

**§ 86.098-10**

**40 CFR Ch. I (7-1-04 Edition)**

standards apply equally to certification and in-use vehicles.

(1) *Standards*—(i) *Hydrocarbons (for gasoline-fueled Otto-cycle and petroleum-fueled diesel-cycle vehicles)*. 0.20 gram per gallon (0.053 gram per liter) of fuel dispensed.

(ii) *Total hydrocarbon equivalent (for methanol-fueled vehicles)*. 0.20 gram per gallon (0.053 gram per liter) of fuel dispensed.

(iii) *Hydrocarbons (for liquefied petroleum gas-fueled vehicles)*. 0.15 gram per gallon (0.04 gram per liter) of fuel dispensed.

(iv) *Refueling receptacle (for natural gas-fueled vehicles)*. Refueling receptacles on natural gas-fueled vehicles shall comply with the receptacle provisions of the ANSI/AGA NGV1 standard-1994 (as incorporated by reference in § 86.1).

(2)(i) The standards set forth in paragraphs (d)(1) (i) and (ii) of this section refer to a sample of refueling emissions collected under the conditions set forth in subpart B of this part and measured in accordance with those procedures.

(ii) For vehicles powered by petroleum-fueled diesel-cycle engines, the provisions set forth in paragraph (d)(1) of this section may be waived: *Provided*, that the manufacturer complies with the provisions of § 86.098-28(g).

(3)(i) A minimum of the percentage shown in table A98-08 of a manufacturer's sales of the applicable model year's gasoline- and methanol-fueled Otto-cycle and petroleum-fueled and methanol-fueled diesel-cycle light-duty vehicles shall be tested under the procedures in subpart B of this part indicated for 1998 and later model years, and shall not exceed the standards described in paragraph (d)(1) of this section. Vehicles certified in accordance with paragraph (d)(2)(ii) of this section, as determined by the provisions of § 86.098-28(g), shall not be counted in the calculation of the percentage of compliance.

TABLE A98-08—IMPLEMENTATION SCHEDULE FOR LIGHT-DUTY VEHICLE REFUELING EMISSION TESTING

Model year	Sales percentage
1998 .....	40
1999 .....	80

TABLE A98-08—IMPLEMENTATION SCHEDULE FOR LIGHT-DUTY VEHICLE REFUELING EMISSION TESTING—Continued

Model year	Sales percentage
2000 and subsequent .....	100

(ii) Small volume manufacturers, as defined in § 86.094-14(b) (1) and (2), are exempt from the implementation schedule of table A98-08 of this section for model years 1998 and 1999. For small volume manufacturers, the standards of paragraph (d) of this section, and the associated test procedures, shall not apply until model year 2000, when 100 percent compliance with the standards of this section is required. This exemption does not apply to small volume engine families as defined in § 86.094-14(b)(5).

(e)-(f) [Reserved]

(g)-(k) [Reserved]. For guidance see § 86.096-8.

[59 FR 16289, Apr. 6, 1994, as amended at 59 FR 48501, Sept. 21, 1994]

**§ 86.098-10 Emission standards for 1998 and later model year Otto-cycle heavy-duty engines and vehicles.**

Section 86.098-10 includes text that specifies requirements that differ from § 86.096-10. Where a paragraph in § 86.096-10 is identical and applicable to § 86.098-10, this may be indicated by specifying the corresponding paragraph and the statement “[Reserved]. For guidance see § 86.096-10.”

(a)(1) Except as provided for 2003 and 2004 model years in §§ 86.005-10(f) and 86.1816-05, exhaust emissions from new 1998 and later model year Otto-cycle heavy-duty engines shall not exceed:

(i) *For Otto-cycle heavy-duty engines fueled with either gasoline or liquefied petroleum gas*, and intended for use in all vehicles except as provided in paragraph (a)(3) of this paragraph.

(A) *Hydrocarbons*. 1.1 grams per brake horsepower-hour (0.41 gram per megajoule), as measured under transient operating conditions.

(B) *Carbon monoxide*. (1) 14.4 grams per brake horsepower-hour (5.36 grams per megajoule), as measured under transient operating conditions.

(2) *For Otto-cycle heavy-duty engines fueled with either gasoline or liquefied petroleum gas and utilizing aftertreatment technology:* 0.50 percent of exhaust gas flow at curb idle.

(C) *Oxides of nitrogen* (1) 4.0 grams per brake horsepower-hour (1.49 grams per megajoule), as measured under transient operating conditions.

(2) A manufacturer may elect to include any or all of its gasoline-fueled Otto-cycle HDE families in any or all of the NO<sub>x</sub> or NO<sub>x</sub> plus NMHC ABT programs for HDEs, within the restrictions described in §86.098-15 as applicable. If the manufacturer elects to include engine families in any of these programs, the NO<sub>x</sub> FELs may not exceed 5.0 grams per brake horsepower-hour (1.9 grams per megajoule). This ceiling value applies whether credits for the family are derived from averaging, trading or banking programs.

(3) A manufacturer may elect to include any or all of its liquified petroleum gas-fueled Otto-cycle HDE families in any or all of the NO<sub>x</sub> or NO<sub>x</sub> plus NMHC ABT programs for HDEs, within the restrictions described in §86.098-15 as applicable. If the manufacturer elects to include engine families in any of these programs, the NO<sub>x</sub> FELs may not exceed 5.0 grams per brake horsepower-hour (1.9 grams per megajoule). This ceiling value applies whether credits for the family are derived from averaging, trading or banking programs.

(ii) *For Otto-cycle heavy-duty engines fueled with either gasoline or liquefied petroleum gas, and intended for use only in vehicles with a Gross Vehicle Weight Rating of greater than 14,000 pounds.*

(A) *Hydrocarbons.* 1.9 grams per brake horsepower-hour (0.71 gram per megajoule), as measured under transient operating conditions.

(B) *Carbon Monoxide.* (1) 37.1 grams per brake horsepower-hour (13.8 grams per megajoule), as measured under transient operating conditions.

(2) *For Otto-cycle heavy-duty engines fueled with either gasoline or liquefied petroleum gas and utilizing aftertreatment technology:* 0.50 percent of exhaust gas flow at curb idle.

(C) *Oxides of nitrogen* (1) 4.0 grams per brake horsepower-hour (1.49 grams per

megajoule), as measured under transient operating conditions.

(2) A manufacturer may elect to include any or all of its gasoline-fueled Otto-cycle HDE families in any or all of the NO<sub>x</sub> or NO<sub>x</sub> plus NMHC ABT programs for HDEs, within the restrictions described in §86.098-15 as applicable. If the manufacturer elects to include engine families in any of these programs, the NO<sub>x</sub> FELs may not exceed 5.0 grams per brake horsepower-hour (1.9 grams per megajoule). This ceiling value applies whether credits for the family are derived from averaging, trading or banking programs.

(3) A manufacturer may elect to include any or all of its liquified petroleum gas-fueled Otto-cycle HDE families in any or all of the NO<sub>x</sub> or NO<sub>x</sub> plus NMHC ABT programs for HDEs, within the restrictions described in §86.098-15 as applicable. If the manufacturer elects to include engine families in any of these programs, the NO<sub>x</sub> FELs may not exceed 5.0 grams per brake horsepower-hour (1.9 grams per megajoule). This ceiling value applies whether credits for the family are derived from averaging, trading or banking programs.

(iii) *For methanol-fueled Otto cycle heavy-duty engines* intended for use in all vehicles, except as provided in paragraph (a)(3) of this section.

(A) *Total Hydrocarbon Equivalent.* 1.1 gram per brake horsepower-hour (0.41 gram per megajoule), as measured under transient operating conditions.

(B) *Carbon monoxide.* (1) 14.4 grams per brake horsepower-hour (5.36 grams per megajoule), as measured under transient operating conditions.

(2) 0.50 percent of exhaust gas flow at curb idle.

(C) *Oxides of nitrogen.* (1) 4.0 grams per brake horsepower-hour (1.49 grams per megajoule), as measured under transient operating conditions.

(2) A manufacturer may elect to include any or all of its methanol-fueled Otto-cycle HDE families in any or all of the NO<sub>x</sub> or NO<sub>x</sub> plus NMHC ABT programs for HDEs, within the restrictions described in §86.098-15 as applicable. If the manufacturer elects to include engine families in any of these programs, the NO<sub>x</sub> FELs may not exceed 5.0 grams per brake horsepower-

hour (1.9 grams per megajoule). This ceiling value applies whether credits for the family are derived from averaging, trading or banking programs.

(iv) *For methanol-fueled Otto-cycle heavy-duty engines* intended for use only in vehicles with a Gross Vehicle Weight Rating of greater than 14,000 lbs.

(A) *Total Hydrocarbon Equivalent*. 1.9 grams per brake horsepower-hour (0.71 gram per megajoule), as measured under transient operating conditions.

(B) *Carbon monoxide*. (1) 37.1 grams per brake horsepower-hour (13.8 grams per megajoule), as measured under transient operating conditions.

(2) 0.50 percent of exhaust gas flow at curb idle.

(C) *Oxides of nitrogen*. (1) 4.0 grams per brake horsepower-hour (1.49 grams per megajoule), as measured under transient operating conditions.

(2) A manufacturer may elect to include any or all of its methanol-fueled Otto-cycle HDE families in any or all of the NO<sub>x</sub> or NO<sub>x</sub> plus NMHC ABT programs for HDEs, within the restrictions described in §86.098-15 as applicable. If the manufacturer elects to include engine families in any of these programs, the NO<sub>x</sub> FELs may not exceed 5.0 grams per brake horsepower-hour (1.9 grams per megajoule). This ceiling value applies whether credits for the family are derived from averaging, trading or banking programs.

(v) *For natural gas-fueled Otto-cycle heavy-duty engines* intended for use in all vehicles except as provided in paragraph (a)(3) of this section.

(A) *Nonmethane hydrocarbons*. 0.9 gram per brake horsepower-hour (0.33 gram per megajoule), as measured under transient operating conditions.

(B) *Carbon monoxide*. (1) 14.4 grams per brake horsepower-hour (5.36 grams per megajoule), as measured under transient operating conditions.

(2) *For natural gas-fueled Otto-cycle heavy-duty engines utilizing aftertreatment technology*. 0.50 percent of exhaust flow at curb idle.

(C) *Oxides of nitrogen*. (1) 5.0 grams per brake horsepower-hour (1.9 grams per megajoule), as measured under transient operating conditions.

(2) A manufacturer may elect to include any or all of its natural gas-

fueled Otto-cycle HDE families in any or all of the NO<sub>x</sub> or NO<sub>x</sub> plus NMHC ABT programs for HDEs, within the restrictions described in §86.098-15 as applicable. If the manufacturer elects to include engine families in any of these programs, the NO<sub>x</sub> FELs may not exceed 5.0 grams per brake horsepower-hour (1.9 grams per megajoule). This ceiling value applies whether credits for the family are derived from averaging, trading or banking programs.

(vi) *For natural gas-fueled Otto-cycle engines* intended for use only in vehicles with a Gross Vehicle Weight Rating of greater than 14,000 pounds.

(A) *Nonmethane hydrocarbons*. 1.7 grams per brake horsepower-hour (0.63 gram per megajoule), as measured under transient operating conditions.

(B) *Carbon monoxide*. (1) 37.1 grams per brake horsepower-hour (13.8 grams per megajoule), as measured under transient operating conditions.

(2) *For natural gas-fueled Otto-cycle heavy-duty engines utilizing aftertreatment technology*. 0.50 percent of exhaust gas flow at curb idle.

(C) *Oxides of nitrogen*. (1) 5.0 grams per brake horsepower-hour (1.9 grams per megajoule), as measured under transient operating conditions.

(2) A manufacturer may elect to include any or all of its natural gas-fueled Otto-cycle HDE families in any or all of the NO<sub>x</sub> or NO<sub>x</sub> plus NMHC ABT programs for HDEs, within the restrictions described in §86.098-15 as applicable. If the manufacturer elects to include engine families in any of these programs, the NO<sub>x</sub> FELs may not exceed 5.0 grams per brake horsepower-hour (1.9 grams per megajoule). This ceiling value applies whether credits for the family are derived from averaging, trading or banking programs.

(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)(1) 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.

(3)(i) A manufacturer may certify one or more Otto-cycle heavy-duty engine configurations intended for use in all vehicles to the emission standards set forth in paragraphs (a)(1)(ii), (a)(1)(iv)

or (a)(1)(vi) of this paragraph: *Provided*, that the total model year sales of such configuration(s), segregated by fuel type, being certified to the emission standards in paragraph (a)(1)(ii) of this section represent no more than five percent of total model year sales of each fuel type Otto-cycle heavy-duty engine intended for use in vehicles with a Gross Vehicle Weight Rating of up to 14,000 pounds by the manufacturer.

(ii) The configurations certified to the emission standards of paragraphs (a)(1) (ii) and (vi) of this section under the provisions of paragraph (a)(3)(i) of this section shall still be required to meet the evaporative emission standards set forth in paragraphs § 86.096–10(b)(1)(i), (b)(2)(i) and (b)(3)(i).

(iii) The configurations certified to the emission standards of paragraphs (a)(1) (ii) and (iv) of this section under the provisions of paragraphs (a)(3) (i) and (ii) of this section shall still be required to meet the evaporative emission standards set forth in paragraphs (b)(1)(i), (b)(2)(i), and (b)(3)(i) of this section.

(b) [Reserved]. For guidance see § 86.096–10.

(c) No crankcase emissions shall be discharged into the ambient atmosphere from any new 1998 or later model year Otto-cycle heavy-duty engine.

(d) Every manufacturer of new motor vehicle engines subject to the standards prescribed in this section shall, prior to taking any of the actions specified in section 203(a)(1) of the Act, test or cause to be tested motor vehicle engines in accordance with applicable procedures in subpart N or P of this part to ascertain that such test engines meet the requirements of paragraphs (a) and (c) of this section.

[58 FR 15800, Mar. 24, 1993, as amended at 59 FR 48501, Sept. 21, 1994; 62 FR 54716, Oct. 21, 1997; 65 FR 59955, Oct. 6, 2000]

**§ 86.098–11 Emission standards for 1998 and later model year diesel heavy-duty engines and vehicles.**

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

(1)(i) *Hydrocarbons (for diesel engines fueled with either petroleum-fuel or liquefied petroleum gas)*. 1.3 grams per brake horsepower-hour (0.48 gram per

megajoule), as measured under transient operating conditions.

(ii) *Total 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) *Nonmethane hydrocarbons (for natural gas-fueled diesel engines)*. 1.2 grams per brake horsepower-hour (0.45 gram per megajoule), 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-, natural gas-, and liquefied petroleum gas-fueled diesel only).

(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 any or all of the NO<sub>x</sub> or NO<sub>x</sub> plus NMHC ABT programs for HDEs, within the restrictions described in § 86.098–15 as applicable. If the manufacturer elects to include engine families in any of these programs, the NO<sub>x</sub> FELs may not exceed 5.0 grams per brake horsepower-hour (1.9 grams per megajoule). This ceiling value applies whether credits for the family are derived from averaging, trading or banking programs.

(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 selective enforcement audit 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) 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 § 86.098–15 as applicable. If the manufacturer elects to include engine families in any of these