Vehicle Carbon Monoxide [FN7]	Oxides of Nitrogen [FN1, 3]
	Weight (lbs.)	Basis (mi)			
PC	All	50,000	0.25	3.4	0.4 [FN4]
PC	All	100,000	0.31	4.2	0.6 [FN9]
Diesel PC (Option 2)	All	100,000	0.31	4.2	1.0
LDT	0-3750	50,000	0.25	3.4	0.4 [FN4]
LDT	0-3750	100,000	0.31	4.2	0.6 [FN9]
Diesel LDT (Option 2)	0-3750	100,000	0.31	4.2	1.0



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LDT	3751-5750	50,000	0.32	4.4	0.7
LDT	3751-5750	100,000	0.40	5.5	0.97 [FN9]
Diesel LDT	3751-5750	100,000	0.40	5.5	1.5

(Option 1)

[FN1] "PC" means passenger cars. "LDT" means light-duty trucks.

[FN2] 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").

[FN3] 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.

[FN4] 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.

[FN5] 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.

[FN6] 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.

[FN7] 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:

FN 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.

FN 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.

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

[FN8] All passenger cars and light-duty trucks, except those diesel vehicles certifying to optional standards, are subject to non-methane hydrocarbon,

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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.

[FN9] 100,000 mile NOx standards are applicable for 1996 and subsequent model-year vehicles.

[FN10] Each manufacturer shall also comply with the requirements specified in section 1960.1(g)(2).

(g)(1) "LEV I" Exhaust Emission Standards for PCs and LDTs. The exhaust emissions from new 1992 through 2003 model-year "LEV I" transitional low-emission vehicles, and new 1992 through 2006 model-year "LEV I" low-emission vehicles and ultra-low-emission vehicles, in the passenger car and light-duty truck

classes shall not exceed:

\_\_\_\_\_  
\_\_\_\_\_

LEV I EXHAUST EMISSION STANDARDS FOR  
TRANSITIONAL LOW-EMISSION VEHICLES,  
LOW-  
EMISSION VEHICLES, ULTRA-LOW-EMISSION  
VEHICLES AND ZERO-EMISSION VEHICLES IN  
PASSENGER CAR AND LIGHT-DUTY TRUCK

VEHICLE CLASSES [FN6,7,8,9,10] [grams  
per mile (or "g/mi")]

Vehicle Type [FN1]	Loaded Vehicle Weight (lbs.)	Durability Basis (mi)	Emission Category [FN2]	Non-Methane Organic Gases [FN3,4]	Vehicle Carbon Monoxide	Oxides of Nitrogen [FN5]
PC and LDT	All	50,000	TLEV	0.125	3.4	0.4
			LEV	0.075	3.4	0.2
			ULEV	0.040	1.7	0.2
			TLEV	0.156	4.2	0.6
LDT	3751-57-50	100,000	LEV	0.090	4.2	0.3
			ULEV	0.055	2.1	0.3
			TLEV	0.160	4.4	0.7
		50,000	LEV	0.100	4.4	0.4
			ULEV	0.050	2.2	0.4
			TLEV	0.200	5.5	0.9

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LEV	0.130	5.5	0.5
ULEV	0.070	2.8	0.5

[FN1] "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.

[FN2] "TLEV" means transitional low-emission vehicle. "LEV" means low-emission vehicle. "ULEV" means ultra-low-emissions vehicle.

[FN3] 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 August 5, 1999, which is incorporated herein by reference.

FNa.Reactivity Adjustment. For TLEVs, LEVs, and ULEVs certified to operate exclusively on any fuel other than conventional gasoline, and for fuel-flexible and dual-fuel TLEVs, LEVs, and ULEVs when certifying on a fuel other than gasoline, manufacturers shall multiply NMOG exhaust certification levels by the applicable reactivity adjustment factor set forth in section 13 of the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in sections I.E.5. of the "California Exhaust Emission Standards and Text Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), or established by the Executive Officer pursuant to Appendix VIII or section II.D. respectively of the foregoing test procedures. In addition, natural gas vehicles certifying to TLEV, LEV, or ULEV standards shall calculate a reactivity-adjusted methane exhaust emission value by multiplying the methane exhaust certification level by the applicable methane reactivity adjustment factor set forth in section 13 or in section I.E.5. of the above referenced test procedures as applicable. The product of the NMOG exhaust certification levels and the reactivity adjustment factor shall be compared to the exhaust NMOG mass emission standards established for the particular vehicle emission category to determine compliance. For natural gas vehicles, the reactivity-adjusted NMOG value shall be added to the reactivity-adjusted methane value and then compared to the exhaust NMOG mass emission standards established for the particular vehicle emission category to determine compliance.

FNb.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

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Regulations.

[FN4] 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.

FNa.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.

FNb.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:

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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

<sup>5</sup> 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.

<sup>6</sup> 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	3.2	0.4
3751-5750 lb. LVW LDTs	50,000	through 1998	0.128	0.5	through 1998	0.075	3.3	0.5
	50,000	1999	0.130	0.5	1999-2002	0.070	2.8	0.5
	100,000	1999	0.160	0.7	1999-2002	0.100	4.4	0.7

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

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

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

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

<sup>7</sup> 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.

<sup>8</sup> 50°F Requirement: Manufacturers shall demonstrate compliance with the above standards for NMOG, CO, and NOx at 50 degrees F according to the procedure specified in section 11k of the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or according to the procedure specified in section 11c of the "California Exhaust Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable. Hybrid electric, natural gas, and diesel-fueled vehicles shall be exempt from 50 degrees F test requirements.

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Vehicle Type	Loaded Vehicle Weight (LVW)	Emission Durability Vehicle Basis (g/mi)		
		Category	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

[FN5] 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.

[FN6] 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)			
	Vehicle	Model Year	NMOG	NOx	Model Year	NMOG	CO	NOx

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PCS, 0-3750 lb. LVW	50.000	through	0.100	0.3	through	0.058	2.6	0.3
LDTs		1998			1998			
	50,000	1999	0.100	0.3	1999-2-002	0.055	2.1	0.3
	100,000	1999	0.125	0.4	1999-2-002	0.075	3.4	0.4
3751-5750 lb. LVW	50,000	through	0.128	0.5	through	0.075	3.3	0.5
LDTs		1998			1998			
	50,000	1999	0.130	0.5	1999-2-002	0.070	2.8	0.5
	100,000	1999	0.160	0.7	1999-2-002	0.100	4.4	0.7

FNa.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.

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

Vehicle Type Weight (LVW)	Loaded Vehicle Category	Emission Basis (g/mi) 50,000 mi	Durability Vehicle
PCS, LDT	All. 0-3750	TLEV	0.32
		LEV	
		ULEV	
LDT	3751-5750	TLEV	0.41
		LEV	
		ULEV	

FNIntermediate 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

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- 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.
- [FN7] 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, 0.10g/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.
- [FN8] 50<sup>o</sup>F Requirement. Manufacturers shall demonstrate compliance with the above standards for NMOG, CO, and NOx at 50 degrees F according to the procedure specified in section 11k of the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or according to the procedure specified in section II.C. of the "California Exhaust Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable. Hybrid electric, natural gas, and diesel-fueled vehicles shall be exempt from 50 degrees F test requirements.
- [FN9] Limit on In-Use Testing. In-use compliance testing shall be limited to vehicles with fewer than 75,000 miles.
- [FN10] 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).
- [FN11] NMOG Credit for Direct Ozone Reduction Technology. A manufacturer that certifies vehicles equipped with direct ozone reduction technologies shall be eligible to receive NMOG credits that can be applied to the NMOG exhaust emissions of the vehicle when determining compliance with the standard. In order to receive credit, the manufacturer must submit the following information for each vehicle model, including, but not limited to:
- FN(a) a demonstration of the airflow rate through the direct ozone reduction device and the ozone-reducing efficiency of the device over the range of speeds encountered in the SFTP test cycle;



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

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

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

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

FLEET AVERAGE NON-METHANE ORGANIC GAS EXHAUST EMISSION REQUIREMENTS FOR LIGHT-DUTY VEHICLE WEIGHT CLASSES [FN7,8,9] [grams per mile (or "g/mi")]

Vehicle Type [FN1]	Loaded Vehicle Weight (lbs.)	Durability Vehicle Basis (mi)	Fleet Average Model Year	Non-Methane Organic Gases
PC and LDT	All	50,000	1994	0.250
		0-3750	1995	0.231
		1996	0.225	
		1997	0.202	
		1998	0.157	
		1999	0.113	
LDT	3751-5750	2000	0.073	
		1994	0.320	
		1995	0.295	
		1996	0.287	
		1997	0.260	

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1998	0.205
1999	0.150
2000	0.099

[FN1] "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.

[FN2] "Non-Methane Organic Gases" (or "NMOG") means the total mass of oxygenated and non-oxygenated hydrocarbon emissions.

[FN3] 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:

FN "Type A HEV" shall mean an HEV which achieves a minimum range of 60 miles over the All-Electric Range Test as defined in "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable.

FN "Type B HEV" shall mean an HEV which achieves a range of 40-59 miles over the All-Electric Range Test as defined in "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable.

FN "Type C HEV" shall mean an HEV which achieves a range of 0-39 miles over the All-Electric Range Test as defined in "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable, and all other HEVs excluding "Type A" and "Type B" HEVs.

FNa. 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."

[FN4] 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

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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:

FN[(No. of Vehicles Certified to the Exhaust Emission Standards in section 1960.1(e)(1) and Produced) x (0.39)] +

FN[No. of Vehicles Certified to the Phase-In Exhaust Emission Standards in section 1960.1(f)(1) and Produced x (0.25)] +

FN[No. of Vehicles Certified to the Phase-Out Exhaust Emission Standards in section 1960.1(f)(1) and Produced x (0.39)] +

FN[(No. of Vehicles Certified to the Exhaust Emission Standards in section 1960.1(f)(2) and Produced) x (0.25)] +

FN[(No. of TLEVs excluding HEVs and Produced) x (0.125)] +

FN[(No. of LEVs excluding HEVs and Produced) x (0.075)] +

FN[(No. of ULEVs excluding HEVs and Produced) x (0.040)] +

FN(HEV contribution factor))P

FN(Total No. of Vehicles Produced, Including Zero-Emission Vehicles and HEVs):

FNa. "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:

FNHEV contribution factor = ([No. of "Type A HEV" TLEVs Produced] x (0.100) +

FN[No. of "Type B HEV" TLEVs Produced] x (0.113) +

FN[No. of "Type C HEV" TLEVs Produced] x (0.125)) +

FN([No. of "Type A HEV" LEVs Produced] x (0.057) +

FN[No. of "Type B HEV" LEVs Produced] x (0.066) +

FN[No. of "Type C HEV" LEVs Produced] x (0.075)) +

FN([No. of "Type A HEV" ULEVs Produced] x (0.020) +

FN[No. of "Type B HEV" ULEVs Produced] x (0.030) +

FN[No. of "Type C HEV" ULEVs Produced] x (0.040))

FNb. "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).

FNc. 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) and calculate their fleet average NMOG values accordingly:

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

[FN5] 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

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equation, where the term "Produced" means produced and delivered for sale in California:

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

FN(Total No. of Vehicles Produced, Including ZEVs and HEVs).

FNa. "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:

FNHEV contribution factor =

$$\begin{aligned} & \text{FN}[(\text{No. of "Type A HEV" TLEVs Produced}) \times (0.130)] + \\ & \text{FN}[(\text{No. of "Type B HEV" TLEVs Produced}) \times (0.145)] + \\ & \text{FN}[(\text{No. of "Type C HEV" TLEVs Produced}) \times (0.160)] + \\ & \text{FN}[(\text{No. of "Type A HEV" LEVs Produced}) \times (0.075)] + \\ & \text{FN}[(\text{No. of "Type B HEV" LEVs Produced}) \times (0.087)] + \\ & \text{FN}[(\text{No. of "Type C HEV" LEVs Produced}) \times (0.100)] + \\ & \text{FN}[(\text{No. of "Type A HEV" ULEVs Produced}) \times (0.025)] + \\ & \text{FN}[(\text{No. of "Type B HEV" ULEVs Produced}) \times (0.037)] + \\ & \text{FN}[(\text{No. of "Type C HEV" ULEVs Produced}) \times (0.050)] \end{aligned}$$

FNb. 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).

FNc. In the 2000 model year, small volume manufacturers shall not exceed a fleet average NMOG value of 0.100 g/mi for LDTs from 3751-5750 lbs. LVW calculated in accordance with note (5).

FNd. 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.

FNe. 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

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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.

[FN7] Calculation of NMOG Credits/Debits and Procedures for Offsetting Debits. FNa. In 1992 through 2000 model years, manufacturers that achieve fleet average NMOG values lower than the fleet average NMOG requirement for the corresponding model year shall receive credits in units of g/mi NMOG determined as:  $[(\text{Fleet Average NMOG Requirement}) - (\text{Manufacturer's Fleet Average NMOG Value})] \times (\text{Total No. of Vehicles Produced and Delivered for Sale in California, Including ZEVs and HEVs})$ .

FNManufacturers 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.

FNb. For the 1994 through 1997 model years, manufacturers shall equalize emission debits within three model years and prior to the end of the 1998 model year by earning g/mi NMOG emission credits in an amount equal to their g/mi NMOG debits, or by submitting a commensurate amount of g/mi NMOG credits to the Executive Officer that were earned previously or acquired from another manufacturer. For 1998 through 2000 model years, manufacturers shall equalize emission debits by the end of the following model year. If emission debits are not equalized within the specified time period, the manufacturer shall be subject to the Health and Safety Code section 43211 civil penalty applicable to a manufacturer which sells a new motor vehicle that does not meet the applicable emission standards adopted by the state board. The cause of action shall be deemed to accrue when the emission debits are not equalized by the end of the specified time period. For the purposes of Health and Safety Code section 43211, the number of vehicles not meeting the state board's emission standards shall be determined by dividing the total amount of g/mi NMOG emission debits for the model year by the g/mi NMOG fleet average requirement for PCs and LDTs 0-3750 lbs. LVW applicable for the model year in which the debits were first incurred.

FNc. 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.

FNd. In order to verify the status of a manufacturer's compliance with the

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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 Office 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.

[FN8] 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).

FNa. 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.

FNb. 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.

FNc. 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).

[FN6] 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.

FNa. Prior to the model year 2000, compliance with the specified fleet average NMOG requirements shall be waived.

FNb. In the 2000 model year, small volume manufacturers shall not exceed a fleet average NMOG value of 0.075 g/mi for PCs and LDTs from 0-3750 lbs. LVW calculated in accordance with note (4).

FNc. Beginning with the 1996 model year, manufacturers that produce and deliver for sale in California LDTs 3751-5750 lbs. LVW that are certified to the Tier I exhaust emission standards in 40 CFR 86.094-9 shall add the following term to the numerator of the fleet average NMOG equation in note (5) and calculate their fleet average NMOG values accordingly: [(No. of Vehicles Certified to federal Tier I exhaust emission standards and Produced and Delivered for Sale in California) x (0.32)]

(h)(1) "Tier I" Exhaust Emission Standards for MDVs.

The exhaust emissions from new 1995 through 2003

model Tier 1 medium-duty vehicles shall not exceed:

\_\_\_\_\_  
\_\_\_\_\_

1995-2003 MODEL-YEAR TIER 1 MEDIUM-DUTY  
VEHICLE EXHAUST EMISSIONS STANDARDS

[FN1,2,3,7,8] (grams per mile)

Test Weight (lbs.)	Durability		Non-Methane Hydrocarbons [FN4]	Carbon Monoxide	Oxides of Nitrogen [FN5]	Particulates [FN6]
	Vehicle Basis (mi)					
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

[FN1] "n/a" means not applicable. "Test Weight" shall mean the average of the vehicle's curb weight and gross vehicle weight.

[FN2] 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](#).

[FN3] 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.

[FN4] For methanol- and ethanol-fueled vehicles certifying to these standards, including flexible-fueled vehicles when certifying on methanol or ethanol, "Non-Methane Hydrocarbons" shall mean "Organic Material Non-Methane Hydrocarbon Equivalent" (or "OMNM-HCE").

[FN5] The maximum projected emissions of oxides of

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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.

[FN6] Particulate standards are only applicable for diesel vehicles and shall be determined on a 120,000 mile basis.

[FN7] In-use compliance testing shall be limited to vehicles with less than 90,000 miles. For the 1995 through 1997 models, alternative in-use compliance is available for medium-duty vehicle manufacturers. A manufacturer may use alternative in-use compliance for up to 100 percent of its fleet in the 1995 and 1996 model years and up to 50 percent of its fleet in the 1997 model year. Small volume manufacturers may use alternative in-use compliance for up to 100 percent of their fleets in the 1995 through 1997 model years. The percentages shall be determined from the manufacturers' projected California sales of medium-duty vehicles. For vehicles certified to the standards and test procedures of

this subsection, "alternative in-use compliance" shall consist of an in-use allowance of 25 percent over the applicable 1995 model-year non-methane hydrocarbon, carbon monoxide, and oxides of nitrogen 50,000 mile emission standards and a waiver of the emission standards beyond 50,000 miles.

[FN8] 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.

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

\_\_\_\_\_  
\_\_\_\_\_

LEV I EXHAUST EMISSION STANDARDS FOR  
LOW-EMISSION VEHICLES, ULTRA-  
LOW-EMISSION  
VEHICLES AND SUPER-ULTRA-LOW-EMISSION  
VEHICLES IN THE MEDIUM-DUTY VEHICLE

WEIGHT CLASS  
[FN8,9,10,11,12,13,14,15,16][gramspermile(or"g/mi")]

Vehicle Test	Durability Basis (mi)	Emission Category [FN2]	Vehicle			
			Non-Methane Organic Gases [FN3, 4]	Carbon Monoxide	Nitrogen [FN5]	Oxides of Particulates [FN6, -7]
Weight (lbs.) [FN1]						
0-3750	50,000	LEV	0.125	3.4	0.4	n/a



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	ULEV	0.075	1.7	0.2	n/a	
120,000	LEV	0.180	5.0	0.6	0.08	
	ULEV	0.107	2.5	0.3	0.04	
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	
120,000	LEV	0.230	6.4	0.6	0.10	
	ULEV	0.143	6.4	0.6	0.05	
	SULEV	0.072	3.2	0.3	0.05	
5751-8500	50,000 LEV		0.195	5.0	0.6	n/a
	ULEV	0.117	5.0	0.6	n/a	
	SULEV	0.059	2.5	0.3	n/a	
120,000	LEV	0.280	7.3	0.9	0.12	
	ULEV	0.167	7.3	0.9	0.06	
	SULEV	0.084	3.7	0.45	0.06	
8501-10,000	50,000 LEV		0.230	5.5	0.7	n/a
	ULEV		0.138	5.5	0.7	n/a
	SULEV	0.069	2.8	0.35	n/a	
120,000	LEV	0.330	8.1	1.0	0.12	
	ULEV	0.197	8.1	1.0	0.06	
	SULEV	0.100	4.1	0.5	0.06	
10,001-14,000	50,000 LEV		0.300	7.0	1.0	n/a
	ULEV		0.180	7.0	1.0	n/a
	SULEV	0.09	3.5	0.5	n/a	
120,000	LEV	0.430	10.3	1.5	0.12	
	ULEV	0.257	10.3	1.5	0.06	
	SULEV	0.130	5.2	0.7	0.06	

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<sup>1</sup> "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.

<sup>2</sup> "LEV" means low-emission vehicle.

"ULEV" means ultra-low-emission vehicle.

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

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

a. **Reactivity Adjustment.** For LEVs and ULEVs certified to operate on an available fuel other than conventional gasoline, including fuel-flexible or dual-fuel vehicles when certifying on a fuel other than gasoline, manufacturers shall multiply the 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 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in section I.E.5. of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), or established by the Executive Officer pursuant to Appendix VIII or section II.D, respectively of the foregoing test procedures. In addition, natural gas vehicles certifying to LEV or ULEV standards shall calculate a reactivity-adjusted methane exhaust emission value by multiplying the methane exhaust certification level by the applicable methane reactivity adjustment factor set forth in section 13 or in section I.E.5. of the above-referenced test procedures as applicable. The product of the exhaust NMOG certification levels and the reactivity adjustment factor shall be compared to the exhaust NMOG mass emission standard established for the particular vehicle emission category to determine compliance. For natural gas vehicles, the reactivity-adjusted NMOG value shall be added to the reactivity-adjusted methane value and then compared to the exhaust NMOG mass emission standards established for the particular vehicle emission category to determine compliance.

b. **Pre-1998 NOx standards.** Prior to the 1998 model year, the 50,000 mile and 120,000 mile LEV exhaust mass emission standards for NOx shall be: 0.7 and 1.0 g/mi for MDVs from 3751-5750 lbs. TW, 1.1 and 1.5 g/mi 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.

<sup>4</sup> **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 14,000 lbs. TW, the applicable exhaust mass emission standard for NMOG when certifying the vehicle for operation on gasoline shall be:

Test Weight (lbs.)	Vehicle Emission Category	50,000 (g/mi)	120,000 (g/mi)
0-3750	LEV	0.25	0.36
	ULEV	0.125	0.180
	SULEV	0.0625	0.090
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

[FN1] "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.

[FN2] "LEV" means low-emission vehicle. "ULEV" means ultra-low-emission vehicle. "SULEV" means super-ultra-low-emission vehicle.

[FN3] Compliance with NMOG Standards. To determine

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

a. Reactivity Adjustment. For LEVs and ULEVs certified to operate on an available fuel other than conventional gasoline, including fuel-flexible or dual-fuel vehicles when certifying on a fuel other than gasoline, manufacturers shall multiply the exhaust NMOG certification

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levels by the applicable reactivity adjustment factor set forth in section 13 of the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in section I.E.5. of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), or established by the Executive Officer pursuant to Appendix VIII or section II.D. respectively of the foregoing test procedures. In addition, natural gas vehicles certifying to LEV or ULEV standards shall calculate a reactivity-adjusted methane exhaust emission value by multiplying the methane exhaust certification level by the applicable methane reactivity adjustment factor set forth in section 13 or in section I.E.5. of the above-referenced test procedures as applicable. The product of the exhaust NMOG certification levels and the reactivity adjustment factor shall be compared to the exhaust NMOG mass emission standard established for the particular vehicle emission category to determine compliance. For natural gas vehicles, the reactivity-adjusted NMOG value shall be added to the reactivity-adjusted methane value and then compared to the exhaust NMOG mass emission standards established for the particular vehicle emission category to determine compliance.

b.Pre-1998 NO<sub>x</sub> standards.Prior to the 1998 model year, the 50,000 mile and 120,000 mile LEV exhaust mass emission standards for NO<sub>x</sub> shall be: 0.7 and 1.0 g/mi for MDVs from 3751-5750 lbs. TW, 1.1 and 1.5 g/mi

Test Weight (lbs.)	Vehicle Emission Category	50,000 (g/mi)	120,000 (g/mi)
0-3750	LEV	0.25	0.36
ULEV	0.125	0.180	
3751-5750	LEV	0.32	0.46
ULEV	0.160	0.230	
SULEV	0.100	0.143	
5751-8500	LEV	0.39	0.56
ULEV	0.195	0.280	
SULEV	0.117	0.167	
8501-10,000	LEV	0.46	0.66

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.

[FN4] 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, manufactures 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 14,000 lbs. TW, the applicable exhaust mass emission standard for NMOG when certifying the vehicle for operation on gasoline shall be:

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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		

<sup>5</sup> 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 be not 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.

<sup>6</sup> Particulate standards are only applicable for diesel vehicles and shall be determined on a 120,000 mile basis.

<sup>7</sup> "n/a" means not applicable.

<sup>8</sup> 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 1955.8(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), "NMOC" shall mean non-methane hydrocarbons.

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

Intermediate In-Use Compliance Standards* (in grams per mile)										
Emission Category	Model Year	Durability Vehicle Basis (mi)	3751-5750 lbs.		5751-8500 lbs.		8501-10,000 lbs.		10,001-14,000 lbs.	
			NMOC	NOx	NMOC	NOx	NMOC	NOx	NMOC	NOx
LEV	through 1997	50,000	0.238	0.7	0.293	1.1	0.345	1.3	0.450	2.0
	1998-1999	50,000	0.238	0.6	0.293	0.9	0.345	1.0	0.450	1.5
	2000	50,000	—	0.6	—	0.9	—	1.0	—	1.5
	2000	120,000	—	0.8	—	1.2	—	1.3	—	2.0
ULEV	through 1999	50,000	0.128	0.6	0.156	0.9	0.184	1.0	0.240	1.5
	2000	50,000	0.128	0.6	0.156	0.9	0.184	1.0	0.240	1.5
	2000	120,000	0.160	0.8	0.195	1.2	0.230	1.3	0.300	2.0
	2001-2002	50,000	0.128	—	0.156	—	0.184	—	0.240	—
	2001-2002	120,000	0.160	—	0.195	—	0.230	—	0.300	—
SULEV	through 2002	50,000	0.072	0.3	0.084	0.45	0.100	0.5	0.130	0.7
	2002	120,000	0.100	0.4	0.117	0.6	0.138	0.65	0.180	1.0

In-use compliance with standards beyond 50,000 miles shall be waived through the 1999 model year for LEVs and ULEVs and through the 2001 model year for SULEVs. Dashes mean that the standard in the section (h)(2) table applies.

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

[FN5] 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 be not greater than 2.00

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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.

[FN6] Particulate standards are only applicable for diesel vehicles and shall be determined on a 120,000 mile basis.

[FN7] "n/a" means not applicable.

[FN8] 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 stand-

ards 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.

[FN9] 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:

[Note: The following TABLE/FORM is too wide to be displayed on one screen. You must print it for a meaningful review of its contents. The table has been divided into multiple pieces with each piece containing information to help you assemble a printout of the table. The information for each piece includes: (1) a three line message preceding the tabular data showing by line # and character # the position of the upper left-hand corner of the piece and the position of the piece within the entire table; and (2) a numeric scale following the tabular data displaying the character positions.]

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 \*\*\*\*\* This is piece 1. -- It begins at character 1 of table line 1. \*\*\*\*\*  
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Emission Category	Model Year	Vehicle Basis (mi)	Durability 3751-5750 lbs.			
			NMOG	NOx	NMOG	NOx
LEV	through	50,000	0.238	0.7	0.293	1.1
1997						
1998-	50,000	0.238	0.6	0.293	0.9	0.345
1999						
2000	50,000	--	0.6	--	0.9	--
2000	120,000	--	0.8	--	1.2	--
ULEV	through	50,000	0.128	0.6	0.156	0.9
1999						
2000	50,000	0.128	0.6	0.156	0.9	0.184
2000	120,000	0.160	0.8	0.195	1.2	0.230
2001-	50,000	0.128	--	0.156	--	0.184

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2002						
2001-	120,000	0.160	--	0.195	--	0.230
2002						
SULEV	through	50,000	0.072	0.3	0.084	0.45
2002						
2002	120,000	0.100	0.4	0.117	0.6	0.138
1...+...10...+...20...+...30...+...40...+...50...+...60...+...70..						

\*\*\*\*\*  
 \*\*\*\*\* This is piece 2. -- It begins at character 73 of table line 1. \*\*\*\*\*  
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5751-8500 lbs.		8501-10,000 lbs.		10,001-14,000 lbs.
NMOG	NOx	NMOG	NOx	
0.345	1.3	0.450	2.0	
1.0	0.450	1.5		
1.0	--	1.5		
1.3	--	2.0		
0.184	1.0	0.240	1.5	
1.0	0.240	1.5		
1.3	0.300	2.0		
--	0.240	--		
--	0.300	--		
0.100	0.5	0.130	0.7	
0.65	0.180	1.0		
73...80...+...90...+...0...+...10...+...20...+...30..				

Intermediate In-Use Compliance Standards [FNal] (in grams per mile)

[FNal] Dashes mean that the standard in the section (h)(2) table applies.

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)92) table applies.

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- a. *Reactivity Adjustment.* For LEVs and ULEVs designed to operate on any available fuel other than conventional gasoline, including fuel-flexible and dual-fuel vehicles when operating on any available fuel other than gasoline, NMOG exhaust mass emission results shall be multiplied by the applicable reactivity adjustment factor to determine compliance with intermediate in-use compliance standards for NMOG. In addition to multiplying the exhaust NMOG mass emission results by the applicable reactivity adjustment factor, natural gas vehicles shall multiply the exhaust methane mass emission results by the applicable methane reactivity adjustment factor and add that value to the reactivity-adjusted NMOG value. For fuel-flexible and dual-fuel vehicles when operating on gasoline, NMOG emission results shall not be multiplied by a reactivity adjustment factor.
- b. *Gasoline Standards for Fuel-Flexible and Dual-Fuel Vehicles.* For fuel-flexible and dual-fuel MDVs from 0-14,000 lbs. TW, intermediate in-use compliance standards for NMOG emissions at 50,000 miles when the vehicle is operated on gasoline, shall be:

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

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:

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

c. The percentages shall be applied to the manufacturer's 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 the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable.

"Type B HEV" shall mean an HEV which achieves a range of 40-59 miles over the All-Electric Range Test as defined in the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable.

"Type C HEV" shall mean an HEV which achieves a range of 0-39 miles over the All-Electric Range Test as defined in the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable, and all other HEVs excluding "Type A" and "Type B" HEVs.

a. For the purpose of calculating 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 through 2000 model years, manufacturers that produce and deliver for sale in California MDVs in excess of the equivalent requirements for LEVs and/or ULEVs certified to the exhaust emission standards set forth in this section (h)(2) or Title 13, CCR Section 1956.8(b), 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 Debts" (or "VEDs") equal to the amount of negative VECs determined by the aforementioned equation.

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a.Reactivity Adjustment.For LEVs and ULEVs designed to operate on any available fuel other than conventional gasoline, including fuel-flexible and dual-fuel vehicles when operating on any available fuel other than gasoline, NMOG exhaust mass emission results shall be multiplied by the applicable reactivity adjustment factor to determine compliance with intermediate in-use compliance standards for NMOG. In addition to multiplying the exhaust NMOG mass emission results by the applicable reactivity adjustment factor, natural gas vehicles shall multiply the exhaust methane mass emission results by the applicable methane reactivity adjustment factor and add that value to the reactivity-adjusted

NMOG value. For fuel-flexible and dual-fuel vehicles when operating on gasoline, NMOG emission results shall not be multiplied by a reactivity adjustment factor.

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

Fuel-Flexible and Dual-Fuel MDVs  
Intermediate In-Use Compliance Standards  
Test Weight (lbs.)

Vehicle Emission Category	50,000 (g/mi)
0-3750 LEV	0.32
ULEV	0.188
3751-5750 LEV	0.41
ULEV	0.238
SULEV	0.128
5751-8500 LEV	0.49
ULEV	0.293
SULEV	0.156
8501-10,000 LEV	0.58
ULEV	0.345
SULEV	0.184
10,000-14,000 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.

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:

[FN10] 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



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

c. The percentages shall be applied to the manufacturer's 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.

[FN11] 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 the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable.

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

Vehicles" as incorporated by reference in section 1960.1(k), or in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable.

"Type C HEV" shall mean an HEV which achieves a range of 0-39 miles over the All-Electric Range Test as defined in the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable, and all other HEVs excluding "Type A" and "Type B" HEVs.

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

[FN12] Calculation of Vehicle Equivalent Credits. In 1992 through 2000 model years, manufacturers that produce and deliver for sale in California MDVs in excess of the equivalent requirements for LEVs and/or ULEVs certified to the exhaust emission standards set forth in this section (h)(2) or [Title 13, CCR Section 1956.8\(h\)](#), shall receive VECs calculated in accordance with the following equation, where

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the term "Produced" means produced and delivered for sale in California:

[(No. of LEVs Produced excluding HEVs) + (No. of "Type C HEV" LEVs Produced)] +

[(No. of "Type A HEV" LEVs Produced) x (1.2)] +

[(No. of "Type B HEV" LEVs Produced) x (1.1)] -

(Equivalent No. of LEVs Required to be Produced))+

((1.4) x [(No. of ULEVs Produced excluding HEVs) + (No. of "Type C HEV" ULEVs Produced)] +

[(1.7) x (No. of "Type A HEV" ULEVs Produced)] +

[(1.5) x (No. of "Type B HEV" ULEVs Produced)] -

[(1.4) x (Equivalent No. of ULEVs Required to be Produced)]) +

(((1.7) x [(No. of SULEVs Produced excluding HEVs) + (No. of "Type C HEV" SULEVs Produced)] +

[(No. of "Type A HEV" SULEVs Produced) x (1.7)] +

[(No. of "Type B HEV" SULEVs) x (1.5)] -

[(1.7) x [(Equivalent No. of SULEVs Required to be Produced)]) +

[(2.0) x (No. of ZEVs Certified and Produced as MDVs)].

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

[FN13] 50°F Requirement. Manufacturers shall demonstrate compliance with the above standards for NMOG, carbon monoxide, and oxides of nitrogen at 50 degrees F according to the procedures specified in section 11k of the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty

Vehicles" as incorporated by reference in section 1960.1(k), or according to the procedure specified in section II.C. of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable. Hybrid electric, natural gas, and diesel-fuel vehicles shall be exempt from 50 degrees F test requirements.

[FN14] In-use compliance testing shall be limited to vehicles with fewer than 90,000 miles.

[FN15] 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). 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).

[FN16] Requirements for Small Volume Manufacturers. As used in Section 1960.1(h)(2), the term "small volume manufacturer" shall mean any vehicle manufacturer with California sales less than or equal to 3000 new PCs, LDTs, and MDVs per model year based on the average number of vehicles sold by the manufacturer each model year from 1992 to 1994, except as otherwise noted below. For manufacturers certifying for the first time in California, model-year sales shall be based on projected California sales.

a. Prior to the model year 2001, small volume manufacturers shall not be required to certify, produce, or deliver LEVs and ULEVs for sale in California.

b. If a manufacturer's average California sales exceeds

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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 1960.1(h)(2) beginning with the fourth model year after the last of the three consecutive model years.

c. If a manufacturer's average California sales falls below 3000 units of new PCs, LDTs, and MDVs based on the average number of vehicles sold for any three consecutive model years, the manufacturer shall be treated as a small volume manufacturer and shall be subject to requirements for small volume manufacturers as specified in 1960.1(h)(2) beginning with the next 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 depleted by the beginning of the third model year after being earned, and will have no value if not used by the beginning of the fourth model year after being earned.

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

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

g. In order to verify the status of a manufacturer's compliance with the phase-in requirements of this section and in order to confirm the accrual of VECs or VEDs, each manufacturer shall submit an annual report to the Executive Officer which sets forth the production data

used to establish compliance by no later than March 1 of the calendar year following the close of the model year.

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.

(i) The exhaust emissions from new 1981 and subsequent model passenger cars, light-duty trucks, and medium-duty vehicles certified to special standards authorized by [sections 1960.2, 1960.3, and 1960.4, subchapter 1, Chapter 3, Title 13, California Code of Regulations](#), shall not exceed [FN1]:

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SPECIAL EXHAUST [FN10]EMISSION  
STANDARDS (grams per mile)

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[Note: The following TABLE/FORM is too wide to be displayed on one screen. You must print it for a meaningful review of its contents. The table has been divided into multiple pieces with each piece containing information to help you assemble a printout of the table. The information for each piece includes: (1) a three line message preceding the tabular data showing by line # and character # the position of the upper left-hand corner of the piece and the position of the piece within the entire table; and (2) a numeric scale following the tabular data displaying the character positions.]

\*\*\*\*\* This is piece 1. -- It begins at character 1 of table line 1. \*\*\*\*\*

Vehicle Year	Inertia Weight Type [FN2]	Equivalent Basis (lbs.) [FN3]	Durability Non-Methane (mi)	Carbon Hydrocarbons	Vehicle Oxides of Monoxide
1981.....	PC [FN6]	All	50,000	0.39	(0.41)
LDT, MDV [FN7]	0-3999	50,000	0.39	(0.41)	9.0
1982 [FN8]....	PC	All	50,000	0.39	(0.41)
1983 [FN8]....	PC	All	50,000	0.39	(0.41)
LDT, MDV	0-3999	50,000	0.39	(0.41)	9.0
1984 [FN8]....	PC	All	50,000	0.39	(0.41)
LDT, MDV	0-3999	50,000	0.39	(0.41)	9.0
1985 [FN8]....	LDT, MDV	0-3999	50,000	0.39	(0.41)

\*\*\*\*\* This is piece 2. -- It begins at character 80 of table line 1. \*\*\*\*\*

Nitrogen [FN5]	
7.0	1.5
1.5	
7.0	1.0
7.0	0.7 9
1.0	
7.0	0.7
0.7 9	
9.0	0.7

[FN1] Subsection (i) shall remain in effect until December 31, 1990, and as of that date is repealed unless a later regulation deletes or extends that date. Notwithstanding the repeal or expiration of this regulation on December 31, 1990, the provisions of the regulation as they existed prior to such repeal or expiration shall continue to be operative and effective for those events occurring prior to the repeal or expiration.

[FN2] "PC" means passenger cars. "LDT" means light-duty trucks. "MDV" means medium-duty vehicles.

[FN3] Equivalent inertia weights are determined under subparagraph 40 CFR 86.129-79(a).

[FN4] Hydrocarbon standards in parentheses apply to total hydrocarbons.

[FN5] 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 no greater than 1.33 times the applicable passenger car standards and 2.0 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 to the nearest 0.1 gm/mi before being compared.

[FN6] For vehicles certified to special standards authorized by [section 1960.2, Article 2,](#)

[Subchapter 1, Chapter 3, Title 13, California Administrative Code.](#)

[FN7] For vehicles certified to special standards authorized by [section 1960.3, Article 2, Subchapter 1, Chapter 3, Title 13, California Administrative Code.](#)

[FN8] For vehicles certified to special standards authorized by [section 1960.4, Article 2, Subchapter 1, Chapter 3, Title 13, California Administrative Code.](#) Special standards revert to "1983 and subsequent" standards for 1985 and subsequent passenger cars and 1986 and subsequent LDTs and MDVs.

[FN9] The Executive Officer may grant limited relief from the 1983 passenger car and 1984 LDT and MDV special NO<sub>x</sub> standard to a manufacturer who exceeds the standard because of unforeseen technical problems.

[FN10] Diesel passenger cars, light-duty trucks, and medium-duty vehicles are subject to the following particulate exhaust emission standards: 0.4 g/mi for the 1985 model year, 0.2 g/mi for the 1986 through 1988 model years, and 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.

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

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

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(k) The test procedures for determining compliance with these standards are set forth in "California Exhaust Emission Standards and Test Procedures for 1981 through 1987 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," adopted by the state board on November 23, 1976, as last amended May 20, 1987, and in "California Exhaust Emission Standards and Test Procedures for 1988 through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," adopted by the state board on May 20, 1987, as last amended August 5, 1999, both of which are incorporated herein by reference, and in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as incorporated by reference in section 1961(d). The test procedures for determining the compliance of 2001 through 2006 model-year hybrid electric vehicles with the standards set forth in this section are set forth in "California Exhaust Emission Standards and Test Procedures for 2005 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck, and Medium-Duty Vehicle Classes, as incorporated by reference in section 1962(h).

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

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

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

(o) [Reserved]

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

1996 AND SUBSEQUENT MODEL-YEAR COLD TEMPERATURE CARBON MONOXIDE EXHAUST EMISSIONS STANDARDS FOR PASSENGER CARS, LIGHT-DUTY TRUCKS, AND MEDIUM-DUTY VEHICLES [FN1,2] (grams per mile)

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

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Medium-Duty Vehicle 3750-8500 [FN3] 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 [FN0] F (-7 [FN0] C).

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

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

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(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:

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\_\_\_\_\_

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) %n4,5,6,7,8,9,10

Loaded Vehicle Type	Vehicle Weight (lbs.)	Durability Vehicle Basis (mi)	NMHC Fuel Type	NOx Composite	%n A/C Test	CO US06 Test	Composite Option
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	

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		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	

[FN1] Abbreviations.

"PC" means passenger car.

"LDT" means light-duty truck.

"NMHC+NO<sub>x</sub>" 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.

[FN2] 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."

[FN3] 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.

[FN4] 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.

[FN5] 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.

[FN6] 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.

[FN7] 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<sub>x</sub> 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<sub>x</sub> 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 emis-

sions 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.

[FN8] "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<sub>x</sub> 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 en-

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gines. 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.

[FN9] 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

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

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

[FN10] 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 Proced-

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.

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

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(r) The Supplemental Federal Test Procedure (SFTP) standards in this section represent the maximum SFTP exhaust emissions at 4,000 miles + 250 miles or at the mileage determined by the manufacturer for emission-data vehicles in accordance with the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), and with the "California

Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as incorporated by reference in section 1961(d). The SFTP exhaust emission levels from new 2001 and subsequent model low-emission vehicles, ultra-low-emission vehicles and super-ultra-low-emission vehicles in the passenger car and light-duty truck class, and new 2003 and subsequent low-emission vehicles, ultra-low-emission

vehicles, and super-ultra-low-emission vehicles in the medium-duty class, shall not exceed:

\_\_\_\_\_  
 \_\_\_\_\_

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) %n6,7,8,9,10,11

Vehicle Type [FN1]	Loaded Weight (lbs.) [FN2]	%n US06 Test		A/C Test [FN1, 5]		
		NOx [FN1]	NMHC [FN4]+ CO [FN1]	NMHC [FN4] + NOx	CO [FN1]	
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 [FN3]	0.60	11.8	0.44	4.0	

[FN1] Abbreviations and Definitions. For the purposes of this SFTP standards table only, the following abbreviations and definitions apply:

"PC" means passenger car.

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

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

"NMHC+NOx" means non-methane hydrocarbon plus oxides of nitrogen emissions.

"CO" means carbon monoxide emissions.

"US06" means the test cycle designed to evaluate emissions during aggressive and microtransient driving.

"A/C" means air-conditioning.

[FN2] For MDVs, "Loaded Vehicle Weight" shall mean "Test Weight," which is the average of the vehicle's curb weight and gross vehicle weight.

[FN3] Vehicles with a gross vehicle weight rating over 8,500 pounds are exempted from the requirements of this subsection.

[FN4] 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."

[FN5] 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<sub>x</sub> 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<sub>x</sub> 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.

[FN6] 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.

[FN7] 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.

[FN8] Air to Fuel Ratio Requirement. With the exception of cold-start conditions, warm-up conditions and rapid-throttle motion conditions

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("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.

[FN9] "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<sub>x</sub> 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.

[FN10] 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.

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

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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 sec-

tion 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.

[FN11] 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.

<General Materials (GM) - References, Annotations, or Tables>

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](#).

## HISTORY

1. Amendment filed 1-14-83; effective thirtieth day thereafter (Register 83, No. 3).

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2. Amendment of subsection (h) filed 4-20-83; effective upon filing pursuant to [Government Code section 11346.2\(d\)](#) (Register 83, No. 17).
3. Amendment of subsection (h) filed 2-17-84; effective thirtieth day thereafter (Register 84, No. 7).
4. Editorial correction of subsection (i) filed 5-8-84; effective thirtieth day thereafter (Register 84, No. 19).
5. Amendment of subsection (h) filed 11-15-85; effective thirtieth day thereafter (Register 85, No. 46).
6. Amendment of subsections (d)-(k) filed 4-21-87; operative 5-21-87 (Register 87, No. 17).
7. Amendment of subsections (d), (e) and (h) filed 7-1-87; operative 7-31-87 (Register 87, No. 28).
8. Amendment filed 2-21-90; operative 3-23-90 (Register 90, No. 8).
9. Amendment of subsections (e) and (i), new subsections (f)(1) and (f)(2) and renumbering of subsections (f)-(k) to subsections (g)-(l) filed 5-22-90; operative 6-21-90 (Register 90, No. 28).
10. Amendment of subsections (e), (f), (g), (h), (i), (j), (k), (l) and (m) filed 8-2-91; operative 9-2-91 (Register 91, No. 49).
11. New subsection (g) and subsection renumbering filed 8-30-91; operative 9-30-91 (Register 92, No. 14).
12. New subsections (e)(3), (h)(2) and (o) filed 8-30-91; operative 9-30-91 (Register 92, No. 14).
13. New subsections (e)(1), (e)(2), (f)(1), (f)(2) and (h)(1) filed 8-30-91; operative 9-30-91 (Register 92, No. 14).
14. Editorial correction of printing error restoring inadvertently omitted subsections (g)(2) and (h)(1)(4) (Register 92, No. 25).

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15. Amendment of footnotes 4 and 6 in subsection (e)(3)'s Table, footnotes 3, 4 and 8 in subsection (g)(1)'s Table, footnotes 3, 4a, 9a, and 13 in subsection (h)(2)'s Table, and subsection (k) filed 11-9-92; operative 12-9-92 (Register 92, No. 46).

16. Amendment of subsection (k) filed 12-9-92; operative 1-1-93 (Register 92, No. 50).

17. Amendment of subsection (k) and Note filed 7-20-93; operative 8-19-93 (Register 93, No. 30).

18. Amendment of subsection (k) filed 11-2-93; operative 12-2-93 (Register 93, No. 45).

19. Amendment of subsection (e)(3) table (6), (f)(1) table (2) and (7), (f)(2) table, (g)(1) table, (g)(2) and table, (h)(1) table and (h)(2) table filed 11-8-93; operative 12-8-93 (Register 93, No. 46).

20. Editorial correction of printing errors in subsections (e)(3), (f)(2) table (3), (g)(1) table (1), (3) and (6), (g)(2) table (4), (5) and (9), (h)(1) table (2), (3) and (5), and (h)(2) table (2)-(5), (8)-(10) and (12)-(13) (Register 93, No. 46).

21. Editorial correction of printing errors in subsection (g)(1), table 1 and subsection (h)(1), table 2 (Register 94, No. 2).

22. Change without regulatory effect amending subsection (h)(2) filed 3-30-94 pursuant to [title 1, section 100, California Code of Regulations](#) (Register 94, No. 13).

23. Amendment of subsection (k) filed 4-13-95; operative 4-13-95 pursuant to [Government Code section 11343.4\(d\)](#) (Register 95, No. 15).

24. Editorial correction of subsection (l) (Register 95, No. 38).

25. Change without regulatory effect amending subsection (l) filed 9-20-95 pursuant to [section 100, title 1, California Code of Regulations](#) (Register 95, No. 38).



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26. Amendment of section and Note filed 9-23-96; operative 10-23-96 (Register 96, No. 39).

27. Amendment of subsections (g)(1), (g)(2), (h)(2) and (k) filed 1-3-97; operative 1-3-97 pursuant to [Government Code section 11343.4](#)(d) (Register 97, No. 1).

28. Amendment of subsection (k) filed 7-25-97; operative 8-24-97 (Register 97, No. 30).

29. Amendment of subsection (k) and new subsections (q)-(r)(11) filed 7-17-98; operative 8-16-98 (Register 98, No. 29).

30. Editorial correction of subsections (d)(2), (e)(1), (g)(1), (g)(2), (h)(2) and reformatting of subsections (q) and (r) (Register 99, No. 26).

31. Amendment of section heading and subsections (e)(2), (e)(3), (f)(2), (g)(1), (g)(2), (h)(1), (h)(2), (j), (k), (n), (p) and (r) and repealer of subsection (o) filed 10-28-99; operative 11-27-99 (Register 99, No. 44).

32. Amendment of subsection (k) filed 5-24-2002; operative 6-23-2002 (Register 2002, No. 21).

33. Amendment of subsections (e)(3) and (h)(2) filed 9-16-2002; operative 10-16-2002 (Register 2002, No. 38).

34. Amendment of subsection (k) filed 2-25-2004; operative 3-26-2004 (Register 2004, No. 9).

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