State of California
AIR RESOURCES BOARD

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 1985 ~~AND SUBSEQUENT~~ THROUGH 2003 MODEL HEAVY-DUTY DIESEL-ENGINES AND VEHICLES

Adopted:	April 8, 1985
Amended:	July 29, 1986
Amended:	January 19, 1990
Amended:	May 15, 1990
Amended:	December 26, 1990
Amended:	July 12, 1991
Amended:	October 23, 1992
Amended:	October 22, 1993
Amended:	March 24, 1994
Amended:	September 22, 1994
Amended:	June 29, 1995
Amended:	June 4, 1997
Amended:	February 26, 1999
Amended:	November 22, 2000 (urban bus)
Amended:	December 8, 2000 (NTE)
Amended:	October 25, 2001 (2007)
Amended:	December 12, 2002

NOTE: This document is a compilation of all the modifications adopted by the Board up through the 2003 model year with some proposed updated conforming language. The non-substantive conforming language is indicated by underline for additions and ~~strikeout~~ for deletions. A new version of these test procedures has been proposed that will apply to 2004 and subsequent model year heavy-duty vehicles.

The format of this document is as follows: various sections of the Code of Federal Regulations (CFR), are incorporated by reference with some modifications. Larger portions of Federal language for a specific section that are not included in these procedures are denoted by the words "DELETE" and larger portions of new California language are indicated by "REPLACE WITH" or "INSERT." The symbols "* * * * *" and "..." mean that the remainder of the federal text for a specific section, which is not shown in these procedures, has been included by reference, with only the printed text changed.

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 1985 ~~AND SUBSEQUENT~~ THROUGH 2003 MODEL HEAVY-DUTY DIESEL-ENGINES AND VEHICLES

The following provisions of Subparts A, I, and N, Part 86, Title 40, Code of Federal Regulations, as adopted or amended by the U.S. Environmental Protection Agency on the date listed, and only to the extent they pertain to the testing and compliance of exhaust emissions from heavy-duty diesel engines and vehicles, are adopted and incorporated herein by this reference as the California Exhaust Emission Standards and Test Procedures for 1985 ~~and subsequent~~ through 2003 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles, except as altered or replaced by the provisions set forth below.

The federal regulations contained in the Subparts identified above that pertain to oxides of nitrogen emission averaging shall not be applicable to these procedures except for diesel engines and vehicles produced in the 1998 ~~and subsequent~~ through 2003 and subsequent model years. The federal regulations contained in the Subparts identified above which pertain to particulate emission averaging are not incorporated in these procedures for 1996 ~~and later~~ through 2003 model engines and vehicles except for diesel engines and vehicles produced in the 1998 ~~and subsequent~~ through 2003 model years. The smoke exhaust test procedures shall be applicable to California petroleum-fueled, liquefied-petroleum gas-fueled, and compressed natural gas-fueled heavy-duty diesel engines and vehicles for 1988 ~~and later~~ through 2003 model years.

The federal regulations in the subparts identified above which pertain to nonconformance penalty shall not be applicable.

The federal regulations contained in the subparts identified above which pertain to evaporative emissions shall not be applicable to these procedures. Applicable regulations pertaining to evaporative emissions are contained in "California Evaporative Emission Standards and Test Procedures for 1978 and Subsequent Model Motor Vehicles," as incorporated in Title 13, California Code of Regulations, Section 1976.

Starting with the 1990 model year, these regulations shall be applicable to all heavy-duty natural-gas-fueled and liquefied-petroleum gas-fueled engines (and vehicles) including those engines derived from existing diesel engines. For any engine that is not a distinctly diesel engine nor derived from such, the Executive Officer shall determine whether the engine shall be subject to these regulations or alternatively to the heavy-duty Otto-cycle engine regulations, in consideration of the relative similarity of the engine's torque-speed characteristics and vehicle applications with those of diesel and Otto-cycle engines.

The regulations concerning the certification of methanol-fueled diesel urban bus engines are not applicable in California until 1991 and subsequent model years. The regulations concerning the certification of all other methanol-fueled diesel engines and vehicles are not applicable in California until 1993 ~~and subsequent~~ through 2003 model years.

Regulations concerning the certification of incomplete medium-duty diesel low-emission vehicles and engines and ultra-low-emission vehicles and engines operating on any fuel are applicable for the 1992 ~~and subsequent~~ through 2003 model years.

All references to the "Administrator" in the federal regulations contained in the subparts identified above shall be replaced with the "Executive Officer."

Subpart A - General Provisions for Emission Regulations for 1977 and Later Model Year New Light-Duty Vehicles, Light-Duty Trucks, and Heavy-Duty Engines, and for 1985 and later Model Year New Gasoline-Fueled, Natural Gas-Fueled, Liquefied Petroleum Gas-Fueled and Methanol-Fueled Heavy-Duty Vehicles.

86.085-1 General Applicability. March 25, 1985

* * * * *

(b) … may request to certify any pre-1996 model year heavy-duty vehicle 10,000 pounds GVWR or less to the medium-duty vehicle exhaust emission standards.

* * * * *

(e) … projected combined California sales of passenger cars, light-duty trucks, medium-duty vehicles and heavy-duty engines in its product line are fewer than 3,000 units for the model…

86.090-1 General Applicability. April 11, 1989.

(a) ... heavy-duty engines. Starting with the 1990 model year, the provisions of this subpart are also applicable to all dedicated gaseous-fuel, dual-fuel and multi-fuel diesel engines (or vehicles) including those engines derived from existing diesel engines. Any reference to diesel engines and vehicles shall also apply to gaseous-fuel engines and vehicles, except where specifically noted. Starting with the 1992 model year, the provisions of this subpart are also applicable to incomplete medium-duty diesel low-emission vehicles and engines and ultra-low-emission vehicles and engines operating on any fuel.

(b) ... Gross Vehicle Weight Rating or less to the medium-duty vehicle exhaust emission standards. Heavy-duty...

* * * * *

(e) ... projected combined California sales of passenger cars, light-duty trucks, medium-duty vehicles, and heavy-duty engines in its product line are fewer than 3,000 units for the model...

* * * * *

86.085-2 Definitions. November 16, 1983.

* * * * *

"Administrator" DELETE; REPLACE WITH:
"Administrator" means the Executive Officer of the Air Resources Board.

* * * * *

"Certificate of Conformity" DELETE; REPLACE WITH:
"Certificate of Conformity" means "Executive Order" certifying vehicles for sale in California.

"Certification" DELETE; REPLACE WITH:
"Certification" means certification as defined in Section 39018 of the Health and Safety Code.

* * * * *

~~"Heavy-Duty Engine" DELETE; REPLACE WITH:~~
~~"Heavy-duty engine" means an engine which is used to propel a heavy-duty vehicle.~~

~~"Heavy-Duty Vehicle" DELETE; REPLACE WITH:~~
~~"Heavy-duty vehicle" means any motor vehicle having a manufacturer's gross vehicle weight rating greater than 6,000 pounds, except passenger cars.~~

* * * * *

"**Medium-duty vehicle"** means 1992 through 2003 ~~and subsequent~~ model year heavy-duty low-emission vehicle, ~~or~~ ultra-low-emission vehicle, super-ultra-low-emission vehicle or zero-emission vehicle certified to the standards in title 13, CCR, section 1960.1(h)(2) having a manufacturer's gross vehicle weight rating of 14,000 pounds or less; ~~or~~ any 1995 through 2003 ~~or subsequent~~ model year heavy-duty vehicle certified to the standards in section 1960.1(h)(1) having a manufacturer's gross vehicle weight rating of 14,000 pounds or less; and any 2000 and subsequent model heavy-duty low-emission, ultra-low-emission, super-ultra-low-emission or zero-emission vehicle certified to the standards in section 1961(a)(1) or 1962, having a manufacturer's gross vehicle weight rating between 8,500 and 14,000 pounds.

"**Urban bus"** means a passenger-carrying vehicle powered by a heavy heavy-duty diesel engine, or of a type normally powered by a heavy heavy-duty diesel engine, with a load capacity of fifteen or more passengers and intended primarily for intra-city operation, i.e., within the confines of a city or greater metropolitan area. Urban bus operation is characterized by short rides and frequent stops. To facilitate this type of operation, more than one set of quick-operating entrance and exit doors

would normally be installed. Since fares are usually paid in cash or tokens, rather than purchased in advance in the form of tickets, urban buses would normally have equipment installed for collection of fares. Urban buses are also typically characterized by the absence of equipment and facilities for long distance travel, e.g., rest rooms, large luggage compartments, and facilities for stowing carry-on luggage. The useful life for urban buses is the same as the useful life for other heavy heavy-duty diesel engines.

"**Useful life"** means:

(1) DELETE

(2) DELETE

(3) DELETE

(4) For a diesel HDE family:

(i) For light heavy-duty diesel engines, for carbon monoxide, particulate, and oxides of nitrogen plus non-methane hydrocarbons emissions standards, a period of use of 10 years or 110,000 miles, whichever first occurs.

(ii) For medium heavy-duty diesel engines, for carbon monoxide, particulate, and oxides of nitrogen plus non-methane hydrocarbons emission standards, a period of use of 10 years or 185,000 miles, whichever first occurs.

(iii) For heavy heavy-duty diesel engines, for carbon monoxide, particulate, and oxides of nitrogen plus non-methane hydrocarbon emissions standards, a period of use of 10 years or 435,000 miles, or 22,000 hours, whichever first occurs, except as provided in paragraphs (4)(iv) and (4)(v) of this definition.

(iv) The useful life limit of 22,000 hours in paragraph (4)(iii) of this definition is effective as a limit to the useful life only when an accurate hours meter is provided by the manufacturer with the engine and only when such hours meter can reasonably be expected to operate properly over the useful life of the engine.

(v) For an individual engine, if the useful life hours limit of 22,000 hours is reached before the engine reaches 10 years or 100,000 miles, the useful life shall become 10 years or 100,000 miles, whichever occurs first, as required under Clean Air Act section 202(d).

(5) As an option for HDE families, an alternative useful life period may be assigned by the Administrator under the provisions of §86.094-21(f).

"**Warranty period**" [DELETE, for guidance see California Code of Regulations, Title 13, §2036].

* * * * *

"Gaseous Fuel" means compressed natural gas or liquefied petroleum gas fuel for use in motor vehicles and engines.

"Dedicated Gaseous-Fuel Engine" means any gaseous-fuel engine that is engineered and designed to be operated solely on a gaseous fuel.

"Duel-Fuel Engine" means any gaseous-fuel engine that is engineered and designed to be operated on either a gaseous fuel to a petroleum fuel.

"Multi-Fuel Engine" means any gaseous-fuel engine that is engineered and designed to be operated with a gaseous fuel simultaneously with a petroleum fuel.

86.093-2 Definitions. March 24, 1993

The definitions of 86.092-2 remain effective. The definitions listed in this section apply beginning with the 1993 model year.

* * * * *

"Urban bus" means a passenger-carrying vehicle powered by a heavy heavy-duty diesel engine, or of a type normally powered by a heavy heavy-duty diesel engine, with a load capacity of fifteen or more passengers and intended primarily for intra-city operation, i.e., within the confines of a city or greater metropolitan area. Urban bus operation is characterized by short rides and frequent stops. To facilitate this type of operation, more than one set of quick-operating entrance and exit doors would normally be installed. Since fares are usually paid in cash or tokens, rather than purchased in advance in the form of tickets, urban buses would normally have equipment installed for collection of fares. Urban buses are also typically characterized by the absence of equipment and facilities for long distance travel, e.g., rest rooms, large luggage compartments, and facilities for stowing carry-on luggage. The useful life for urban buses is the same as the useful life for other heavy heavy-duty diesel engines.

* * * * *

86.094-2 Definitions. March 24, 1993.

* * * * *

"Useful life" means:

* * * * *

(d) For a diesel heavy-duty engine family:

(1) For light heavy-duty diesel engines, a period of use of 8 years or 110,000 miles, whichever first occurs.
(2) For medium heavy-duty diesel engines, a period of use of 8 years or 185,000 miles, whichever first occurs.
(3) For heavy heavy-duty diesel engines, a period of use of 8 years or 290,000 miles, whichever first occurs, except as provided in paragraph (4).
(4) For heavy heavy-duty diesel engines used in urban buses, for the particulate standard, a period of use of 10 years or 290,000 miles, whichever first occurs.

* * * * *

86.098-2 Definitions. April 6, 1994.

The definitions of §86.096-2 continue to apply to 1996 and later model year vehicles. DELETE.

The definitions listed in this section apply beginning with the 1998 model year.

"Dispensed fuel temperature" DELETE
"Evaporative/refueling emission control system" DELETE
"Evaporative/refueling emission family" DELETE
"Integrated refueling emission control system" DELETE
"Non-integrated refueling emission control system" DELETE
"Refueling emissions" DELETE
"Refueling emission canister(s)" DELETE
"Resting losses" DELETE
"Useful life" means:
(1) DELETE
(2) DELETE
(3) DELETE
(4) For a diesel heavy-duty engine family:
(i) DELETE
(ii) For light heavy-duty diesel engines, for the oxides of nitrogen standard, a period of use of 10 years or 110,000 miles, whichever first occurs.
(iii) DELETE
(iv) For medium heavy-duty diesel engines, for the oxides of nitrogen standard, a period of use of 10 years or 185,000 miles, whichever first occurs.
(v) DELETE

(vi) For heavy heavy-duty diesel engines, for the oxides of nitrogen standard, a period of use of 10 years or 290,000 miles, whichever first occurs.
(vii) DELETE

86.004-2 Definitions. January 18, 2001.

The definitions of §86.098-2 continue to apply to 1998 and later model year vehicles. The definitions listed in this section apply beginning with the 2004 model year.

"Useful life" means:

(1) DELETE
(2) DELETE
(3) DELETE
(4) For a diesel HDE family:
(i) For light heavy-duty diesel engines, for carbon monoxide, particulate, and oxides of nitrogen plus non-methane hydrocarbons emissions standards, a period of use of 10 years or 110,000 miles, whichever first occurs.
(ii) For medium heavy-duty diesel engines, for carbon monoxide, particulate, and oxides of nitrogen plus non-methane hydrocarbons emission standards, a period of use of 10 years or 185,000 miles, whichever first occurs.
(iii) For heavy heavy-duty diesel engines, for carbon monoxide, particulate, and oxides of nitrogen plus non-methane hydrocarbon emissions standards, a period of use of 10 years or 435,000 miles, or 22,000 hours, whichever first occurs, except as provided in paragraphs (4)(iv) and (4)(v) of this definition.
(iv) The useful life limit of 22,000 hours in paragraph (4)(iii) of this definition is effective as a limit to the useful life only when an accurate hours meter is provided by the manufacturer with the engine and only when such hours meter can reasonably be expected to operate properly over the useful life of the engine.
(v) For an individual engine, if the useful life hours limit of 22,000 hours is reached before the engine reaches 10 years or 100,000 miles, the useful life shall become 10 years or 100,000 miles, whichever occurs first, as required under Clean Air Act section 202(d).
(5) As an option for HDE families, an alternative useful life period may be assigned by the Administrator under the provisions of §86.094-21(f).

Warranty period [DELETE, for guidance see California Code of Regulations, Title 13, §2036].

86.078-3 Abbreviations. January 21, 1980.
86.090-3 Abbreviations. April 11, 1989.
86.098-3 Abbreviations. October 21, 1997.

(a) The abbreviations in §86.090-3 continue to apply. The abbreviations in this section apply beginning with the 1998 model year.

(b) The abbreviations of this section apply to this subpart, and also to subpart N of this part, and have the following meanings:

T_D --DELETE
ABT--Averaging, banking, and trading
HDE--Heavy-duty engine

86.084-4 Section numbering; construction. September 25, 1980.
86.084-5 General standards; increase in emissions; unsafe conditions. November 2, 1982.
86.090-5 General standards; increase in emissions; unsafe conditions. April 11, 1989
86.078-6 Hearings on certification December 12, 1984.
86.078-7 Maintenance of records; submittal of information; right of entry. November 2, 1982.
86.085-11 Emission standards for 1985 and later model year diesel heavy-duty engines. November 16, 1983.

* * * * *

(a)(1)(iii) Oxides of Nitrogen. 5.1 grams per ...

* * * * *

(b) DELETE; REPLACE WITH:
(b) At the option of the manufacturer, the standards set forth in §86.088-11, paragraph (a)(1) can replace the standards set forth in paragraph (a)(1), applicable to new 1987 model year diesel heavy-duty engines only.

* * * * *

(d) ...in Subpart N of this part to ascertain...

* * * * *

86.088-11 Emission standards for 1988 and later model year diesel heavy-duty engines. March 15, 1985.
86.090-11 Emission standards for 1990 and later model year diesel heavy-duty engines and vehicles. April 11, 1989.

* * * * *

(b)(1) The opacity of smoke emission from new 1990 and later model year petroleum-fueled diesel heavy-duty engines shall not exceed:

* * * * *

86.091-11 Emission standards for 1991 and later model year diesel heavy-duty engines and vehicles. April 11, 1989.

* * * * *

(a)(1)(iv)(C) A manufacturer may elect to include all or some of its diesel heavy-duty engine families in the appropriate heavy-duty particulate averaging program (petroleum or methanol or gaseous fuel), provided that engines produced for sale in California or in 49-state areas may be averaged only within each of those areas. Dual-fuel and multi-fuel engines may not be included in the diesel particulate averaging program. With the exceptions regarding methanol-fueled or gaseous-fuel diesel urban bus engines as noted below, averaging is not permitted between fuel types. Non-methanol-fueled and non-gaseous-fuel engines for use in urban buses may not be included in either heavy-duty particulate averaging program. Emissions from methanol-fueled and dedicated gaseous-fuel urban bus engines certified to 0.10 grams per brake horsepower-hour particulates may be included in the averaging program for petroleum fueled engines other than urban bus engines. Averaging is limited to engines within a given primary service class as defined in 86.085-2. Averaging across primary service classes is not permitted. If the manufacturer elects to participate in either averaging program, individual family particulate limits may not exceed 0.60 gram per brake horsepower-hour (0.22 grams per megajoule). Heavy-duty diesel engines converted to methanol fuel or gaseous fuel may be used to comply with the urban bus particulate standard and may be used in the diesel particulate averaging program. Such engines must comply with all applicable heavy-duty diesel engine emission standards and test procedures in this Part.

* * * * *

(a)(2) Manufacturers may choose to certify diesel and incomplete medium-duty vehicles from 8501-14,000 pounds, gross vehicle weight to the emission standards and test procedures specified below as an alternative to the primary standards and test procedures specified in §1960.1, Title 13, California Code of Regulations. Manufacturers certifying medium-duty vehicles to these optional heavy-duty standards and test procedures shall reimburse the cost of in-use procurement and compliance testing as specified in §§2136 through 2140, Title 13, California Code of Regulations. Exhaust emissions from new 1995 and later model year medium-duty vehicles certifying to the optional heavy-duty engine test procedures shall not exceed the following:

(i) Carbon Monoxide. 14.4 grams per brake horsepower-hour, as measured under transient operating conditions.

(ii) Non-Methane Hydrocarbons and Oxides of Nitrogen. 3.9 grams per brake horsepower-hour total, as measured under transient operating conditions.

(iii) Particulate Emissions. 0.10 grams per brake horsepower-hour, as measured under transient operating conditions.

(3) Manufacturers may choose to certify incomplete medium-duty low-emission, ~~and~~ ultra-low-emission, and super-ultra-low-emission vehicles from 8501-14,000 pounds gross vehicle weight to the emission standards and test procedures specified below as an alternative to the primary standards and test procedures specified in §1960.1, Title 13, California Code of Regulations. Manufacturers certifying medium-duty low-emission, ~~and~~ ultra-low-emission, and super-ultra-low-emission vehicles to these optional heavy-duty standards and test procedures shall specify, in the application for certification, an in-use compliance test procedure, as provided in §2139(c), Title 13, California Code of Regulations. Exhaust emissions from new 1992 and later model year medium-duty low-emission (LEV), ~~and~~ ultra-low-emission (ULEV) , and super-ultra-low-emission (SULEV) vehicles certifying to the optional heavy-duty engine test procedures shall not exceed the following:

(i) Carbon Monoxide. 14.4 grams per brake horsepower-hour for LEVs and ULEVs and 7.2 grams per brake horsepower-hour for SULEVs, as measured under transient operating conditions.

(ii) Non-Methane Hydrocarbons and Oxides of Nitrogen. 3.5 grams per brake horsepower-hour total for LEVs through the 2001 model year; 3.0 grams per brake horsepower-hour total for LEVs for the 2002 and 2003 model years; ~~and~~ 2.5 grams per brake horsepower-hour total for ULEVs, and 2.0 grams per brake horsepower-hour for SULEVs, as measured under transient operating conditions.

(iii) Particulate Emissions. 0.10 grams per brake horsepower-hour for LEVs and ULEVs and 0.05 grams per brake horsepower-hour for SULEVs, as measured under transient operating conditions.

(iv) Formaldehyde Emissions. 0.050 grams per brake horsepower-hour for LEVs and ULEVs and 0.025 grams per brake horsepower-hour for SULEVs, as measured under transient operating conditions.

(4) The standards set forth in paragraphs (a)(1), (a)(2), and (a)(3) ....

* * * * *

(b)(1) The opacity of smoke emission from new 1991 and later model year petroleum-fueled diesel heavy-duty engines shall not exceed:

* * * * *

86.094-11 Emission standards for 1994 and later model year diesel heavy-duty engines and vehicles. March 24, 1993.

* * * * *

(a)(1)(iv) Particulate.

(A) For diesel engines to be used in urban buses, 0.07 gram per brake horsepower-hour (0.026 gram per megajoule), as measured under transient operating conditions.

(B) For all other diesel engines only, 0.10 gram per brake horsepower-hour (0.037 gram per megajoule), as measured under transient operating conditions.

(C) A manufacturer may elect to include all or some of its diesel heavy-duty engine families in the appropriate heavy-duty particulate averaging program (petroleum or methanol or gaseous fuel), provided that engines produced for sale in California or in 49-state areas may be averaged only within each of those areas. Dual-fuel and multi-fuel engines may not be included in the diesel particulate averaging program. With the exceptions regarding methanol-fueled or gaseous-fuel diesel urban bus engines as noted below, averaging is not permitted between fuel types. Non-methanol-fueled and non-gaseous-fuel engines for use in urban buses may not be included in either heavy-duty particulate averaging program. Emissions from methanol-fueled and dedicated gaseous-fuel urban bus engines certified to 0.10 grams per brake horsepower-hour particulates for 1991-1993 model years, and certified to 0.07 grams per brake horsepower-hour particulates for 1994-1995 model years, may be included in the averaging program for petroleum fueled engines other

than urban bus engines. Averaging is limited to engines within a given primary service class as defined in 86.085-2. Averaging across primary service classes is not permitted. If the manufacturer elects to participate in either averaging program, individual family particulate limits may not exceed 0.60 gram per brake horsepower-hour (0.22 grams per megajoule). Heavy-duty diesel engines converted to methanol fuel or gaseous fuel may be used to comply with the urban bus particulate standard and may be used in the diesel particulate averaging program. Such engines must comply with all applicable heavy-duty diesel engine emission standards and test procedures in this Part.

* * * * *

(a)(2) A manufacturer may elect to certify 1994 and 1995 model year heavy heavy-duty diesel engines to be used in urban buses to an optional oxides of nitrogen emission standard between 0.5 grams per brake horsepower-hour and 3.5 grams per brake horsepower-hour at 0.5 grams per brake horsepower-hour increments, as measured under transient operating conditions.

(b)(1) The opacity of smoke emission from new 1994 and later model year petroleum-fueled diesel heavy-duty engines shall not exceed:

* * * * *

86.096-11 Emission standards for 1996 and later model year diesel heavy-duty engines and vehicles. March 24, 1993.

(a) Exhaust emissions from new 1996 and later model year diesel heavy-duty engines shall not exceed the following:

(1) (i) Hydrocarbons (for petroleum-fueled diesel engines). 1.3 grams per brake horsepower-hour (0.48 gram per megajoule), as measured under transient operating conditions.

(ii) Organic Material Hydrocarbon Equivalent (for methanol-fueled diesel engines). 1.3 grams per brake horsepower-hour (0.48 gram per megajoule), as measured under transient operating conditions.

(iii) Non-Methane Hydrocarbons (an option for diesel, natural gas, or liquefied petroleum gas engines). 1.2 grams per brake horsepower-hour, as measured under transient operating conditions.

(2) Carbon Monoxide.

(i) 15.5 grams per brake horsepower-hour (5.77 grams per megajoule), as measured under transient operating conditions.

(ii) 0.50 percent of exhaust gas flow at curb idle (methanol-fueled diesel only).

(3) Oxides of Nitrogen.

(i) For diesel engines to be used in urban buses, 4.0 grams per brake horsepower-hour, as measured under transient operating conditions.

(ii) For all other diesel engines only, 5.0 grams per brake horsepower-hour (1.9 grams per megajoule), as measured under transient operating conditions.

(iii) DELETE

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

(4) Particulate.

(i) For diesel engines to be used in urban buses, 0.05 gram per brake horsepower-hour (0.019 gram per megajoule) for certification testing and 0.07 gram per brake horsepower-hour (0.026 gram per megajoule) for in-use testing, as measured under transient operating conditions.

(ii) For all other diesel engines only, 0.10 gram per brake horsepower-hour (0.037 gram per megajoule), as measured under transient operating conditions.

(iii) DELETE

(5) A manufacturer may elect to certify 1996 and later model year heavy heavy-duty diesel engines to be used in urban buses to an optional oxides of nitrogen emission standard between 0.5 grams per brake horsepower-hour and 2.5 grams per brake horsepower-hour at 0.5 grams per brake horsepower-hour increments, as measured under transient operating conditions.

(b) (1) The opacity of smoke emission from new 1996 and later model year petroleum-fueled diesel heavy-duty engines shall not exceed:

* * * * *

86.098-11 Emission standards for 1998 and later model year diesel heavy-duty engines and vehicles. October 21, 1997.

(a) Exhaust emissions from new 1998 and later model year diesel heavy-duty engines shall not exceed the following:

(1) DELETE

(2) DELETE

(3) Oxides of Nitrogen.

(i) 4.0 grams per brake horsepower-hour (1.49 grams per megajoule), as measured under transient operating conditions.

(ii) A manufacturer may elect to include any or all of its diesel HDE families in the banking portion of the NOx or NOx plus NMHC ABT programs for HDEs, within the restrictions described in this section and §86.098-15 as applicable.

(4) Particulate.

(i) DELETE

(ii) DELETE

(iii) A manufacturer may elect to include any or all of its diesel HDE families in the banking portion of the particulate ABT programs for HDEs, within the restrictions described in this section and §86.098-15 as applicable.

(A) DELETE

(B) DELETE

(C) DELETE

(iv) For 2002 and subsequent model year diesel-fueled, dual-fuel, and bi-fuel engines produced beginning October 1, 2002, for use in urban buses, the PM standard shall be 0.01 grams per brake horsepower-hour (0.004 grams per megajoule) for certification testing and selective enforcement audit testing, and 0.01 grams per brake horsepower-hour (0.004 grams per megajoule) for in-use testing, as measured under transient operating conditions. Manufacturers may choose to meet this standard with an aftertreatment system that reduces PM to 0.01 grams per brake horsepower-hour.

(b) DELETE

(c) DELETE

(d) DELETE

(e) (1) Reduced-emission exhaust emission standards for certain 1995 and later model year heavy-duty diesel engines may be optionally selected as follows:

(i) A manufacturer may elect to certify 1996 through 2002 model year diesel engines produced before October 1, 2002, for use in urban buses, to an optional reduced-emission oxides of nitrogen standard between 0.5 grams per brake horsepower-hour and 2.5 grams per brake horsepower-hour, inclusive, at 0.5 grams per brake horsepower-hour increments, as measured under transient operating conditions. Engines certified to a standard contained in this paragraph are not eligible to participate in NOx, NOx plus NMHC, or particulate ABT programs.

(ii) A manufacturer may elect to certify 1995 through 1997 model year diesel engines for use in vehicles with a Gross Vehicle Weight Rating of greater than 14,000 pounds except urban bus engines, and 1994 through 1995 model year urban bus engines, to an optional reduced-emission oxides of nitrogen standard between 0.5 grams per brake horsepower-hour and 3.5 grams per brake horsepower-hour, inclusive, at 0.5 grams per brake horsepower-hour increments, as measured under transient operating conditions. Engines certified to a standard contained in this paragraph are not eligible to participate in NOx, NOx plus NMHC, or particulate ABT programs.

(iii) A manufacturer may elect to certify 1998 through 2002 model year diesel engines produced before October 1, 2002, for use in vehicles with a Gross Vehicle Weight Rating of greater than 14,000 pounds, other than urban transit buses, to an optional reduced-emission oxides of nitrogen standard between 0.5 grams per brake horsepower-hour and 2.5 grams per brake horsepower-hour, inclusive, at 0.5 grams per brake horsepower-hour increments, as measured under transient operating conditions. Engines certified to a standard contained in this paragraph are not eligible to participate in NOx, NOx plus NMHC, or particulate ABT programs.

(iv) A manufacturer may elect to certify 2002 – 2003 model year diesel-fueled, dual-fuel, and bi-fuel engines for urban buses produced beginning October 1, 2002, to an optional reduced-emission oxides of nitrogen plus non-methane hydrocarbon standard between 0.3 grams per brake horsepower-hour and 1.8 grams per brake horsepower-hour, inclusive, at 0.3 grams per brake horsepower-hour increments, and particulate matter standards of 0.01 grams per brake horsepower-hour, as measured under transient operating conditions. Engines certified to the standards contained in this paragraph are not eligible to participate in NOx, NOx plus NMHC, or particulate ABT programs.

(v) A manufacturer may elect to certify 2002 model year diesel-cycle engines produced beginning October 1, 2002, through model year 2006 diesel-cycle engines, other than diesel-fueled, dual-fuel, and bi-

fuel engines, for urban buses to an optional reduced-emission oxides of nitrogen plus non-methane hydrocarbon standard between 0.3 grams per brake horsepower-hour and 1.8 grams per brake horsepower-hour, inclusive, at 0.3 grams per brake horsepower-hour increments, and a particulate matter standard of 0.01 grams per brake horsepower-hour, 0.02 grams per brake horsepower-hour, or 0.03 grams per brake horsepower-hour, as measured under transient operating conditions. Engines certified to the standards contained in this paragraph are not eligible to participate in NOx, NOx plus NMHC, or particulate ABT programs.

(vi) A manufacturer may elect to certify 2002 model year diesel engines produced beginning October 1, 2002 and later model year diesel engines, for use in vehicles with a Gross Vehicle Weight Rating of greater than 14,000 pounds, other than urban transit buses, to an optional reduced-emission oxides of nitrogen plus non-methane hydrocarbon standard between 0.3 grams per brake horsepower-hour and 1.8 grams per brake horsepower-hour, inclusive, at 0.3 grams per brake horsepower-hour increments, and a particulate matter standard of 0.01 grams per brake horsepower-hour, 0.02 grams per brake horsepower-hour, or 0.03 grams per brake horsepower-hour, as measured under transient operating conditions. Engines certified to the standards contained in this paragraph are not eligible to participate in NOx, NOx plus NMHC, or particulate ABT programs

(f) An engine family whose design allows engine operation in either of two distinct alternative fueling modes, where each fueling mode is characterized by use of one fuel or a combination of two fuels and significantly different emission levels under each mode, may certify to a different NOx standard for each fueling mode, provided it meets the following requirements:

(1) The NOx certification standard used for certification under the higher emitting fueling mode must be the standard contained in (a)(3)(i) of this section, as appropriate.

(2) The NOx certification standard used for certification under the lower emitting fueling mode must be one of the reduced-emission standards contained in (e)(1) of this section, as appropriate.

(3) The engine family is not used to participate in any manufacturer's averaging, banking or trading program.

(4) The engine family meets all other applicable emission standards in each fueling mode.

(5) The higher emitting fueling mode must be intended only for fail-safe vehicle operation in the case of a malfunction or inadvertent fuel depletion which precludes normal operation in the lower emitting fueling mode. Evidence of such design intent would be a significantly reduced horsepower versus engine speed curve when operating in the higher emitting fueling

mode as compared to the curve while operating in the lower emitting fueling mode.

(6) All applicable exhaust emission testing, data submission, and certification application requirements must be met separately for each of the two fueling modes of operation, but should be submitted for ARB approval in a single package.

86.080-12 Alternative certification procedures. April 17, 1980.
86.084-14 Small-volume manufacturers certification procedures. January 31, 1985.

* * * * *

(b)(1) ...produced by manufacturers with California sales (for the model year in which certification is sought) of fewer than 3,000 units (PC, LDT, MDV, and HDE combined).

* * * * *

(c)(4) DELETE; REPLACE WITH:
(c)(4) Small volume manufacturers shall include in their records all of the information that EPA requires in §86.084-21. This information will be considered part of the manufacturer's application for certification.

* * * * *

(c)(7)(i)(C) ...determines and prescribes based on design specifications or sufficient control over design specifications, development data, in-house testing procedures, and in-use experience. However, ...

* * * * *

(c)(11)(ii)(D)(*1*) ...We project the total California sales of vehicles (engines) subject to this subpart to be fewer than 3,000 units.

* * * * *

(c)(13)(ii) ...affect vehicle emissions. All running changes which do not adversely affect emissions or the emissions control system durability are deemed approved unless disapproved by the Executive Officer within 30 days of the implementation of the running change. This...

* * * * *

86.090-14 Small-volume manufacturers certification procedures. April 11, 1989.

* * * * *

(b)(1) ...produced by manufacturers with California sales (for the model year in which certification is sought) of fewer than 3,000 units (PC, LDT, MDV, and HDE combined).

* * * * *

(c)(4) DELETE; REPLACE WITH:
(c)(4) The manufacturer shall include in its records all of the information that EPA requires in §86.088-21 of this subpart. This information will be considered part of the manufacturer's application for certification.

* * * * *

(c)(7)(i)(C) ...determines and prescribes based on design specifications or sufficient control over design specifications, development data, in-house testing procedures, and in-use experience. However ...

* * * * *

(c)(11)(ii)(D)(*1*) ... We project the total California sales of vehicles (engines) subject to this subpart to be fewer than 3,000 units.

* * * * *

(c)(13)(ii) ...affect vehicle emissions. All running changes which do not adversely affect emissions or the emissions control system durability are deemed approved unless disapproved by the Executive Officer within 30 days of the implementation of the running change. This ...

86.098-15 NOx and particulate averaging, trading, and banking for heavy-duty engines, and NOx plus NMHC and particulate averaging, trading, and banking for medium-duty diesel-cycle engines certified under Title 13 California Code of Regulations §1956.8(h) for use in vehicles of more than 8,500 pounds through 14,000 pounds gross vehicle weight rating. October 21, 1997.

Introductory paragraph DELETE
New introductory paragraph (a) INSERT:
(a) Except as otherwise noted, references in this subsection to engines, heavy-duty engines, or HDEs shall include medium-duty diesel-cycle engines certified

under Title 13 California Code of Regulations §1956.8(h) for sale in California for use in vehicles of more than 8,500 pounds through 14,000 pounds gross vehicle weight rating. Except as otherwise noted, references to NOx averaging, banking and trading programs shall mean NOx plus NMHC averaging, trading and banking programs when applied to such medium-duty diesel-cycle engines.

(1) Heavy-duty engines eligible for NOx and particulate averaging, trading and banking programs are described in the applicable emission standards sections in this subpart or in Title 13 California Code of Regulations §1956.8(h). Manufacturers of heavy-duty engines certified for use in vehicles sold in California must utilize the requirements of paragraph (j) of this section for the inclusion of such engines in averaging, trading and banking programs. All heavy-duty engine families which include any engines labeled for use in clean-fuel vehicles as specified in 40 CFR part 88 are not eligible for these programs. Participation in these programs is voluntary.

* * * * *

(b)(6) If ARB or the manufacturer determines that a reporting error occurred on an end-of-year report previously submitted to ARB under this section, the manufacturer's credits and credit calculations will be recalculated. Erroneous positive credits will be void. Erroneous negative balances may be adjusted by ARB for retroactive use.

(i) If ARB review of a manufacturer's end-of-year report indicates a credit shortfall, the manufacturer will be permitted to purchase the necessary credits to bring the credit balance for that engine family to zero, at the ratio of 1.2 credits purchased for every credit needed to bring the balance to zero. If sufficient credits are not available to bring the credit balance for the engine family in question to zero, ARB may void the certificate for that engine family *ab initio*.

(ii) If within 180 days of receipt of the manufacturer's end-of-year report, ARB review determines a reporting error in the manufacturer's favor (i.e., resulting in a positive credit balance) or if the manufacturer discovers such an error within 180 days of ARB receipt of the end-of-year report, the credits will be restored for use by the manufacturer.

* * * * *

(c)(1) For each participating engine family, NOx and particulate emission credits (positive or negative) are to be calculated according to one of the following equations and rounded, in accordance with ASTM E29-93a, to the nearest one-tenth of a Megagram (MG). Consistent units are to be used throughout the equation.

(i) For determining credit need for all engine families and credit availability for engine families generating credits for averaging programs only:

Emission credits = (Std-FEL) x (CF) x (UL) x (Production) x (10^{-6})

(ii) For determining credit availability for engine families generating credits for trading or banking programs:

Emission credits = (Std-FEL) x (CF) x (UL) x (Production) x (10^{-6}) x (Discount)

(iii) For purposes of the equations in paragraphs (c)(1)(i) and (ii) of this section:

Std = the current and applicable heavy-duty engine NOx or particulate emission standard in grams per brake horsepower-hour or grams per Megajoule. In the case of medium-duty engines, Std= the Tier 1 standard for the 1998 through 2001 model years, the LEV standard for the 2002 through 2003 model years, and the ULEV standard for the 2004 and subsequent model years.

FEL = the NOx or particulate family emission limit for the engine family in grams per brake horsepower-hour or grams per Megajoule.

CF = a transient cycle conversion factor in BHP-hr/mi or MJ/mi, as given in paragraph (c)(2) of this section.

UL = the useful life, or alternative life as described in paragraph (f) of §86.094-21, for the given engine family in miles.

Production = the number of engines produced for U.S. sales within the given engine family during the model year. In the case of medium-duty engines and light heavy-duty engines, Production= the number of engines produced for California sales within the given engine family during the model year. Quarterly production projections are used for initial certification. Actual production is used for end-of-year compliance determination.

Discount = a one-time discount applied to all credits to be banked or traded within the model year generated. The discount applied here is 0.8. Banked credits traded in a subsequent model year will not be subject to an additional discount. Banked credits used in a subsequent model year's averaging program will not have the discount restored.

* * * * *

(d) Averaging sets for NOx emission credits: The averaging and trading of NOx emission credits will only be allowed between heavy-duty engine families in the same averaging set. Engines sold in California may only be used to generate credits to be banked for use in the year 2004 and later, according to paragraph (j) of this section. The averaging sets for the averaging and trading of NOx emission credits for heavy-duty engines are defined as follows:

* * * * *

(d)(2) For diesel cycle heavy-duty engines:

(i) Heavy heavy-duty engines and medium heavy-duty engines, as defined in §86.090-2, each constitute an averaging set. Light heavy-duty engines, as defined in §86.090-2, for use in vehicles of more than 14,000 pounds gross vehicle weight rating, and medium-duty engines certified under Title 13 California Code of Regulations §1956.8(h) for use in vehicles of more than 8,500 pounds through 14,000 pounds gross vehicle weight rating, combined constitute an averaging set. Averaging and trading among all diesel-cycle engine families within the same averaging set is allowed.

(ii) Urban buses are treated as members of the primary intended service class where they otherwise would fall.

* * * * *

(e) Averaging sets for particulate emission credits. The averaging and trading of particulate emission credits will only be allowed between diesel cycle heavy-duty engine families in the same averaging set. Engines sold in California may only be used to generate credits to be banked for use in the year 2004 and later, according to paragraph (j) of this section. The averaging sets for the averaging and trading of particulate emission credits for diesel cycle heavy-duty engines are defined as follows:

(1) Engines intended for use in urban buses constitute a separate averaging set from all other heavy-duty engines. Averaging and trading between diesel cycle bus engine families is allowed.

(2) For heavy-duty engines, exclusive of urban bus engines, heavy heavy-duty engines and medium heavy-duty engines, as defined in §86.090-2, each constitute an averaging set. Light heavy-duty engines, as defined in §86.090-2, for use in vehicles of more than 14,000 pounds gross vehicle weight rating and medium-duty engines certified under Title 13 California Code of Regulations §1956.8(h) for use in vehicles of more than 8,500 pounds through 14,000 pounds gross vehicle weight rating, combined

constitute an averaging set. Averaging and trading between diesel-cycle engine families within the same averaging set is allowed.

(3) Otto-cycle engines may not participate in particulate averaging, trading, or banking.

* * * * *

(f)(1)(ii) Manufacturers may bank credits only after the end of the model year and after actual credits have been reported to ARB in the end-of-year report. During the model year and before submittal of the end-of-year report, credits originally designated in the certification process for banking will be considered reserved and may be redesignated for trading or averaging.

* * * * *

(f)(3)(i) Banked credits may be used in averaging, or in trading, or in any combination thereof, during the certification period. Credits declared for banking from the previous model year but not reported to ARB may also be used. However, if ARB finds that the reported credits can not be proven, they will be revoked and unavailable for use.

* * * * *

(i) DELETE

(j) Program for early banking. Provisions set forth in paragraphs (a) through (i) of this section apply only as allowed in paragraph (j) of this section. The procedures of paragraph (j) must be utilized for engines certified for sale in California to participate in ABT programs.

(1) To be eligible for the program described in paragraph (j) of this section, the following must apply:

(i) Credits are generated from diesel cycle heavy-duty engines certified and labeled for use in California vehicles.

(ii) During certification, the manufacturer shall declare its intent to include specific engine families in the program described in this paragraph (j). Separate declarations are required for each program and no engine families may be included in both programs in the same model year.

(2) Credit generation and use.

(i) For engine manufacturers not subject to the Settlement Agreements[1], credits shall only be generated by 1998 and later model

1 Seven of the largest heavy-duty diesel engine manufacturers will be implementing measures to reduce emissions

year engine families. Manufacturers subject to the Settlement Agreements shall generate credits according to the specific requirements contained therein.

(ii) Credits may only be used for 2004 and later model year heavy-duty diesel engines, except that manufacturers subject to the Settlement Agreements shall generate credits according to the specific requirements contained therein. When used with 2004 and later model year engines, NOx credits may be used to meet the NOx plus NMHC standard, except as otherwise provided in §86.004-11(a)(1)(i)(D), and under the requirements of §86.004-15.

(iii) DELETE

(3) Program flexibilities.

(i) NOx and PM credits that are banked until model year 2004 under this paragraph (j) may be used in 2004 or any model year thereafter without being forfeited due to credit age, except that engine manufacturers subject to the Settlement Agreements shall be subject to the requirements contained in their respective Settlement Agreements. This supersedes the requirement in paragraph (f)(2)(i) of this section.

(ii) There are no regional category restraints for averaging, trading, and banking of credits generated under the program described in paragraph (j) of this section, except as noted in paragraphs (d), (e), and (j)(1)(i) of this section.

(iii) Credit discounting.

(A) For NOx and PM credits generated under this paragraph (j) from heavy-duty engine families with NOx certification levels greater than 3.5 grams per brake horsepower-hour for oxides of nitrogen, a Discount value of 0.9 shall be used in place of 0.8 in the credit availability equation in paragraph (c)(1) of this section. For credits generated from medium-duty engine families, a Discount value of 0.9 shall be used if the NOx plus NMHC value is greater than the applicable standard required in subparagraph (c)(1)(iii) less 0.5 g/BHP-hr. For manufacturers subject to the provisions in the Settlement Agreements for the advanced implementation date for the 2004 heavy-duty engine emission standards, the

---

beginning October 1, 2002, to meet the requirements of the Heavy-Duty Diesel Engine Settlement Agreements reached with the ARB. The Heavy-Duty Diesel Engine Settlements were agreements reached in response to lawsuits brought by the United States Environmental Protection Agency and violations alleged by the ARB pertaining to excess in-use emissions caused by the use of defeat devices and unacceptable algorithms. Navistar signed its Settlement Agreement on October 22, 1998. Cummins, Detroit Diesel Corporation, Caterpillar, Volvo, Mack and Renault signed their Settlement Agreements on December 15, 1998.

provisions contained in this paragraph shall apply to engines produced before October 1, 2002.

(B) For NOx and PM credits generated under this paragraph (j) from heavy-duty engine families with NOx certification levels less than or equal to 3.5 grams per brake horsepower-hour for oxides of nitrogen, a Discount value of 1.0 shall be used in place of 0.8 in the credit availability equation in paragraph (c)(1) of this section. For credits generated from medium-duty engine families, a Discount value of 1.0 shall be used if the NOx plus NMHC value is less than the applicable standard required in subparagraph (c)(1)(iii) less 0.5 g/BHP-hr. For manufacturers subject to the provisions in the Settlement Agreements for the advanced implementation date for the 2004 heavy-duty engine emission standards, the provisions contained in this paragraph shall apply to engines produced before October 1, 2002.

(iv) Credit apportionment. At the manufacturer's option, marketable emission reduction credits for NOx, for use in emission reduction credit programs other than ABT, may be generated based upon engine certification to the optional reduced-emission NOx certification standards of §86.098-11(e), except that medium-duty engines certified under Title 13 California Code of Regulations §1956.8(h) for use in vehicles of more than 8,500 pounds through 14,000 pounds gross vehicle weight rating may not be used as the basis for generating marketable emission reduction credits. Use of any marketable emission reduction credits generated must meet the requirements of the individual emission reduction credit program where the credits will be applied.

(A) For those engine sales used to generate ABT credits, the manufacturer shall report engine sales in the category "ABT-only credits." For those engine sales certified to generate marketable emission reduction credits for NOx, the manufacturer shall report engine sales in the category "non-manufacturer-owned credits."

(1) For engine sales reported as "ABT-only credits," the credits generated must be used solely in the ABT program described in this section or §86.004-15.

(2) The engine manufacturer may declare a portion of engine sales "nonmanufacturer-owned credits" and any marketable NOx credits generated based upon such sales would belong to another party. For ABT, the manufacturer may not generate any credits for the

engine sales reported as "nonmanufacturer-owned credits."

(B) Only manufacturer-owned credits resulting from engine sales reported as "ABT-only credits" shall be used in the averaging, trading, and banking provisions described in this section.

(C) Credits shall not be double-counted. Credits used in the ABT program may not be provided to an engine purchaser for use in another program.

(D) Manufacturers shall determine and state the number of engines sold as "ABT-only credits" and "nonmanufacturer-owned credits" in the end-of-model year reports required under §86.098-23.

(v) For medium-duty diesel-cycle engines certified under Title 13 California Code of Regulations §1956.8(h) for use in vehicles of more than 8,500 pounds through 14,000 pounds gross vehicle weight rating:

(A) From the 1998 model year through the 2005 model year, credits may be generated by an alternative mechanism proposed by the engine manufacturer and approved by the Executive Officer of the ARB. The alternative credit-generating mechanism shall not include any attribute expressly prohibited under the federal ABT program, such as cross-class or cross-fuel trading.

(B) Manufacturers must annually submit a proposed plan for generating credits to the Executive Officer of the ARB and have it approved prior to sale of engines of that model year in California.

86.085-20 Incomplete vehicles, classification. January 12, 1983.
86.085-21 Application for certification. December 10, 1984.
86.087-21 Application for certification. November 16, 1983.
86.088-21 Application for certification. March 15, 1985.
86.090-21 Application for certification. April 11, 1989.
86.091-21 Application for certification. April 11, 1989.

* * * * *

(b)(2) For 1992 and subsequent model-year low-emission and ultra-low-emission vehicles and engines not powered exclusively by diesel, projected California sales data and fuel economy estimates two years prior to certification, and projected California sales data for all vehicles and engines, regardless of operating fuel or vehicle emission category, sufficient to enable the Executive Officer to select a test

fleet representative of the vehicles (or engines) for which certification is requested at the time of certification.

* * * * *

86.098-21 Application for certification. October 21, 1997.

* * * * *

(b)(2) DELETE; REPLACE WITH:
(b)(2) For 1992 and subsequent model-year low-emission and ultra-low-emission vehicles and engines not powered exclusively by diesel, projected California sales data and fuel economy estimates two years prior to certification, and projected California sales data for all vehicles and engines, regardless of operating fuel or vehicle emission category, sufficient to enable the Executive Officer to select a test fleet representative of the vehicles (or engines) for which certification is requested at the time of certification.

* * * * *

86.085-22 Approval of application for certification; test fleet selections; determinations of parameters subject to adjustment for certification and selective enforcement audit, adequacy of limits, and physically adjustable ranges. August 30, 1985.

DELETE any reference to Selective Enforcement Audit.

86.090-22 Approval of application for certification; test fleet selections; determinations of parameters subject to adjustment for certification and selective enforcement audit, adequacy of limits, and physically adjustable ranges. April 11, 1989.

DELETE any reference to Selective Enforcement Audit.

86.085-23 Required data. March 15, 1985.

* * * * *

(b)(1) (ii) ...useful life of the engine. Such data shall be submitted to the Executive Officer for review. If the durability test method is accepted by EPA, it shall also be accepted by ARB, subject to the following condition. If, after certification for the first model year in which the method is used, the Executive Officer determines that a manufacturer's durability test procedures do not conform with good engineering practices, the Executive Officer may require changes to that manufacturer's durability test procedures for

subsequent model years. The manufacturer's revised durability test procedures shall be submitted to the Executive Officer for review and approval.

* * * * *

86.087-23 Required data. March 15, 1985.

* * * * *

(b)(1) (ii) ...useful life of the engine. Such data shall be submitted to the Executive Officer for review. If the durability test method is accepted by EPA, it shall also be accepted by ARB, subject to the following condition. If, after certification for the first model year in which the method is used, the Executive Officer determines that a manufacturer's durability test procedures do not conform with good engineering practices, the Executive Officer may require changes to that manufacturer's durability test procedures for subsequent model years. The manufacturer's revised durability test procedures shall be submitted to the Executive Officer for review and approval.

* * * * *

86.088-23 Required data. July 19, 1985.

* * * * *

(b)(1) (ii) ...useful life of the engine. Such data shall be submitted to the Executive Officer for review. If the durability test method is accepted by EPA, it shall also be accepted by ARB, subject to the following condition. If, after certification for the first model year in which the method is used, the Executive Officer determines that a manufacturer's durability test procedures do not conform with good engineering practices, the Executive Officer may require changes to that manufacturer's durability test procedures for subsequent model years. The manufacturer's revised durability test procedures shall be submitted to the Executive Officer for review and approval.

* * * * *

(f) DELETE

* * * * *

86.090-23 Required data. April 11, 1989.

* * * * *

(b)(1) (ii) ...useful life of the engine. Such data shall be submitted to the Executive Officer for review. If the durability test method is accepted by EPA, it shall also be accepted by ARB, subject to the following condition. If, after certification for the first model year in which the method is used, the Executive Officer determines that a manufacturer's durability test procedures do not conform with good engineering practices, the Executive Officer may require changes to that manufacturer's durability test procedures for subsequent model years. The manufacturer's revised durability test procedures shall be submitted to the Executive Officer for review and approval.

* * * * *

(c) ...as required under §86.090-26(a)(3)(i) or §86.090-26(a)(3)(ii). In lieu of providing emission data on idle CO emissions or particulate emissions from methanol-fueled diesel certification vehicles...

* * * * *

(f) DELETE

* * * * *

86.091-23 Required data. April 11, 1989.

* * * * *

(b)(1) (ii) ...useful life of the engine. Such data shall be submitted to the Executive Officer for review. If the durability test method is accepted by EPA, it shall also be accepted by ARB, subject to the following condition. If, after certification for the first model year in which the method is used, the Executive Officer determines that a manufacturer's durability test procedures do not conform with good engineering practices, the Executive Officer may require changes to that manufacturer's durability test procedures for subsequent model years. The manufacturer's revised durability test procedures shall be submitted to the Executive Officer for review and approval.

* * * * *

(c) ...as required under §86.090-26(a)(3)(i) or §86.090-26(a)(3)(ii). In lieu of providing emission data on idle CO emissions or particulate emissions from methanol-fueled diesel certification vehicles...

* * * * *

86.098-23 Required data. October 21, 1997.

* * * * *

(b)(1) (ii) The manufacturer shall submit exhaust emission deterioration factors for light-duty trucks and HDEs and all test data that are derived from the testing described under §86.094-21(b)(5)(i)(A), as well as a record of all pertinent maintenance. Such testing shall be designed and conducted in accordance with good engineering practice to assure that the engines covered by a certificate issued under §86.098-30 will meet each emission standard (or family emission limit, as appropriate) in §86.094-9, §86.098-10, §86.098-11 or superseding emissions standards sections as appropriate, in actual use for the useful life applicable to that standard. Such data shall be submitted to the Executive Officer for review. If the durability test method is accepted by EPA, it shall also be accepted by ARB, subject to the following condition. If, after certification for the first model year in which the method is used, the Executive Officer determines that a manufacturer's durability test procedures do not conform with good engineering practices, the Executive Officer may require changes to that manufacturer's durability test procedures for subsequent model years. The manufacturer's revised durability test procedures shall be submitted to the Executive Officer for review and approval.

* * * * *

(c) Emission data--

(1) Certification vehicles. The manufacturer shall submit emission data, including, in the case of methanol fuel, methanol, formaldehyde, and total hydrocarbon equivalent, on such vehicles tested in accordance with applicable test procedures and in such numbers as specified. These data shall include zero-mile data, if generated, and emission data generated for certification as required under §86.094-26 (a)(3)(i) or (ii). In lieu of providing emission data on idle CO emissions or particulate emissions from methanol-fueled diesel certification vehicles, the Administrator may, on request of the manufacturer, allow the manufacturer to demonstrate (on the basis of previous emission tests, development tests, or other information) that the

engine will conform with certain applicable emission standards of §86.094-8 or §86.094-9. Standards eligible for such manufacturer requests are those for idle CO emissions, smoke emissions, or particulate emissions from methanol-fueled diesel-cycle certification vehicles, and those for particulate emissions from model year 1994 and later gasoline-fueled or methanol-fueled Otto-cycle certification vehicles that are not certified to the Tier 0 standards of §86.094- 9(a)(1)(i), (ii), or §86.094-8(a)(1)(i). Also eligible for such requests are standards for total hydrocarbon emissions from model year 1994 and later certification vehicles that are no certified to the Tier 0 standards of §86.094-9(a)(1)(i), (ii), or §86.094-8(a)(1)(i). By separate request, including appropriate supporting test data, the manufacturer may request that the Administrator also waive the requirement to measure particulate emissions when conducting Selective Enforcement Audit testing of Otto-cycle vehicle.

(2) Certification engines.

(i) The manufacturer shall submit emission data on such engines tested in accordance with applicable emission test procedures of this subpart and in such numbers as specified. These data shall include zero-hour data, if generated, and emission data generated for certification as required under §86.090-26(c)(4). These data shall also include, where there is a combined standard (e.g., NMHC + NOx), emissions data for the individual pollutants as well as for the pollutants when combined. In lieu of providing emission data on idle CO emissions or particulate emissions from methanol-fueled diesel-cycle certification engines, or on CO emissions from petroleum-fueled or methanol-fueled diesel certification engines the Administrator may, on request of the manufacturer, allow the manufacturer to demonstrate (on the basis of previous emission tests, development tests, or other information) that the engine will conform with the applicable emission standards of §86.094-11 or superseding emissions standards sections as applicable. In lieu of providing emission data on smoke emissions from methanol-fueled or petroleum-fueled diesel certification engines, the Administrator may, on the request of the manufacturer, allow the manufacturer to demonstrate (on the basis of previous emission tests, development tests, or other information) that the engine will conform with the applicable emissions standards of §86.098-11 or superseding emissions standards sections as applicable, except for engines with a particulate matter certification level exceeding 0.25 grams per brake horsepower-hour. In lieu of providing emissions data on smoke emissions from petroleum-fueled or methanol-fueled diesel engines when conducting Selective Enforcement Audit testing under 40 CFR part 86, subpart K, the Administrator may, on separate request of the manufacturer, allow the

manufacturer to demonstrate (on the basis of previous emission tests, development tests, or other information) that the engine will conform with the applicable smoke emissions standards of §86.098-11 or superseding emissions standards sections as applicable, except for engines with a particulate matter certification level exceeding 0.25 grams per brake horsepower-hour.

* * * * *

(h) Manufacturers participating in any of the emissions ABT programs under §86.098-15 or superseding ABT sections for HDEs shall submit for each participating family the items listed in paragraphs (h) (1) through (3) of this section.

* * * * *

(h)(3) (i) These reports shall be submitted within 90 days of the end of the model year to: Chief, Mobile Source Operations Division, California Air Resources Board, 9528 Telstar Avenue, El Monte, California 91731.
(ii) These reports shall indicate the engine family, the averaging set, the actual U.S. (49-state or 50-state, as applicable) production volume, the values required to calculate credits as given in the applicable ABT section, the resulting type and number of credits generated/required, and the NCPs in use on a similar NCP family. Manufacturers shall also submit how and where credit surpluses are to be banked. Copies of contracts related to credit trading must also be included or supplied by the broker if applicable. The report shall also include a calculation of credit balances to show that net mass emissions balances are within those allowed by the emission standards (equal to or greater than a zero credit balance). Any credit discount factor described in the applicable ABT section must be included as required.

* * * * *

(j) Failure by a manufacturer generating credits for deposit only in the HDE banking programs to submit their end-of-year reports in the applicable specified time period (i.e., 90 days after the end of the model year) shall result in the credits not being available for use until such reports are received and reviewed by ARB. Use of projected credits pending ARB review will not be permitted in these circumstances.

* * * * *

86.001-23 Required data. October 21, 1997.

The provisions of this section are effective beginning with the 2004 model year.

* * * * *

(b)(1) (ii) The manufacturer shall submit exhaust emission deterioration factors for light-duty trucks and HDEs and all test data that are derived from the testing described under §86.094-21(b)(5)(i)(A), as well as a record of all pertinent maintenance. Such testing shall be designed and conducted in accordance with good engineering practice to assure that the engines covered by a certificate issued under §86.098-30 will meet each emission standard (or family emission limit, as appropriate) in §86.094-9, §86.098-10, §86.098-11 or superseding emissions standards sections as appropriate, in actual use for the useful life applicable to that standard. Such data shall be submitted to the Executive Officer for review. If the durability test method is accepted by EPA, it shall also be accepted by ARB, subject to the following condition. If, after certification for the first model year in which the method is used, the Executive Officer determines that a manufacturer's durability test procedures do not conform with good engineering practices, the Executive Officer may require changes to that manufacturer's durability test procedures for subsequent model years. The manufacturer's revised durability test procedures shall be submitted to the Executive Officer for review and approval.

* * * * *

(c) Emission data - -

(1) Certification vehicles. The manufacturer shall submit emission data, including, in the case of methanol fuel, methanol, formaldehyde, and total hydrocarbon equivalent, on such vehicles tested in accordance with applicable test procedures and in such numbers as specified. These data shall include zero-mile data, if generated, and emission data generated for certification as required under §86.094-26(a)(3)(i) or (ii). In lieu of providing emission data on idle CO emissions or particulate emissions from methanol-fueled diesel certification vehicles, the Administrator may, on request of the manufacturer, allow the manufacturer to demonstrate (on the basis of previous emission tests, development tests, or other information) that the engine will conform with certain applicable emission standards of §86.094-8 or §86.094-9. Standards eligible for such manufacturer requests are those for idle CO emissions, smoke emissions, or particulate emissions from methanol-fueled diesel-cycle certification vehicles, and those for particulate emissions from model year 1994 and later gasoline-fueled or methanol-fueled Otto-cycle certification vehicles that are not certified to the Tier 0

standards of §86.094-9(a)(1)(i), (ii), or §86.094-8(a)(1)(i). Also eligible for such requests are standards for total hydrocarbon emissions from model year 1994 and later certification vehicles that are no certified to the Tier 0 standards of §86.094-9(a)(1)(i), (ii), or §86.094-8(a)(1)(i). By separate request, including appropriate supporting test data, the manufacturer may request that the Administrator also waive the requirement to measure particulate emissions when conducting Selective Enforcement Audit testing of Otto-cycle vehicle.

(2) Certification engines.

(i) The manufacturer shall submit emission data on such engines tested in accordance with applicable emission test procedures of this subpart and in such numbers as specified. These data shall include zero-hour data, if generated, and emission data generated for certification as required under §86.090-26 (c)(4). These data shall also include, where there is a combined standard (e.g., NMHC + NOx), emissions data for the individual pollutants as well as for the pollutants when combined. In lieu of providing emission data on idle CO emissions or particulate emissions from methanol-fueled diesel-cycle certification engines, or on CO emissions from petroleum-fueled or methanol- fueled diesel certification engines the Administrator may, on request of the manufacturer, allow the manufacturer to demonstrate (on the basis of previous emission tests, development tests, or other information) that the engine will conform with the applicable emission standards of §86.094-11 or superseding emissions standards sections as applicable. In lieu of providing emission data on smoke emissions from methanol-fueled or petroleum-fueled diesel certification engines, the Administrator may, on the request of the manufacturer, allow the manufacturer to demonstrate (on the basis of previous emission tests, development tests, or other information) that the engine will conform with the applicable emissions standards of §86.098-11 or superseding emissions standards sections as applicable, except for engines with a particulate matter certification level exceeding 0.25 grams per brake horsepower-hour. In lieu of providing emissions data on smoke emissions from petroleum-fueled or methanol-fueled diesel engines when conducting Selective Enforcement Audit testing under 40 CFR part 86, subpart K, the Administrator may, on separate request of the manufacturer, allow the manufacturer to demonstrate (on the basis of previous emission tests, development tests, or other information) that the engine will conform with the applicable smoke emissions standards of §86.098-11 or superseding emissions standards sections as applicable, except for engines with a particulate matter certification level exceeding 0.25 grams per brake horsepower-hour.

* * * * *

(h) Manufacturers participating in any of the emissions ABT programs under §86.098-15 or superseding ABT sections for HDEs shall submit for each participating family the items listed in paragraphs (h) (1) through (3) of this section.

* * * * *

(h)(3) (i) These reports shall be submitted within 90 days of the end of the model year to: Chief, Mobile Source Operations Division, California Air Resources Board, 9528 Telstar Avenue, El Monte, California 91731.
(ii) These reports shall indicate the engine family, the averaging set, the actual U.S. (49-state or 50-state, as applicable) production volume, the values required to calculate credits as given in the applicable ABT section, the resulting type and number of credits generated/required, and the NCPs in use on a similar NCP family. Manufacturers shall also submit how and where credit surpluses were dispersed (or are to be banked) and how and through what means credit deficits were met. Copies of contracts related to credit trading must also be included or supplied by the broker if applicable. The report shall also include a calculation of credit balances to show that net mass emissions balances are within those allowed by the emission standards (equal to or greater than a zero credit balance). Any credit discount factor described in the applicable ABT section must be included as required.

* * * * *

(j) Failure by a manufacturer generating credits for deposit only in the HDE banking programs to submit their end-of-year reports in the applicable specified time period (i.e., 90 days after the end of the model year) shall result in the credits not being available for use until such reports are received and reviewed by ARB. Use of projected credits pending ARB review will not be permitted in these circumstances.

* * * * *

86.085-24 Test vehicles and engines. December 10, 1984.

* * * * *

(e)(1) (i) DELETE; REPLACE WITH:

(e)(1) (i) a combined total of 3,000 California passenger cars, light-duty trucks, medium-duty vehicles, and heavy-duty engines,
(ii) DELETE
(iii) DELETE
(iv) DELETE
(v) DELETE
(vi) ...may request a reduction in the number of test vehicles (or engines)...
(e)(2) ...total sales of fewer than 3,000...

* * * * *

(f) ...submitted. Durability data submitted may be from engines previously certified by the EPA or the Air Resources Board.

* * * * *

86.090-24 Test vehicles and engines. April 11, 1989.

* * * * *

(e)(1) (i) DELETE; REPLACE WITH:
(e)(1) (i) A combined total of 3,000 California passenger cars, light-duty trucks, medium-duty vehicles, and heavy-duty engines, ...
(ii) DELETE
(iii) DELETE
(iv) DELETE
(v) DELETE
(vi) ...may request a reduction in the number of test vehicles (or engines)...
(e)(2) ...total sales of fewer than 3,000...

* * * * *

(f) ...submitted. Durability data submitted may be from engines previously certified by the EPA or the Air Resources Board.

* * * * *

86.085-25 Maintenance. November 16, 1983.
86.087-25 Maintenance. March 15, 1985.
86.088-25 Maintenance. March 15, 1985.
86.090-25 Maintenance. April 11, 1989.
86.084-26 Mileage and service accumulation; emission measurements. October 19, 1983.

86.090-26 Mileage and service accumulation; emission measurements. April 11, 1989.
86.085-27 Special test procedures. January 12, 1983.
86.090-27 Special test procedures. April 11, 1989.
86.085-28 Compliance with emission standards. January 24, 1985.
86.087-28 Compliance with emission standards. March 15, 1985.
86.088-28 Compliance with emission standards. March 15, 1985.
86.090-28 Compliance with emission standards. April 11, 1989.

* * * * *

(c)(4)(ii) ...and exhaust particulate. For petroleum-fueled diesel smoke testing...

* * * * *

(c)(4)(iii)(B) (*1*) ...For transient HC (OMHCE), formaldehyde (methanol-fueled engines and vehicles, low-emission vehicles and engines, and ultra-low-emission vehicles and engines), CO, and NOx, the official exhaust emission...
(*2*) ...For transient HC (OMHCE), formaldehyde (methanol-fueled engines and vehicles, low-emission vehicles and engines, and ultra-low-emission vehicles and engines), CO, and NOx, the official exhaust emission...
(*3*) Petroleum-fueled diesel heavy-duty engines only.

* * * * *

86.091-28 Compliance with emission standards. April 11, 1989.

* * * * *

(c)(4) (ii) ...and exhaust particulate. For petroleum-fueled diesel smoke testing...

* * * * *

(c)(4)(iii)(B) (*1*) ...For transient HC (OMHCE), formaldehyde (methanol-fueled engines and vehicles, low-emission vehicles and engines, and ultra-low-emission vehicles and engines), CO, and NOx, the official exhaust emission...
(*2*)...For transient HC (OMHCE), formaldehyde (methanol-fueled engines and vehicles, low-emission vehicles and engines, and

ultra-low-emission vehicles and engines), CO, and NOx, the official exhaust emission...

(*3*) Petroleum-fueled diesel heavy-duty engines only.

* * * * *

86.098-28 Compliance with emission standards. June 30, 1995

* * * * *

(c)(4) (ii) Separate exhaust emission deterioration factors, determined from tests of engines, subsystems, or components conducted by the manufacturer, shall be supplied for each engine-system combination. For Otto-cycle engines, separate factors shall be established for transient HC (THCE), CO, and NOx; and idle CO, for those engines utilizing aftertreatment technology (e.g., catalytic converters). For diesel-cycle engines, separate factors shall be established for transient HC (THCE), CO, NOx, and exhaust particulate. For petroleum-fueled diesel-cycle smoke testing, separate factors shall also be established for the acceleration mode (designated as "A"), the lugging mode (designated as "B"), and peak opacity (designated as "C").

* * * * *

(c)(4)(iii) (B) Paragraph (c)(4)(iii)(B) of this section applies to diesel-cycle heavy-duty engines.

(*1*) Diesel-cycle heavy-duty engines not utilizing aftertreatment technology (e.g., particulate traps). For transient HC (OMHCE), formaldehyde (methanol-fueled engines and vehicles, low-emission vehicles and engines, and ultra-low-emission vehicles and engines), CO, NOx, and exhaust particulate, the official exhaust emission results for each emission data engine at the selected test point shall be adjusted by the addition of the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than zero, it shall be zero for the purposes of this paragraph.

(*2*) Diesel-cycle heavy-duty engines utilizing aftertreatment technology (e.g., particulate traps). For transient HC (OMHCE), formaldehyde (methanol-fueled engines and vehicles, low-emission vehicles and engines, and ultra-low-emission vehicles and engines), CO, NOx, and exhaust particulate, the official exhaust emission results for

each emission data engine at the selected test point shall be adjusted by multiplication by the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than one, it shall be one for the purposes of this paragraph.

(*3*) Petroleum-fueled diesel-cycle heavy-duty engines only. For acceleration smoke ("A"), lugging smoke ("B"), and peak smoke ("C"), the official exhaust emission results for each emission data engine at the selected test point shall be adjusted by the addition of the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than zero, it shall be zero for the purposes of this paragraph.

* * * * *

86.085-29 Testing by the Administrator. January 24, 1984.
86.087-29 Testing by the Administrator. January 24, 1984.
86.088-29 Testing by the Administrator. March 15, 1985.
86.090-29 Testing by the Administrator. April 11, 1989.
86.091-29 Testing by the Administrator. April 11, 1989.
86.085-30 Certification. January 24, 1984.
86.087-30 Certification. August 30, 1985.
86.088-30 Certification. March 15, 1985.
86.090-30 Certification. April 11, 1989.
86.091-30 Certification. April 11, 1989.
86.098-30 Certification. October 21, 1997.

* * * * *

(a)(3) (i) One such certificate will be issued for each engine family except for heavy-duty engines certified under the provisions of §86.098-11(f) in which case two certificates will be issued, one for each fueling mode. For gasoline-fueled and methanol-fueled light-duty vehicles and light duty-trucks and petroleum-fueled diesel-cycle light-duty vehicles and light duty-trucks not certified under §86.098-28(g), one such certificate will be issued for each engine family-evaporative/refueling emission family combination. Each certificate will certify compliance with no more than one set of in-use and certification standards (or family emission limits, as appropriate).

* * * * *

(b)(3) If after a review of the test reports and data submitted by the manufacturer, data derived from any additional testing conducted pursuant to §86.091-29, data or information derived from any inspection carried out under §86.094-7(d) or any other pertinent data or information, the Administrator determines that one or more test vehicles (or test engines) of the certification test fleet do not meet applicable standards (or family emission limits, as appropriate), he will notify the manufacturer in writing, setting forth the basis for his determination. Within 30 days following receipt of the notification, the manufacturer may request a hearing on the Administrator's determination. The request shall be in writing, signed by an authorized representative of the manufacturer and shall include a statement specifying the manufacturer's objections to the Administrator's determination and data in support of such objections. If, after a review of the request and supporting data, the Administrator finds that the request raises a substantial factual issue, he shall provide the manufacturer a hearing in accordance with Title 17, California Code of Regulations, §60040, et seq., with respect to such issue.

* * * * *

(b)(4) (i) Request a hearing under Title 17, California Code of Regulations, §60040, et seq.; or

* * * * *

(b)(5) (i) Request a hearing under Title 17, California Code of Regulations, §60040, et seq.; or

* * * * *

(c)(5) (i) Be made only after the manufacturer concerned has been offered an opportunity for a hearing conducted in accordance with Title 17, California Code of Regulations, §60040, et seq.; and

* * * * *

(c)(6) The manufacturer may request in the form and manner specified in paragraph (b)(3) of this section that any determination made by the Administrator under paragraph (c)(1) of this section to withhold or deny certification be reviewed in a hearing conducted in accordance with Title 17, California Code of Regulations, §60040, et seq. If the Administrator finds, after a review of the request and supporting data, that the request raises a substantial factual issue, he will grant the request with respect to such issue.

* * * * *

86.079-31 Separate certification. September 8, 1977.
86.079-32 Addition of a vehicle or engine after certification. September 8, 1977.
86.079-33 Changes to a vehicle or engine covered by certification. September 8, 1977.
86.082-34 Alternative procedure for notification of additions and changes. November 2, 1982.
86.085-35 Labeling. Labels shall comply with the requirements set forth in the "California Motor Vehicle Emission Control Label Specifications," as last amended June 29, 1995.

86.085-37 Production vehicles and engines. January 12, 1983.
86.085-38 Maintenance instructions. November 16, 1983.
86.087-38 Maintenance instructions. March 15, 1985.
86.084-40 Automatic expiration of reporting and recordkeeping requirements. September 25, 1980.

Subpart I - Emission Regulations for New Diesel-Fueled Heavy-Duty Engines; Smoke Exhaust Test Procedure

86.884-1 General Applicability. ~~April 11, 1989~~. September 21, 1994.

The provisions of this subpart are applicable to new petroleum-fueled diesel heavy-duty engines beginning with the 1984 model year.

The provisions of this subpart are not applicable to new heavy-duty diesel gaseous-fuel engines and those gaseous-fuel engines derived from diesel engines, except dual-fuel and multi-fuel engines which use petroleum fuel.

86.884-2 Definitions. November 16, 1983.
86.884-3 Abbreviations. November 16, 1983.
86.884-4 Section numbering. ~~November 16, 1983.~~ September 21, 1994.
86.884-5 Test Procedures. April 11, 1989.
86.884-6 Fuel specifications. April 11, 1989.
86.884-7 Dynamometer operation cycle for smoke emission tests. ~~November 16, 1983.~~ September 5, 1997..
86.884-8 Dynamometer and engine equipment. ~~November 16, 1983.~~ September 5, 1997.
86.884-9 Smoke measurement system. ~~November 16, 1983.~~ September 5, 1997.
86.884-10 Information. ~~November 16, 1983.~~ September 5, 1997.
86.884-11 Instrument checks. ~~November 16, 1983.~~ December 11, 1984.
86.884-12 Test run. ~~November 16, 1983.~~ December 16, 1987.
86.884-13 Data analysis. ~~November 16, 1983.~~ September 5, 1997.
86.884-14 Calculations. ~~November 16, 1983.~~ September 5, 1997.

Subpart N - Emission Regulations for New Otto-Cycle and Diesel Heavy-Duty Engines; Gaseous and Particulate Exhaust Test Procedures

86.1301-84 Scope; applicability. November 16, 1983.
86.1301-88 Scope; applicability. March 15, 1985.
86.1301-90 Scope; applicability. April 11, 1989.
86.1302-84 Definitions. November 16, 1983.
86.1303-84 Abbreviations. November 16, 1983.
86.1304-84 Section numbering; construction. November 16, 1983~~.~~
86.1304-90 Section numbering; construction. ~~April 11, 1989.~~ October 6, 2000.
86.1305-84 Introduction; structure of subpart. November 16, 1983.
86.1305-90 Introduction; structure of subpart. April 11, 1989.
86.1306-84 Equipment required and specifications; overview. November 16, 1983.
86.1306-88 Equipment required and specifications; overview. March 15, 1985.
86.1306-90 Equipment required and specifications; overview. April 11, 1989.
86.1306-96 Equipment required and specifications; overview. September 21, 1994.
86.1308-84 Dynamometer and engine equipment specifications. December 10, 1984.
86.1309-84 Exhaust gas sampling system; gasoline-fueled engines. November 16, 1983.
86.1309-90 Exhaust gas sampling system; gasoline-fueled and methanol-fueled Otto-cycle engines. January 18, 2001.

* * * * *

(a)(3)...For methanol-fueled engines, the sample lines for the methanol and formaldehyde samples are heated to 235^{o} ±15^{o}F (113^{o} ± 8^{o}C).

* * * * *

86.1310-84 Exhaust gas sampling and analytical system; diesel-fueled engines. December 10, 1984.
86.1310-88 Exhaust gas sampling and analytical system; diesel engines. March 15, 1985.
86.1310-90 Exhaust gas sampling and analytical system; petroleum-fueled and methanol-fueled diesel engines. September 5, 1997.

* * * * *

(a)(3)...samples collected for these purposes (Figure N90-2 and N90-3).

* * * * *

86.1311-84 Exhaust gas analytical system, CVS bag sample. November 16, 1983.

86.1311-90 Exhaust gas analytical system, CVS bag sample. April 11, 1989.
86.1311-94 Exhaust gas analytical system, CVS bag sample. October 21, 1997.
86.1312-88 Weighing chamber and microgram balance specifications. September 5, 1997.
86.1313-84 Fuel specifications. December 10, 1984.
86.1313-90 Fuel specifications. April 11, 1989.

* * * * *

Amend subparagraphs §86.1313-90(b)(2) and (b)(3) as follows:

(b) Diesel test fuel. (1) The petroleum fuels for testing diesel engines … pour depressant, dye, dispersant, and biocide. Fuels specified for emissions testing are intended to be representative of commercially available in-use fuels.

(2) Except as noted below, petroleum fuel for diesel engines … shall be used. For 1993 and subsequent model-year diesel-fueled engines, the petroleum fuel used in exhaust emissions testing may meet the specifications in Table N98-2 of 40 Code of Federal Regulations section 86.1313-98(b)(2) as adopted September 5, 1997, or substantially equivalent specifications approved by the Executive Officer as an option to the specifications in Table N90-2. For 1995 through ~~2005~~ 2003 model-year medium-duty diesel-fueled engines, and for 1996 and 1997 model-year urban bus engines only, the petroleum fuel used in exhaust emissions testing may meet the specifications listed below, or substantially equivalent specifications approved by the Executive Officer, as an option to the specifications in Table N90-2. Where a manufacturer elects pursuant to this subparagraph to conduct exhaust emission testing using the specifications in Table N98-2, or the specifications listed below, the Executive Officer shall conduct exhaust emission testing with the diesel fuel meeting the specifications elected by the manufacturer. The manufacturer shall submit evidence to the Executive Officer demonstrating to the Executive Officer's satisfaction that the test fuel will be the predominant in-use fuel. Such evidence could include such things as copies of signed contracts from customers indicating the intent to purchase and use the test fuel as the primary fuel for use in the engines or other evidence acceptable to the Executive Officer.

Fuel Property	Limit	Test Method [a]
Natural Cetane Number	47-55	D613-86
Distillation Range, °F		Title 13 CCR, §2282(g)(3)
IBP	340-420	
10% point	400-490	
50% point	470-560	
90% point	550-610	
EP	580-660	

API Gravity, degrees	33-39	D287-82
Total Sulfur, wt. %	0.01-0.05	Title 13 CCR, §2282(g)(3)
Nitrogen Content, ppmw	100-500	Title 13 CCR, §2282(g)(3)
Total Aromatic Hydrocarbons, vol.%	8-12	Title 13 CCR, §2282(g)(3)
Polycyclic Aromatic Hydrocarbons, wt. % (max.)	1.4	Title 13 CCR, §2282(g)(3)
Flashpoint, ^{o}F (max)	130	D 93-80
Viscosity @ 40^{o}F, centistokes	2.0-4.1	D 445-83

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

(3) Except as noted below, petroleum fuel for diesel engines meeting the specifications in Table N90-3, or substantially equivalent specifications approved by the Executive Officer, shall be used in service accumulation. The grade of petroleum fuel recommended by the engine manufacturer, commercially designated as "Type 2-D" grade diesel fuel, shall be used. For 1993 and subsequent model-year diesel-fueled engines, excluding the 1995 through 2005 model-year medium-duty diesel-fueled engines referenced below, the petroleum fuel used in service accumulation may meet the specifications in Table N94-3 of 40 Code of Federal Regulations section 86.1313-94(b)(3), as adopted August 21, 1990, or substantially equivalent specifications approved by the Executive Officer as an option to the specifications in Table N90-3. For 1995 through 2005 model-year medium-duty diesel-fueled engines, and for 1996 and 1997 model-year urban bus engines only, diesel fuel representative of commercial diesel fuel which will be generally available through retail outlets shall be used in service accumulation. The manufacturer shall submit evidence to the Executive Officer demonstrating to the Executive Officer's satisfaction that the test fuel will be the predominant in-use fuel. Such evidence could include such things as copies of signed contracts from customers indicating the intent to purchase and use the test fuel as the primary fuel for use in the engines or other evidence acceptable to the Executive Officer.

# # # #

Alcohol Fuel Specifications.

Amend §86.1313-94(c) as follows: Delete subparagraphs (c)(1) and (c)(2); replace with:

(c)(1) **Emission test fuel**. For Otto-cycle or diesel alcohol vehicles and hybrid electric vehicles which use Otto-cycle or diesel alcohol engines, methanol or ethanol fuel used for exhaust and evaporative emission testing shall meet the specifications set forth in

section 2292.1, title 13, CCR, (Specifications for M-100 Fuel Methanol) or section 2292.3 (Specification for E-100 Fuel Ethanol) as modified by the following:

Specification	Limit
M-100 Fuel Methanol	
Methanol	98.0 ?0.5 vol. percent
Ethanol	1.0 ~~?0.1~~ vol. percent (max.)
Petroleum fuel meeting the specifications of 40 CFR 86.1313-98.	1.0 ?0.1 vol. percent
E-100 Fuel Ethanol	
Ethanol	98.0 ?0.5 vol. percent
Methanol	1.0 ~~?0.1~~ vol. percent (max.)
Petroleum fuel meeting the specifications of 40 CFR 86.1313-98	1.0 ?0.1 vol. percent

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

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

Mixtures of Petroleum and Alcohol Fuels for Flexible Fuel Vehicles

Amend §86.1313-94(d) as follows: Delete subparagraphs (d)(1) and (d)(2); replace with:

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

Specification	Limit
M-85 Fuel Methanol	
Petroleum fuel meeting the specifications of 40 CFR 1313-98.	13-16 vol. percent
Reid vapor pressure	8.0-8.5 psi, using common blending components from the gasoline stream.
E-85 Fuel Ethanol	
Petroleum fuel meeting the specifications of section 100.3.1.	15-21 vol. percent
Reid vapor pressure	8.0-8.5 psi, using common blending components from the gasoline stream.

(d)(2) **Mileage accumulation fuel.** For flexible fuel Otto-cycle or diesel alcohol vehicles and hybrid electric vehicles that use Otto-cycle or diesel alcohol engines, petroleum fuel shall meet the applicable specifications in §86.1313-94 (a) or (b), as modified by these test procedures, and methanol or ethanol fuel shall meet the applicable specifications set forth in section 2292.2, title 13, CCR, (Specifications for M-85 Fuel Methanol) or section 2292.4 (Specification for E-85 Fuel Ethanol). Mileage accumulation procedures shall be subject to the requirements set forth in 40 CFR §86.001-26 and §86.1831-01(a) and (b) and are subject to the prior approval of the Executive Officer. A manufacturer shall consider expected customer fuel usage as well as emissions deterioration when developing its durability demonstration.

(d)(3) **Evaporative emission test fuel for emission-data and durability-data vehicles.** For Otto-cycle or diesel alcohol vehicles and hybrid electric vehicles which use Otto-cycle or diesel alcohol engines, a blend of methanol or ethanol fuel used for evaporative emission testing shall meet the applicable specifications set forth in section 2292.2, title 13, CCR, (Specifications for M-85 Fuel Methanol) or section 2292.4 (Specifications for E-85 Fuel Ethanol) and gasoline meeting the specifications of §86.1313-94 (a)(1), as modified by these test procedures, such that the final blend is composed of either 35 volume percent methanol (± 1.0 volume percent of total blend) for methanol-fueled vehicles or 10 volume percent ethanol (± 1.0 volume percent of total blend) for ethanol-fueled vehicles. Alternative alcohol-gasoline blends may be used in place of M35 or E10 if demonstrated to result in equivalent or higher evaporative emissions, subject to prior approval of the Executive Officer.

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

Natural Gas Fuel Specifications

Amend §86.1313-94(e) as follows: Delete subparagraphs (e)(1), (e)(2) and (e)(3); Replace with:

(e)(1) **Exhaust emission test fuel.** For dedicated, dual-fueled or hybrid electric vehicles which use natural gas, fuel used for exhaust and evaporative emission testing shall meet the specifications listed in section 2292.5, title 13, CCR, (Specifications for Compressed Natural Gas) as modified by the following:

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

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

Liquefied Petroleum Gas Fuel Specifications

Amend §86.1313-94(f) as follows: Delete subparagraphs (f)(1) and (f)(2); Replace with:

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

Specification	Limit

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

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

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

Any person may petition the state board to establish by regulation certification testing specifications for a new clean fuel for which specifications for the new clean fuel are not specifically set forth in paragraph §86.1313-94 as amended herein. Prior to adopting such specifications, the state board shall consider the relative cost-effectiveness of use of the fuel in reducing emissions compared to the use of other fuels. Whenever the state board adopts specifications for a new clean fuel for certification testing, it shall also establish by regulation specifications for the fuel as it is sold commercially to the public.

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

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

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

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

86.1314-84 Analytical gases. December 10, 1984.
86.1314-94 Analytical gases. June 30, 1995.
86.1316-84 Calibration; frequency and overview. December 10, 1984.

86.1316-90 Calibration; frequency and overview. April 11, 1989.
86.1316-94 Calibration; frequency and overview. September 5, 1997.
86.1318-84 Engine dynamometer system calibrations. December 10, 1984.
86.1319-84 CVS calibration. December 10, 1984.
86.1319-90 CVS calibration. January 18, 2001.
86.1320-88 Gas meter or flow instrumentation calibration, particulate measurement. March 15, 1985.
86.1320-90 Gas meter or flow instrumentation calibration; particulate, methanol, and formaldehyde measurement. April 11, 1989.
86.1321-84 Hydrocarbon analyzer calibration. December 10, 1984.
86.1321-90 Hydrocarbon analyzer calibration. April 11, 1989.
86.1321-94 Hydrocarbon analyzer calibration. September 5, 1997.
86.1322-84 Carbon monoxide analyzer calibration. ~~November 16, 1983~~ September 5, 1997.
86.1323-84 Oxides of nitrogen analyzer calibration. ~~December 10, 1984~~ September 5, 1997.
86.1324-84 Carbon dioxide analyzer calibration. ~~November 16, 1983~~ September 5, 1997.
86.1325-94 Methane analyzer calibration. September 5, 1997.
86.1326-84 Calibration of other equipment. November 16, 1983.
86.1326-90 Calibration of other equipment. April 11, 1989.
86.1327-84 Engine dynamometer test procedures; overview. December 10, 1984.
86.1327-88 Engine dynamometer test procedures; overview. March 15, 1985.
86.1327-90 Engine dynamometer test procedures; overview. April 11, 1989.
86.1327-98 Engine dynamometer test procedures; overview. September 5, 1997
86.1330-84 Test sequence, general requirements. November 16, 1983.
86.1330-90 Test sequence, general requirements. ~~April 11, 1989~~ January 18, 2001.
86.1332-84 Engine mapping procedures. December 10, 1984.
86.1332-90 Engine mapping procedures. ~~April 11, 1989~~ September 21, 1994.
86.1333-84 Transient test cycle generation. November 16, 1983.
86.1333-90 Transient test cycle generation. ~~April 11, 1989~~ May 4, 1998.
86.1334-84 Pre-test engine and dynamometer preparation. ~~December 10, 1984~~ January 18, 2001.
86.1335-84 Optional forced cool-down procedure. December 10, 1984.
86.1335-90 Optional forced cool-down procedure. ~~April 11, 1989~~ September 5, 1997.
86.1336-84 Engine starting and restarting. ~~March 15, 1985~~ September 21, 1994.
86.1337-84 Engine dynamometer test run. November 16, 1983.
86.1337-88 Engine dynamometer test run. March 15, 1985.
86.1337-90 Engine dynamometer test run. April 11, 1989.
86.1338-84 Emission measurement accuracy. ~~November 16, 1983~~ September 5, 1997.
86.1339-88 Diesel particulate filter handling and weighing. March 15, 1985.
86.1339-90 Particulate filter handling and weighing. ~~April 11, 1989~~ January 18, 2001.
86.1340-84 Exhaust sample analysis. December 10, 1984.

86.1340-90 Exhaust sample analysis. April 11, 1989.
86.1340-94 Exhaust sample analysis. June 30, 1995.
86.1341-84 Test cycle validation criteria. March 15, 1985.
86.1341-90 Test cycle validating criteria. April 11, 1989.
86.1341-98 Test cycle validation criteria. September 5, 1997.
86.1342-84 Calculations; exhaust emissions. March 15, 1985.
86.1342-90 Calculations; exhaust emissions. April 11, 1989.
86.1342-94 Calculations; exhaust emissions. September 5, 1997.

* * * * *

Amend subparagraph (d) Meaning of symbols as follows:

* * * * *

(1)(ii) . . . (101.3 kPa) pressure; or, if gaseous fuels are being used, 18.64 g/ft^3 for natural gas and 17.28 g/ft^3 for liquefied petroleum gas, assuming an average carbon to hydrogen ratio of 1:3.803 for natural gas and 1:2.656 for liquefied petroleum gas, at 68^{o}F and 760 mm Hg pressure. The Executive Officer may approve other density values deemed appropriate by a manufacturer when gaseous fuels are being used.

* * * * *

(3)(v)(A) $CO_e = (1\text{-}0.01925CO_{2e} - 0.000323R)CO_{em}$ for gasoline and petroleum diesel fuel, with hydrogen to carbon ratio of 1.85:1.

(3)(v)(B) $CO_e = [1\text{-}(0.01 + 0.005HCR)CO_{2e} - 0.00323R]CO_{em}$ for methanol fuel, where HCR is hydrogen to carbon ratio as measured for the fuel used. For natural gas and liquefied petroleum gas, HCR is assumed to be 2.656 and 3.802, respectively.

* * * * *

(8)(i) K_H = Humidity correction factor.

* * * * *

(iii) For petroleum-fueled, gaseous-fuel, and methanol-fueled diesel engines: $K_H = 1/[1\text{-}0.0026(H\text{-}75)]$ (or for SI units, ...

* * * * *

86.1343-88 Calculations; particulate exhaust emissions (including diesel gaseous-fuel, dual-fuel and multi-fuel engines). ~~April 11, 1989~~ September 5, 1997.
86.1344-84 Required information. November 16, 1983.
86.1344-88 Required information. March 15, 1985.
86.1344-90 Required information. April 11, 1989.
86.1344-94 Required information. October 21, 1997.

Appendix I - Urban Dynamometer Schedules.

(f)(2) EPA Engine Dynamometer Schedule for Heavy-Duty Diesel Engines. December 10, 1984.

Additional Requirements

1. Any reference to vehicle or engine sales or vehicle or engine production volume throughout the United States shall mean vehicle or engine sales or vehicle or engine production volume in each the United States and California.
2. Regulations concerning EPA hearings, EPA inspections, and specific language on the Certificate of Conformity, shall not be applicable to these procedures.
3. Any reference made to Selective Enforcement Auditing (SEA) shall not be applicable to these procedures.
4. Methanol-fueled engines and vehicles shall comply with the "California Evaporative Emission Standards and Test Procedures for 1978 and Subsequent Model Liquefied Petroleum Gas- or Gasoline- or Methanol-Fueled Motor Vehicles," as incorporated in Title 13, California Code of Regulations, Section 1976.
5. In addition to the standards and provisions specified in CFR Section 86.091-11 and 86.094-11 (emission standards for diesel-fuel and diesel methanol heavy-duty engines and vehicles), the following formaldehyde emission levels as measured under transient operating conditions shall not be exceeded for methanol-fueled engines and vehicles:

Model Year	Formaldehyde (g/bhp-hr)
1993-1995	0.10
1996 ~~and Subsequent~~ through 2003	0.05

The following formaldehyde emission levels as measured under transient operating conditions shall not be exceeded for 1992 and subsequent low-emission and ultra-low-emission vehicles and engines used in low-emission and ultra-low-emission vehicles operating on any fuel.

Model Year	Formaldehyde (g/bhp-hr)
1992 ~~and Subsequent~~ through 2003 Low-Emission Vehicles and Engines	0.050
1992 ~~and Subsequent~~ through 2003 Ultra-Low-Emission Vehicles and Engines	0.025

6. All dedicated gaseous-fuel, dual-fuel, and multi-fuel diesel engines (and vehicles), including those engines derived from existing diesel engines shall comply with the requirements which are applicable to heavy-duty diesel engines, except where otherwise noted.
7. Prior to the 2004 model year, non-methane hydrocarbon emissions shall be measured in accordance with the "California Non-Methane Hydrocarbon Test Procedures," as last amended July 12, 1991, which is incorporated herein by reference.
8. For dual-fuel or multi-fuel gaseous engines and vehicles, the noted deterioration factors shall be determined separately for operation on each type of fuel or combination of fuels that the engine is designed to use. For certification to be granted, the provisions of 86.091-28(c) must be met separately for emissions using each type and combination of fuels.
9. Except where otherwise noted, references to requirements for averaging, banking and trading programs for heavy-duty engines shall apply for medium-duty engines certified under Title 13, California Code of Regulations §1956.8(h) for use in vehicles of more than 8,500 pounds through 14,000 pounds gross vehicle weight rating, under the restrictions of §86.098-15, as incorporated herein.