

**APPENDIX A**  
**REGULATORY AMENDMENTS**

## PROPOSED REGULATION ORDER

Adopt the following new sections of Title 13, California Code of Regulations, to read as set forth in the following pages:

Section 1956.1	Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Year Heavy-Duty Urban Transit Bus Engines and Vehicles
Section 1956.2	Fleet Rule for Urban Transit Bus Operators
Section 1956.3	Zero Emission Bus Requirements
Section 1956.4	Reporting Requirements for Urban Transit Bus Operators

Amend the following section of Title 13, California Code of Regulations, to read as set forth in the following pages:

Section 1956.8	Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Year Heavy-Duty Engines and Vehicles
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SECTION 1956.1, TITLE 13, CCR

Add to Title 13, California Code of Regulations, new section 1956.1, to read:

- 1956.1 Exhaust Emission Standards and Test Procedures - 1985 and Subsequent Model Heavy Duty Urban Bus Engine and Vehicles
- (a) The exhaust emissions from new 1985 and subsequent model heavy-duty diesel cycle urban bus engines and vehicles fueled by methanol, natural gas, liquefied petroleum gas, and petroleum shall not exceed the following, by model year, in grams per brake horsepower-hour (g/bhp-hr):
- (1) 1985-1986 - 1.3 total hydrocarbons [or Organic Material Hydrocarbon Equivalent (OMHCE) for methanol-fueled buses], 15.5 carbon monoxide (CO), and 5.1 oxides of nitrogen (NOx).
  - (2) 1987- (a manufacturer may certify to the 1988 emission standards one year early as an option) - 1.3 total hydrocarbons (or OMHCE for methanol-fueled buses), 15.5 CO, and 5.1 NOx.
  - (3) 1988-1990 - 1.3 HC (or OMHCE for methanol-fueled buses), 15.5 CO, 6.0 NOx, 0.60 particulate matter (PM), and for 1990 only, 1.2 optional non-methane hydrocarbons (NMHC).
  - (4) 1991-1993 - 1.3 HC (or OMHCE for methanol-fueled buses), 1.2 optional NMHC, 15.5 CO, 5.0 NOx, and 0.10 PM. Emissions from methanol-fueled, natural-gas-fueled and liquefied-petroleum-gas-fueled urban bus engines may be included in the averaging program for petroleum-fueled engines other than urban bus engines.
  - (5) 1994-1995 - 1.3 HC (or OMHCE for methanol-fueled buses), 1.2 optional NMHC, 15.5 CO, 5.0 NOx (or optional 3.5 to 0.5 NOx), and 0.07 PM. Emissions from methanol-fueled, natural-gas-fueled and liquefied-petroleum-gas-fueled urban bus engines, may be included in the averaging program for petroleum-fueled engines other than urban bus engines.
  - (6) 1996-2003 - 1.3 HC or OMHCE, 1.2 optional NMHC, 15.5 CO, 4.0 NOx, and 0.05 PM (0.07 PM in-use).
    - (A) For 1996 and 1997 only, a manufacturer may apply to the Executive Officer for an exemption from the 4.0 NOx standard, not to exceed 10% of the average of the manufacturer's total urban bus sales in California for the

three preceding model years, upon providing technical justification and sales data for each exemption applied for.

- (B) 1998 through 2003 model year engines may generate averaging, banking, and trading credits in accordance with the requirements for averaging, banking and trading programs set forth in "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy Duty Diesel Engines and Vehicles" in subdivision (b) of section 1956.8, 13 CCR.
  - (C) Manufacturers may choose to certify 1998 through September 30, 2002 model year bus engines to an optional NOx emissions standard between 0.5 and 2.5 g/bhp-hr. A manufacturer may certify to any standard between the values of 2.5 and 0.5g/bhp-hr, by 0.5 g/bhp-hr increments. Manufacturers may not use engines certified to this optional NOx standard for any averaging, banking, or trading program set forth in the test procedures document incorporated in subdivision (b) of section 1956.8, 13 CCR.
- (7) October 2002-2006 optional standards -- Manufacturers may choose to certify to an optional 1.8 to 0.3 g/bhp-hr NOx plus NMHC standard, measured as the arithmetic sum of the NOx and NMHC exhaust component certification values, without restriction on individual component certification values; provided that engines certified to this optional reduced-emission NOx standard may not participate in any averaging, banking, or trading program set forth in the test procedures document incorporated in subdivision (b) of section 1956.8, 13 CCR. A manufacturer may certify to any standard between the values of 1.8 to 0.3 g/bhp-hr, by 0.3 g/bhp-hr NOx + NMHC increments. Manufacturers certifying to this optional standard must also certify to a PM standard of 0.03, 0.02, or 0.01 g/bhp-hr.
- (8) 2004 – 2006: Except as provided in (9), below, the required standard shall be 2.4 NMHC plus NOx measured as the arithmetic sum of exhaust component certification values for these pollutants, without restriction on individual component values, 15.5 CO, and 0.05 PM (0.07 PM in-use).
- (A) Manufacturers may choose to certify to a 2.5 optional combined NOx + NMHC standard, provided that the NMHC exhaust component certification value shall not exceed 0.5 g/bhp-hr.

- (B) Emissions averaging may be used to meet the combined NOx + NMHC standard, the optional combined NOx + NMHC standard set forth in paragraph (A), and the PM standard.
  - (C) The combined NOx + NMHC standard and the optional combined NOx + NMHC standard described in paragraph (A) may serve as the certification standard for the higher emitting fueling mode of an engine certified under the dual fueling mode certification process set forth in section 1956.8(a)(3), 13 CCR.
- (9) 2004-2006 – For diesel or dual-fuel urban bus engines, the standards are 0.5 NOx, 0.01 PM, 0.05 NMHC, 5.0 CO, and 0.01 formaldehyde. As an option, manufacturers may choose to meet these standards with an engine that is certified to the standards in (8) above, equipped with an aftertreatment system that reduces NOx to 0.5 and PM to 0.01 standards. Manufacturers shall be responsible for full certification, durability, testing, and warranty and other requirements for the base engine. For the aftertreatment system, manufacturers shall not be subject to the certification durability requirements, or in-use recall and enforcement provisions, but are subject to warranty provisions for functionality.
- (10) 2007 and subsequent – 0.2 NOx, 0.01 PM, 0.05 NMHC, 5.0 CO, and 0.01 formaldehyde. Engines certified to this standard shall meet the given standards for each pollutant, and must not participate in any averaging, banking, and trading program as described in subdivision (b) of section 1956.8, 13 CCR.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43100, 43101, 43104, and 43806 Health and Safety Code and section 28114 Vehicle Code  
Reference: Sections 39002, 39003, 39017, 39033, 39500, 39650, 39657, 39667, 39701, 40000, 43000, 43000.5, 43009, 43013, 43018, 43102, 43806, Health and Safety Code, and sections 27157 and 28114 Vehicle Code.

## SECTION 1956.2, TITLE 13, CCR

Add to Title 13, California Code of Regulations, new section 1956.2, to read:

### 1956.2 Fleet Rule for Urban Transit Bus Operators

- (a) To encourage transit agencies that operate urban bus fleets to purchase or lease currently available lower emission alternative-fuel buses, while also providing flexibility to such fleet operators to determine their optimal fleet mix in consideration of such factors as air quality benefits, service availability, cost, efficiency, safety, and convenience, two paths to compliance with this fleet rule are available: the alternative-fuel path and the diesel path. Transit agencies must choose their compliance path, and those choosing the alternative-fuel path shall notify ARB of their intent to follow that path, by January 31, 2001. Reporting requirements for that notification are set forth in subdivision (a)(1) of section 1956.4, 13 CCR.
- (b) Transit agencies on the alternative-fuel path shall meet the following requirements:
  - (1) Upon approval of the regulation, and through Model Year 2015, 85 percent of all urban buses purchased or leased each year must be alternative-fuel buses.
  - (2) NOx fleet average requirements as set forth in subsection (d), below.
  - (3) Beginning October 1, 2002, engines certified to an optional PM standard of 0.03 g/bhp-hr or lower shall be used.
  - (4) PM retrofit requirements and use of low sulfur fuel as set forth in subsection (e), below.
  - (5) Zero emission bus purchase requirements beginning in model year 2010, in accordance with the requirements in section 1956.3, 13, CCR.
  - (6) Reporting requirements as set forth in section 1956.4, 13 CCR.
- (c) Transit agencies on the diesel path shall meet the following requirements:
  - (1) NOx fleet average requirements as set forth in subsection (d), below.
  - (2) PM retrofit requirements and use of low sulfur fuel as set forth in subsection (e), below.
  - (3) Zero emission bus demonstration in 2003-2004, as required in section 1956.3.
  - (4) Beginning January 1, 2004, transit agencies on the diesel path shall not take delivery of any buses certified to emissions levels in excess of those specified in subdivision (a)(9) of section 1956.1, 13 CCR.

- (5) Zero emission bus purchase requirements beginning in model year 2008, in accordance with the requirements in section 1956.3, 13 CCR.
  - (6) Reporting requirements as set forth in section 1956.4, 13 CCR.
- (d) Beginning October 1, 2002, no transit agency shall own, operate, or lease a fleet of urban buses with average NO<sub>x</sub> emissions in excess of 4.8 g/bhp-hr, based on new or repowered engine certification standards.
- (1) This fleet average requirement shall be based on urban buses owned, operated, or leased by the transit agency, including diesel buses, alternative-fuel buses, all heavy-duty zero emission buses, electric trolley buses, and articulated buses, in their fleet.
  - (2) Transit agencies may use ARB-certified retrofit systems to comply with the fleet average requirement (in addition to bus purchases, repowerings, and retirements).
  - (3) Transit agencies have the option of retiring all 1987 and earlier model year diesel urban buses by October 1, 2002, to comply with the fleet average standard requirement.
- (e) To reduce public exposure to diesel particulate matter, transit agencies and companies that lease buses to transit agencies shall participate in a program to retrofit diesel buses in their fleet, and to operate their diesel buses on diesel fuel with a maximum sulfur content of 15 parts per million. Documentation of compliance with these requirements must be provided in accordance with the provisions of subdivision (c) of section 1956.4,
- (f) 13 CCR.
- (1) By January 1, 2003, transit agencies shall not own, operate or lease 1990 and earlier model year diesel, dual fuel, or diesel hybrid buses in their active fleet, unless those buses have been retrofitted as provided in (A), below, or are eligible for an exemption as provided in (B), below. Transit agencies with less than 20 buses in their active fleet, and that operate in federal ozone ambient air quality standard attainment areas, are subject to this requirement beginning January 1, 2007.
    - (A) The retrofit must be certified by the ARB as having an 85 percent or greater efficiency in reducing diesel particulate matter.
    - (B) 1990 and earlier buses were originally certified to a PM standard of 0.60 grams per brake horsepower-hour. Only those 1990 and earlier buses that have been retrofitted to

0.10 grams per brake horsepower-hour PM with an ARB-certified retrofit device (to meet the requirements of the U.S. EPA urban transit bus rebuild and retrofit program, 85CFR, sections 1401 through 1415) are eligible for the retirement exemption provided in subsection (e)(4), below.

- (2) Transit agencies shall not own, operate or lease 1991 through 1995 diesel, dual-fuel, or diesel hybrid transit buses in their active fleet, unless the buses have been retrofitted according to the requirements and schedule set forth in paragraphs (A) through (D), below. Transit agencies with less than 20 buses in their active fleet, and which operate in federal ozone ambient air quality standard attainment areas, are exempt from paragraphs (A) and (B), and subject to paragraph (C) beginning January 1, 2007.
  - (A) 20 percent of these buses shall be retrofitted by January 1, 2003.
  - (B) 75 percent of these buses shall be retrofitted by January 1, 2004.
  - (C) 100 percent of these buses shall be retrofitted by January 1, 2005, except for those buses eligible for the retirement exemption in subsection (e)(4), below.
  - (D) The retrofit must be certified by the ARB as having an 85 percent or greater efficiency in reducing diesel particulate matter.
  
- (3) Transit agencies shall not own or operate 1996 through 2003 diesel, dual-fuel, or diesel hybrid buses in their active fleet, unless the buses have been retrofitted according to the following requirements:
  - (A) 20 percent of these buses shall be retrofitted by January 1, 2007.
  - (B) 75 percent of these buses shall be retrofitted by January 1, 2008.
  - (C) 100 percent of these buses shall be retrofitted by January 1, 2009, except for those buses eligible for the retirement exemption in subsection (e)(4), below.



- (D) The retrofit must be certified by the ARB as having an 85 percent or greater efficiency in reducing diesel particulate matter.
- (4) Transit agencies must meet the 100 percent retrofit requirements in subsections (1)(B), (2)(C), and (3)(C), above, except for those buses that are within two years of retirement. Those buses within two years of retirement are exempt from the retrofit requirements, and retirement of the exempt buses must be documented in accordance with section 1956.4(c)(2), below.
- (5) Beginning July 1, 2002, transit agencies shall not operate diesel buses on diesel fuel with a sulfur content in excess of 15 parts per million.
  - (A) Transit agencies with less than 20 buses in their active fleets, and which operate in federal ozone ambient air quality attainment areas, are not subject to this requirement until July 1, 2006.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018 Health and Safety Code.  
Reference: Sections 39002, 39003, 39017, 39500, 39650, 40000, 43000, 43000.5, 43013, 43018, 43801, 43806 Health and Safety Code, and sections 233, 28114, 27157 Vehicle Code.

## SECTION 1956.3, TITLE 13, CCR

Add to Title 13, California Code of Regulations, new section 1956.3, to read:

### 1956.3 Zero Emission Bus Requirements

- (a) "Zero emission bus" means an Executive Officer certified urban bus that produces zero exhaust emissions of any criteria pollutant (or precursor pollutant) under any and all possible operational modes and conditions.
  - (1) A hydrogen-fuel cell bus shall qualify as a zero emission bus.
  - (2) An electric trolley bus with overhead twin-wire power supply shall qualify as a zero emission bus.
  - (3) A battery electric bus shall qualify as a zero emission bus.
  - (4) Incorporation of a fuel-fired heater shall not preclude an urban bus from being certified as a zero emission bus, provided the fuel-fired heater cannot be operated at ambient temperatures above 40°F and the heater is demonstrated to have zero evaporative emissions under any and all possible operational modes and conditions.
- (b) Zero Emission Bus Demonstration Project – except as provided in (3) below, the owner or operator of an urban bus fleet on the diesel path in accordance with the provisions of section 1956.2, with more than 200 urban transit buses in its active fleet on January 31, 2001, shall implement a demonstration project. The owner or operator shall evaluate the operation of zero emission buses in revenue service, and prepare and submit a report on the demonstration project to the Executive Officer for inclusion in a future review of zero emission technology.
  - (1) This demonstration project shall meet all of the following specifications and requirements:
    - (A) utilize a minimum of three zero emission buses,
    - (B) include any necessary site improvements,
    - (C) locate fueling infrastructure onsite,
    - (D) provide appropriate maintenance and storage facilities,
    - (E) train bus operators and maintenance personnel
    - (F) place the buses in revenue service for a minimum duration of 12 calendar months,
    - (G) retain operation and maintenance records, and
    - (H) report on the demonstration program as set forth in subdivision (d) of section 1956.4, 13 CCR.

- (2) When planning and implementing the demonstration project, the operator or owner shall meet the following milestones:
  - (A) no later than January 1, 2002, prepare and solicit bid proposals for materials and services necessary to implement the demonstration project, including but not limited to the zero emission buses and the associated infrastructure
  - (B) no later than July 1, 2003, place at least three zero emission buses in revenue service, and
  - (C) no later than January 31, 2005, submit a report on the demonstration project to the Executive Officer, in accordance with section 1956.4 (d)(3), 13 CCR.
  
- (3) Multiple transit agencies within the same air basin may, on a case-by-case basis, petition the Executive Officer to implement a joint zero emission bus demonstration project. Electric trolley buses shall not qualify as zero emission buses for purposes of this joint demonstration project. No more than three transit agencies can participate in any one joint project. Transit agencies that are participating in a joint demonstration project shall:
  - (A) designate the agency hosting the onsite demonstration,
  - (B) jointly fund the demonstration project,
  - (C) place a minimum of three zero emission buses per participating transit agency in revenue service,
  
- (c) Purchase Requirement for Zero Emission Buses - The owner or operator of a transit agency with more than 200 urban buses in active service on January 1, 2007, for transit agencies on the diesel path, and January 1, 2009, for transit agencies on the alternative-fuel path, shall purchase and/or lease zero emission buses, in accordance with the following:
  - (1) For transit agencies on the diesel path, in accordance with the requirements in section 1956.2, a minimum 15 percent of purchase and lease agreements, when aggregated annually, for model year 2008 through model year 2015 urban buses shall be zero emission buses.
  - (2) For transit agencies on the alternative-fuel path, in accordance with the requirements in section 1956.2, a minimum 15 percent of purchase and lease agreements, when aggregated annually, for model year 2010 through model year 2015 urban buses shall be zero emission buses.
  - (3) The provisions of paragraphs (1) and (2) shall not apply if the operator's urban bus fleet is composed of 15 percent or more zero

emission buses on January 1, 2008, for transit agencies on the diesel path, and on January 1, 2010, for transit agencies on the alternative-fuel path, or at any time thereafter.

- (d) The Air Resources Board shall review zero-emission bus technology and the feasibility of implementing the requirements of section (c) above no later than January 2006. Based on that assessment, the Board shall decide whether to proceed with the implementation of the requirements.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43100, 43101, 43104, 43806 Health and Safety Code, and sections 27157 Vehicle Code.

Reference: Sections 39002, 39003, 39017, 39018, 39500, 39701, 40000, 43000, 43000.5, 43009, 43013, 43018, 43102, 43801, 43806 Health and Safety Code, and sections 27157 and 28114 Vehicle Code.

SECTION 1956.4, TITLE 13, CCR

Add to Title 13, California Code of Regulations, new section 1956.4, to read:

- 1956.4 Reporting Requirements for all Urban Bus Transit Agencies and Leasing Companies
- (a) The following reports on new bus purchases and/or leases by transit operators on the alternative-fuel path shall be submitted as described below:
- (1) The initial report shall be submitted by January 31, 2001 and shall state the transit agency's intent to qualify for the alternative-fuel path.
  - (2) Any requests for deviation from the requirement that 85 percent of buses purchased per year must be alternative-fuel buses must be submitted in writing and approved by the Executive Officer of the Air Resources Board 90 days prior to purchase.
  - (3) Transit agencies shall maintain, and produce upon request, records regarding: the number, model year, and fuel used for engines in transit buses they currently own or operate, bus purchases and/or leases beginning January 1, 2000, annual average percentage of total bus purchases and/or leases that were alternative-fuel buses.
- (b) The following reports on the NO<sub>x</sub> fleet average requirement shall be submitted as described below:
- (1) initial documentation shall be submitted by January 31, 2001, and contain, at a minimum, the active urban bus fleet NO<sub>x</sub> emission average, and if that number exceeds the required average, a schedule of actions planned to achieve that average by October 1, 2002, including numbers and model years of bus purchases, retirements, retrofits, and/or repowerings, or, indicate the intent to retire all model year 1987 and earlier buses in their active fleet by October 1, 2002.
  - (2) a final report shall be submitted by January 31, 2003, detailing the active urban bus fleet NO<sub>x</sub> emission average as of October 1, 2002, and actions, if any were needed, taken to achieve that standard, including numbers and model years of bus purchases, retirements, retrofits, and/or repowerings, or documenting the retirement of all model year 1987 and earlier buses.

- (c) The following reports on the PM bus retrofit requirements shall be submitted as described below:
  - (1) initial reports shall be submitted by the dates shown below and shall contain, at a minimum, the following information:
    - (A) number and model year of diesel buses in the active fleet, projected number and model year of buses to be retrofitted annually, projected number and model year of exempt buses, if any, and basis for exemption.
    - (B) a report for Tier 1 and Tier 2 requirements shall be submitted by January 31, 2002.
    - (C) a report for Tier 3 requirements shall be submitted by January 31, 2005.
  - (2) transit agencies shall maintain, and produce on request, records of number and model year of diesel buses in the active fleet, number and model year of buses retrofitted per year, retrofit devices used, number and model year of exempt buses, if any, and basis for exemption.
- (d) The following reports on the zero-emission bus demonstration program shall be submitted by those transit agencies required to conduct such demonstrations as described below:
  - (1) initial documentation shall be submitted by January 31, 2003, and contain, at a minimum, the bus order and delivery schedule, fuel type, type of refueling station, any planned facility modifications, and a revenue service demonstration plan
  - (2) a financial plan shall be submitted by January 31, 2003, and contain, at a minimum, projected expenditures for capital costs for purchasing and/or leasing buses, refueling stations, any facility modifications, and projected annual operating costs
  - (3) a final report shall be submitted by January 31, 2005, and contain, at a minimum, the following information:
    - (A) a brief description of the zero emission technology utilized, identification of bus manufacturer and product specifications,
    - (B) miles driven per bus in revenue service, safety incidents, driver and mechanic training conducted, and maintenance (both scheduled and unscheduled),

- (C) qualitative transit personnel and passenger experience, and
  - (D) a financial summary of capital costs of demonstration program, including bus purchases and/or leases, fueling infrastructure, any new facilities or modifications, and annual operating costs.
- (e) The following reports on new zero-emission bus purchases and/or leases shall be submitted by transit agencies required to purchase zero-emission buses as described below:
- (1) initial report shall be submitted by date shown below, and contain, at a minimum, the following information:
    - (A) a brief description of the zero emission technology to be utilized and a plan for the implementation of the requirement,
    - (B) for an exemption from the purchase requirement, documentation that 15 percent or more of the transit agency's active urban bus fleet is composed of zero-emission buses.
    - (C) transit agencies on the diesel path shall submit report by January 1, 2007.
    - (D) transit agencies on the alternative-fuel path shall submit report by January 1, 2009.
  - (2) any requests for deviation from the requirement that 15 percent of buses purchased per year must be zero-emission buses must be submitted in writing and approved by the Executive Officer of the Air Resources Board 90 days prior to purchase.
  - (3) transit agencies on the diesel path shall maintain, and produce upon request, records regarding: the number, model year, and fuel used in engines they currently own or operate, bus purchases and/or leases beginning with model year 2008 and through model year 2015, annual average percentage of total bus purchases and/or leases that were zero-emission buses.
  - (4) transit agencies on the alternative-fuel path shall maintain, and produce upon request, records regarding: the number, model year, and fuel used in engines they currently own or operate, bus purchases and/or leases beginning with model year 2010 and

through model year 2015, annual average percentage of total bus purchases and/or leases that were zero-emission buses.

NOTE: Authority cited: Sections 39600, 39601, 39659, 39701, 43018, 41511 Health and Safety Code

Reference: Sections 39700, 39701, 41510, 41511, 43000, 43000.5, 43013, 43018, 43801, 43806 Health and Safety Code.



SECTION 1956.8, TITLE 13, CCR

Amend Title 13, California Code of Regulations, section 1956.8, to read:

(Note: The regulatory amendments proposed for this are shown in underline to indicate additions to the text, ***BOLD ITALICS*** to indicate added footnotes, and ~~strikeout~~ to indicate deletions.)

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

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

Exhaust Emission Standards  
For 1985 – 2003 Model Heavy-Duty Engines  
(grams per brake horsepower-hour)

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

1995-1997 <sup>↓ E</sup>	1.3	1.2	15.5	3.5 to 0.5	0.10
1996-2003 <sup>F</sup>	1.3	1.2	15.5	4.0 <sup>± G</sup>	0.05 <sup>H± G</sup>
1996-2003 <sup>G</sup>	1.3	1.2	15.5	2.5 to 0.5	0.05 <sup>H</sup>
1998-2003 <sup>K F</sup>	1.3	1.2	15.5	4.0 <sup>G, S</sup>	0.10 <sup>G</sup>
1998-2003 <sup>↓ E</sup>	1.3	1.2	15.5	2.5 to 0.5 <sup>± I</sup>	0.10

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

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

<sup>C</sup> For methanol-fueled engines, these standards shall be applicable beginning with the 1993 model year.

<sup>D</sup> Emissions averaging may be used to meet this standard. Averaging is restricted to within each useful life subclass and is applicable only through the 1995 model year. Emissions from engines used in urban buses shall not be included in the averaging program.

<sup>E</sup> These are optional standards. A manufacturer may elect to certify to an optional NOx standard between the values, inclusive, by 0.5 grams per brake horsepower-hour increments. Engines certified to any of these optional NOx standards are not eligible for participation in any averaging, banking or trading programs described in "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" incorporated in (b), below.

<sup>F</sup> These are mandatory standards.

<sup>G</sup> Engines of 1998 through 2003 model years may be eligible to generate banking credits based on these standards according to the requirements of the averaging, banking and trading programs described in "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" incorporated in (b), below.

<sup>H</sup> May be used as the certification standard for the higher emitting fueling mode of an engine certified under the dual fueling mode certification process of (a)(3), below.

<sup>1</sup> May be used as the certification standard for the lower emitting fueling mode of an engine certified under the dual fueling mode certification process of (a)(3), below.

**Exhaust Emission Standards for Engines Used in October 2002  
and Subsequent Model Heavy-Duty Engines and Vehicles**

Model Year	Oxides of Nitrogen Plus Non-methane Hydrocarbons	Optional Oxides of Nitrogen Plus Non-methane Hydrocarbons	Carbon Monoxide	Particulate Matter
2004 and subsequent <sup>G</sup>	2.4 <sup>L,P,S</sup>	2.5 <sup>M,P,S</sup>	15.5	0.05 <sup>H,P</sup>
2004 September 30, 2002 and subsequent <sup>N</sup>	2.4 <sup>L,P,S</sup>	2.5 <sup>M,P,SB,C,E</sup>	15.5	0.10 <sup>PC</sup>
2004 and subsequent <sup>G</sup>	n/a	1.8 to 0.3 <sup>L,R,T</sup>	15.5	0.05 <sup>H</sup>
2004 September 30, 2002 and subsequent <sup>N</sup>	n/a	1.8 to 0.3 <sup>L,R,TA,D,F</sup>	15.5	0.10 0.03 to 0.01 <sup>A,F,G</sup>

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

<sup>B</sup> ~~As an option a manufacturer may elect to certify to the 1988 model-year emission standards one year early, for the 1987 model year.~~

<sup>C</sup> ~~These standards apply to urban bus engines only.~~

<sup>D</sup> ~~For engines other than urban bus engines. For methanol-fueled engines, these standards shall be applicable beginning with the 1993 model year.~~

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

<sup>F</sup> ~~These mandatory standards apply to urban bus engines only.~~

<sup>G</sup> ~~These optional standards apply to urban bus engines only. A manufacturer may elect to certify to an optional NOx standard by 0.5 grams per brake horsepower-hour increments. Engines certified to any of these optional NOx standards are not eligible~~

~~for participation in any averaging, banking or trading programs described in "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" incorporated in (b), below.~~

~~<sup>H</sup> For in-use testing, a 0.07 gram per brake horsepower-hour standard for particulates shall apply.~~

~~<sup>I</sup> 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.~~

~~<sup>J</sup> These are optional standards and apply to all heavy-duty engines excluding urban bus engines. A manufacturer may elect to certify to an optional NO<sub>x</sub> standard between the values, inclusive, by 0.5 grams per brake horsepower-hour increments. Engines certified to any of these optional NO<sub>x</sub> standards are not eligible for participation in any averaging, banking or trading programs described in "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" incorporated in (b), below.~~

~~<sup>K</sup> These mandatory standards apply to all heavy-duty engines except urban bus engines.~~

~~<sup>L</sup> <sup>A</sup> This is the standard for the arithmetic sum of the oxides of nitrogen exhaust component certification value and the non-methane hydrocarbon exhaust component certification value, without individual restriction on the individual component values.~~

~~<sup>MB</sup> This is the standard for the arithmetic sum of the oxides of nitrogen exhaust component certification value and the non-methane hydrocarbon exhaust component certification value, with the non-methane hydrocarbon individual component value not to exceed 0.5 g/bhp-hr.~~

~~<sup>N</sup> These standards apply to all heavy-duty engines except urban bus engines.~~

~~<sup>O</sup> Engines of 1998 through 2003 model years may be eligible to generate banking credits based on these standards according to the requirements of the averaging, banking and trading programs described in "California Exhaust Emission Standards~~

~~and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" incorporated in (b), below.~~

<sup>PC</sup> Emissions averaging may be used to meet this standard. Averaging must be based on the requirements of the averaging, banking and trading programs described in "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" incorporated in (b), below.

<sup>RD</sup> A manufacturer may elect to certify to an optional reduced-emission NO<sub>x</sub>+NMHC standard between the values, inclusive, by 0.3 grams per brake horsepower-hour increments. Engines certified to any of these optional reduced-emission NO<sub>x</sub> standards are not eligible for participation in any averaging, banking or trading programs described in "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" incorporated in (b), below.

<sup>SE</sup> May be used as the certification standard for the higher emitting fueling mode of an engine certified under the dual fueling mode certification process of (a)(3), below.

<sup>TF</sup> May be used as the certification standard for the lower emitting fueling mode of an engine certified under the dual fueling mode certification process of (a)(3), below.

<sup>G</sup> A manufacturer may elect to certify to an optional reduced-emission PM standard between the values, inclusive, by 0.01 grams per brake horsepower-hour increments. Engines certified to any of these optional reduced-emission PM standards are not eligible for participation in any averaging, banking or trading programs described in "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" incorporated in (b), below.

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

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

(3) 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 by significantly different emission levels under each mode, may certify to a different NO<sub>x</sub> or NO<sub>x</sub> plus NMHC (as applicable depending on model year) standard for each fueling mode, provided it meets the following requirements:

- (A) The NOx or NOx plus NMHC certification standard used for operation under the higher emitting fueling mode must be one of the standards denoted by footnote S in (a)(1).
- (B) The NOx or NOx plus NMHC certification standard used for operation under the lower emitting fueling mode must be one of the reduced-emission standards denoted by footnote T in (a)(1).
- (C) The engine family is not used to participate in any manufacturer's averaging, banking or trading program.
- (D) The engine family meets all other emission requirements contained in this section.
- (E) The higher emitting fueling mode must be intended only for fail-safe vehicle operation when a malfunction or inadvertent fuel depletion precludes operation in the lower emitting fueling mode, as evidenced by a significantly reduced horsepower versus engine speed curve when operating in the higher emitting fueling mode when compared to the similar curve for the lower emitting fueling mode.

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

(c), (d), (e), (f), (g) [No Change]

(h) The exhaust emissions from new 1992 and subsequent model-year engines used in incomplete medium-duty low-emission vehicles, ultra-low-emission vehicles, and super-ultra-low-emission vehicles, and for diesel engines used in medium-duty low-emission vehicles, ultra-low-emission vehicles and super-ultra-low-emission vehicles shall not exceed:

**Exhaust Emission Standards for Engines Used in Incomplete Medium-Duty Low-Emission Vehicles, Ultra-Low-Emission Vehicles, and Super Ultra-Low-Emission Vehicles, and for Diesel Engines Used in Medium-Duty Low-Emission Vehicles, Ultra-Low-Emission Vehicles, and Super Ultra-Low-Emission Vehicles<sup>A,F</sup>**  
(grams per brake horsepower-hour)

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

<sup>A</sup> This set of standards is optional. Manufacturers of engines used in incomplete medium-duty vehicles or diesel engines used in medium-duty vehicles from 8501-14,000 pounds gross vehicle weight rating may choose to comply with these standards as an alternative to the primary emission standards and test procedures specified in section 1960.1, Title 13, California Code of Regulations. Manufacturers that choose to comply with these optional heavy-duty standards and test procedures shall specify, in the application for certification, an in-use compliance test procedure, as provided in section 2139(c), Title 13, California Code of Regulations.

<sup>B</sup> "LEV" means low-emission vehicle.  
"ULEV" means ultra-low-emission vehicle.  
"SULEV" means super ultra-low-emission vehicle.

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

<sup>D</sup> This standard shall only apply to diesel engines and vehicles.

- <sup>E</sup> Manufacturers may certify engines used in incomplete medium-duty vehicles or diesel engines used in medium-duty vehicles to these standards to meet the requirements of section 1956.8(g), Title 13, California Code of Regulations.
- <sup>F</sup> In-use compliance testing shall be limited to vehicles or engines with fewer than 90,000 miles.
- <sup>G</sup> [The U.S. EPA is considering the adoption of amendments to the federal emission standards for engines used in incomplete medium-duty vehicles or diesel engines used in medium-duty vehicles as they existed June 24, 1996. If the U.S. EPA promulgates amendments to the emission standards for this category, the ARB will hold a noticed public hearing within one year of such promulgation to consider the adoption of similar or identical standards in California.]
- <sup>H</sup> For engines certified to the 3.5 grams per brake horsepower-hour (g/bhp-hr) LEV standards, the in-use compliance standard shall be 3.7 g/bhp-hr for the first two model years of introduction. For engines certified to the 2002 and 2003 model year LEV standards, the in-use compliance standard shall be 3.2 g/bhp-hr. For engines certified to the 1992 through 2003 model year ULEV standards, the in-use compliance standard shall be 2.7 g/bhp-hr for the first two model years of introduction. For engines certified to the 1992 and subsequent SULEV standards, the in-use compliance standard shall be 2.2 g/bhp-hr for the first two model years of introduction.
- <sup>I</sup> Manufacturers have the option of certifying to either option A or B. Manufacturers electing to certify to Option A must demonstrate that the NMHC emissions do not exceed 0.5 g/bhp-hr.
- <sup>J</sup> Emissions averaging may be used to meet these standards for diesel engines, using the requirements for participation in averaging, banking and trading programs, as set forth in the "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles", adopted April 8, 1985, as last amended [insert date of finalized amendment], incorporated by reference in paragraph (b), above.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43103, 43104, and 43806, Health and Safety Code, and section 28114, Vehicle Code.

Reference: Sections 39002, 39003, 43000, 43013, 43018, 43100, 43101, 43101.5, 43102, 43103, 43104, 43106, 43204, and 43806, Health and Safety Code.



AMENDMENTS TO THE CALIFORNIA EXHAUST EMISSION STANDARDS AND  
TEST PROCEDURES FOR 1985 AND SUSEQUENT MODEL  
HEAVY-DUTY DIESEL ENGINES AND VEHICLES

State of California  
AIR RESOURCES BOARD

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

Adopted: April 8, 1985  
Amended: July 29, 1986  
Amended: January 22, 1990  
Amended: May 15, 1990  
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Amended: July 12, 1991  
Amended: October 23, 1992  
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Amended: March 24, 1994  
Amended: September 22, 1994  
Amended: June 29, 1995  
Amended: June 4, 1997  
Amended: April 15, 1999  
Amended: (insert date of finalized amendment)

NOTE: This document incorporates by reference various sections of the Code of Federal Regulations (CFR), some with modifications. As noted, some of the current modifications are to CFR sections already amended in California effective April 15, 1999. Modifications to portions of paragraphs in the Federal language are indicated by underline for additions and ~~strikeout~~ for deletions. Larger portions of Federal language for a specific section which is not to be included in these procedures are denoted by the "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. The symbol "#####" means that the remainder of the text of these procedures, which is not shown in this amendment document, has not been changed.

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

The following provisions of Subparts A, I, and N, 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 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 which 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 model years. The federal regulations contained in the Subparts identified above which pertain to particulate emission averaging shall not be applicable to these procedures for 1996 and subsequent 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 model years.

The federal regulations contained 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 emission 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 Diesel natural-gas-fueled and liquefied-petroleum gas-fueled engines (and vehicles) including those engines derived from existing Diesel engines. For any engine which 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 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 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 model years.

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-Fuel and Methanol Fueled Heavy-Duty Vehicles

Adopt and amend 86.098-11, Title 40, Code of Federal Regulations, (October 21, 1997) as amended by the Air Resources Board effective April 15, 1999, to read:

86.098-11 emissions standards for 1998 and later model year diesel heavy-duty engines and vehicles (October 21, 1997 as amended)

(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 NO<sub>x</sub> 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 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

(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 ~~2003 model year~~ September 30, 2002 diesel engines 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 the 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)(iv) A manufacturer may elect to certify 1998 through ~~2003 model year~~ September 30, 2002 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 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 the 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 October 1, 2002 through model year 2003 diesel engines for urban buses for sale to transit agencies on the fleet rule diesel path, 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.

(v) A manufacturer may elect to certify October 1, 2002 through model year 2006 diesel engines for urban buses for sale to transit agencies on the fleet rule alternative-fuel path, 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 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.

#####

Adopt and amend 86.004-11, Title 40, Code of Federal Regulations, (October 21, 1997) as amended by the Air Resources Board effective April 15, 1999, to read:

§ 86.004-11 Emission standards for 2004 and later model year diesel heavy-duty engines and vehicles (October 21, 1997 as amended)

(a)(1) Exhaust emissions from new 2004 and later model year diesel HDEs, other than urban buses, shall not exceed the following:

(i)(A) Oxides of Nitrogen plus Non-methane Hydrocarbons (NO<sub>x</sub> + NMHC) for engines fueled with either petroleum fuel, natural gas, or liquefied petroleum gas, 2.4 grams per brake horsepower-hour (0.89 gram per megajoule), as measured under transient operating conditions.

(B) Oxides of Nitrogen plus Non-methane Hydrocarbon Equivalent (NO<sub>x</sub> + NMHCE) for engines fueled with methanol, 2.4 grams per brake horsepower-hour (0.89 gram per megajoule), as measured under transient operating conditions.

(C) Optional Standard. Manufacturers may elect to certify to an Oxides of Nitrogen plus Non-methane Hydrocarbons (or equivalent for methanol-fueled engines) standard of 2.5 grams per brake horsepower-hour (0.93 gram per megajoule), as measured under transient operating conditions, provided that Non-methane Hydrocarbons (or equivalent for methanol-fueled engines) do not exceed 0.5 grams per brake horsepower-hour (0.19 gram per megajoule) NMHC (or NMHCE for methanol-fueled engines), as measured under transient operating conditions.

(D) A manufacturer may elect to include any or all of its diesel HDE families in any or all of the emissions ABT programs for HDEs, within the restrictions described in § 86.004-15 or superseding applicable sections. If the manufacturer elects to include engine families in any of these programs, the NO<sub>x</sub> plus NMHC (or NO<sub>x</sub> plus NMHCE for methanol-fueled engines) FELs may not exceed 4.5 grams per brake horsepower-hour (1.7 grams per megajoule). This ceiling value applies whether credits for the family are derived from averaging, banking, or trading programs. Additionally, families certified to the optional standard contained in paragraph (a)(1)(i)(C) of this section shall not exceed 0.50 grams per brake horsepower-hour (0.19 gram per megajoule) NMHC (or NMHCE for methanol-fueled engines) through the use of credits.

(E) DELETE

(ii) DELETE

(iv) Particulate.

(A) DELETE

(B) DELETE



(C) A manufacturer may elect to include any or all of its diesel HDE families in any or all of the particulate ABT programs for HDEs, within the restrictions described in this section and in § 86.004-15 or superseding applicable sections. If the manufacturer elects to include engine families in any of these programs, the particulate FEL may not exceed 0.25 gram per brake horsepower-hour (0.093 gram per megajoule).

(2) The standards set forth in paragraph (a)(1) of this section refer to the exhaust emitted over the operating schedule set forth in paragraph (f)(2) of appendix I to this part, and measured and calculated in accordance with the procedures set forth in subpart N or P of this part, except as noted in § 86.098-23(c)(2) or superseding sections.

(b) DELETE

(c) DELETE

(d) DELETE

(e) A manufacturer may elect to certify ~~2003~~ 2004 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 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 standard contained in this paragraph are not eligible to participate in NO<sub>x</sub>, NO<sub>x</sub> plus NMHC, or particulate ART programs.

\*\*\*\*\*

(g)(1) exhaust emission from new 2004 through 2006 model year urban bus HDEs shall not exceed the following:

(i)(A) Oxides of Nitrogen plus Non-methane Hydrocarbons (NO<sub>x</sub> + NMHC) for engines fueled with either petroleum fuel, natural gas, or liquefied petroleum gas, 2.4 grams per brake horsepower-hour (0.89 gram per megajoule), as measured under transient operating conditions.

(B) Oxides of Nitrogen plus Non-methane Hydrocarbon Equivalent (NO<sub>x</sub> + NMHCE) for engines fueled with methanol, 2.4 grams per brake horsepower-hour (0.89 gram per megajoule), as measured under transient operating conditions.

(C) Optional Standard. Manufacturers may elect to certify to an Oxides of Nitrogen plus Non-methane Hydrocarbons (or equivalent for methanol-fueled engines) standard of 2.5

grams per brake horsepower-hour (0.93 gram per megajoule), as measured under transient operating conditions, provided that Non-methane Hydrocarbons (or equivalent for methanol-fueled engines) do not exceed 0.5 grams per brake horsepower-hour (0.19 gram per megajoule) NMHC (or NMHCE for methanol-fueled engines), as measured under transient operating conditions.

(D) A manufacturer may elect to include any or all of its diesel HDE families in any or all of the emissions ABT programs for HDEs, within the restrictions described in § 86.004-15 or superseding applicable sections. If the manufacturer elects to include engine families in any of these programs, the NO<sub>x</sub> plus NMHC (or NO<sub>x</sub> plus NMHCE for methanol-fueled engines) FELs may not exceed 4.5 grams per brake horsepower-hour (1.7 grams per megajoule). This ceiling value applies whether credits for the family are derived from averaging, banking, or trading programs. Additionally, families certified to the optional standard contained in paragraph (a)(1)(i)(C) of this section shall not exceed 0.50 grams per brake horsepower-hour (0.19 gram per megajoule) NMHC (or NMHCE for methanol-fueled engines) through the use of credits.

(E) Oxides of Nitrogen for engines for sale to transit agencies on the fleet rule diesel path fueled with either petroleum fuel, natural gas, or liquefied petroleum gas, 0.5 grams per brake horsepower-hour (0.02 gram per megajoule), or equivalent for methanol-fueled engines, measured under transient operating conditions.

(F) A manufacturer may elect to include any or all of its diesel HDE families in any or all of the emissions ABT programs for HDEs, within the restrictions described in § 86.004-15 or superseding applicable sections. If the manufacturer elects to include engine families in any of these programs, the NO<sub>x</sub> plus NMHC (or NO<sub>x</sub> plus NMHCE for methanol-fueled engines) FELs may not exceed 4.5 grams per brake horsepower-hour (1.7 grams per megajoule). This ceiling value applies whether credits for the family are derived from averaging, banking, or trading programs. Additionally, families certified to the optional standard contained in paragraph (a)(1)(i)(C) of this section shall not exceed 0.50 grams per brake horsepower-hour (0.19 gram per megajoule) NMHC (or NMHCE for methanol-fueled engines) through the use of credits.

(ii)(A) Non-methane hydrocarbons for engines for urban buses for sale to transit agencies on the fleet rule diesel path fueled with either petroleum fuel, natural gas, or liquefied petroleum gas, 0.05 grams per brake horsepower-hour (0.02) gram per megajoule), or equivalent for methanol-fueled engines, as measured under transient operating conditions.

(iii) (A) Particulates for engines to be used in urban buses, 0.03 grams per brake horsepower-hour (0.01 gram per megajoule) for certification testing and selective enforcement audit testing, and 0.04 grams per brake horsepower-hour (0.02 gram per megajoule) for in-use testing, as measured under transient operating conditions.

(B) A manufacturer may elect to include any or all of its diesel HDE families in any or all of the particulate ABT programs for HDEs, within the restrictions described in this

section and in § 86.004-15 or superseding applicable sections. If the manufacturer elects to include engine families in any of these programs, the particulate FEL may not exceed 0.25 gram per brake horsepower-hour (0.093 gram per megajoule).

(B) Particulates for engines to be used in urban buses for sale to transit agencies on the fleet rule diesel path, 0.01 grams per brake horsepower-hour (0.00 gram per megajoule) for certification testing and selective enforcement audit testing, and 0.01 grams per brake horsepower-hour (0.01 gram per megajoule) for in-use testing, as measured under transient operating conditions.

(iv)(A) Carbon monoxide for engines to be used in urban buses for sale to transit agencies on the fleet rule diesel path, 5.0 grams per brake horsepower-hour (1.9 gram per megajoule) for certification testing and selective enforcement audit testing, and 7.0 grams per brake horsepower-hour (2.6 gram per megajoule) for in-use testing, as measured under transient operating conditions.

(v)(A) Formaldehyde for engines used in urban buses for sale to transit agencies on the fleet rule diesel path, 0.01 grams per brake horsepower-hour (0.0 gram per megajoule) for certification testing and selective enforcement audit testing, and 0.01 grams per brake horsepower-hour (0.01 gram per megajoule) for in-use testing, as measured under transient operating conditions

(g) Optional Standards. As described in superceding applicable sections 86.098-11, (October 21,1997 revised effective April 15, 1999) (e)(1)(i)(iv)(v) for urban buses