

(b) The abbreviations of this section apply to this subpart, and also to subparts B, E, F, G, K, M, N, and P of this part, and have the following meanings:

T<sub>D</sub>—Dispensed fuel temperature  
 ABT—Averaging, banking, and trading  
 HDE—Heavy-duty engine

[62 FR 54716, Oct. 21, 1997]

**§ 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]

(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; 75 FR 22979, Apr. 30, 2010]

**§ 86.098-14 Small-volume manufacturers certification procedures.**

Section 86.098-14 includes text that specifies requirements that differ from §§ 86.094-14 or 86.095-14. Where a paragraph in § 86.094-14 or § 86.095-14 is identical and applicable to § 86.098-14, this may be indicated by specifying the corresponding paragraph and the statement “[Reserved]. For guidance see § 86.094-14.” or “[Reserved]. For guidance see § 86.095-14.”.

(a)-(c)(7)(i)(C)(3) [Reserved]. For guidance see § 86.094-14.

(c)(7)(i)(C)(4) For light-duty vehicle, light-duty truck, and heavy-duty vehicle evaporative and/or refueling emissions (as applicable) and for light-duty truck, and heavy-duty engine exhaust emissions, deterioration factors shall be determined in accordance with § 86.098-24.

(c)(7)(ii)-(c)(11)(ii)(B) introductory text [Reserved]. For guidance see § 86.094-14.

(c)(11)(ii)(B)(I) Engine evaporative/refueling family names and vehicle (or engine) configurations.