

$$\frac{[(\text{PROD}_A)(\text{STD}_A) + (\text{PROD}_B)(\text{STD}_B)]}{[(\text{PROD}_A) + (\text{PROD}_B)]} = \text{Manufacturer's Composite NO}_x \text{ Standard,}$$

Where:

$\text{PROD}_A$  = The manufacturer's total light-duty truck production for those engine families subject to the standard of § 86.088-9(a)(iii)(A) and included in the average for a given model year,

$\text{STD}_A$  = The  $\text{NO}_x$  standard of § 86.088-9(a)(iii)(A),

$\text{PROD}_B$  = The manufacturer's total light-duty truck production for those engine families subject to the standard of § 86.088-9(a)(iii)(B) and included in the average for a given model year, and

$\text{STD}_B$  = The  $\text{NO}_x$  standard of § 86.088-9(a)(iii)(B).

*Critical emission-related components* are those components which are designed primarily for emission control, or whose failure may result in a significant increase in emissions accompanied by no significant impairment (or perhaps even an improvement) in performance, driveability, and/or fuel economy as determined by the Administrator.

*Critical emission-related maintenance* means that maintenance to be performed on critical emission-related components.

*Emission-related maintenance* means that maintenance which does substantially affect emissions or which is likely to affect the emissions deterioration of the vehicle or engine during normal in-use operation, even if the maintenance is performed at some time other than that which is recommended.

*Family  $\text{NO}_x$  emission limit* means the  $\text{NO}_x$  emission level to which an engine family is certified in the light-duty truck  $\text{NO}_x$  averaging program, expressed to one-tenth of a gram per mile accuracy.

*Non-emission-related maintenance* means that maintenance which does not substantially affect emissions and which does not have a lasting effect on the emissions deterioration of the vehicle or engine during normal in-use operation once the maintenance is performed.

*Production-weighted  $\text{NO}_x$  average* means the manufacturer's production-

weighted average  $\text{NO}_x$  emission level, for certification purposes, of all of its light-duty truck engine families included in the  $\text{NO}_x$  averaging program. It is calculated at the end of the model year by multiplying each family  $\text{NO}_x$  emission limit by its respective production, summing those terms, and dividing the sum by the total production of the effected families. Those vehicles produced for sale in California or at high altitude shall each be averaged separately from those produced for sale in any other area.

*Production-weighted particulate average* means the manufacturer's production-weighted average particulate emission level, for certification purposes, of all of its diesel engine families included in the particulate averaging program. It is calculated at the end of the model year by multiplying each family particulate emission limit by its respective production, summing those terms, and dividing the sum by the total production of the effected families. Those vehicles produced for sale in California or at high altitude shall each be averaged separately from those produced for sale in any other area.

(Secs. 202, 203, 206, 207, 208, 301a, Clean Air Act, as amended; 42 U.S.C. 7521, 7522, 7525, 7541, 7542, 7601a)

[50 FR 10648, Mar. 15, 1985]

#### § 86.090-2 Definitions.

The definitions in § 86.088-2 remain effective. The definitions in this section apply beginning with the 1990 model year.

*Averaging* for heavy-duty engines means the exchange of  $\text{NO}_x$  and particulate emission credits among engine families within a given manufacturer's product line.

*Averaging set* means a subcategory of heavy-duty engines within which engine families can average and trade emission credits with one other.

*Banking* means the retention of heavy-duty engine  $\text{NO}_x$  and particulate

emission credits, by the manufacturer generating the emission credits, for use in future model year certification programs as permitted by regulation.

*Composite particulate standard*, for a manufacturer which elects to average light-duty vehicles and light-duty

trucks together in either the petroleum-fueled or methanol-fueled light-duty particulate averaging program, means that standards calculated using the following equation and rounded to the nearest one-hundredth (0.01) of a gram per mile:

$$\frac{(\text{PROD}_{\text{LDV}})(\text{STD}_{\text{LDV}}) + (\text{PROD}_{\text{LDT}})(\text{STD}_{\text{LDT}})}{(\text{PROD}_{\text{LDV}}) + (\text{PROD}_{\text{LDT}})} = \text{Manufacturer composite particulate standard}$$

Where:

$\text{PROD}_{\text{LDV}}$  represents the manufacturer's total petroleum-fueled diesel or methanol-fueled diesel light-duty vehicle production for those engine families being included in the appropriate average for a given model year.

$\text{STD}_{\text{LDV}}$  represents the light-duty vehicle particulate standard.

$\text{PROD}_{\text{LDT}}$  represents the manufacturer's total petroleum-fueled diesel or methanol-fueled diesel light-duty truck production for those engine families being included in the appropriate average for a given model year.

$\text{STD}_{\text{LDT}}$  represents the light-duty truck particulate standard.

*Dedicated vehicle (or engine)* means any motor vehicle (or motor vehicle engine) engineered and designed to be operated using a single fuel. Flexible fuel vehicles and multi-fuel vehicles are not dedicated vehicles.

*Diesel* means type of engine with operating characteristics significantly similar to the theoretical Diesel combustion cycle. The non-use of a throttle during normal operation is indicative of a diesel engine.

*Dual fuel vehicle (or engine)* means any motor vehicle (or motor vehicle engine) engineered and designed to be operated on two different fuels, but not on a mixture of fuels.

*Emission credits* mean the amount of emission reductions or exceedances, by a heavy-duty engine family, below or above the emission standard, respectively. Emission credits below the standard are considered as "positive credits," while emission credits above the standard are considered as "negative credits." In addition, "projected credits" refer to emission credits based on the projected U.S. production vol-

ume of the engine family. "Reserved credits" are emission credits generated within a model year waiting to be reported to EPA at the end of the model year. "Actual credits" refer to emission credits based on actual U.S. production volumes as contained in the end-of-year reports submitted to EPA. Some or all of these credits may be revoked if EPA review of the end of year reports or any subsequent audit actions uncover problems or errors.

*Family emission limit (FEL)* means an emission level declared by the manufacturer which serves in lieu of an emission standard for certification purposes in any of the averaging, trading, or banking programs. FELs must be expressed to the same number of decimal places as the applicable emission standard. The FEL for an engine family using NO<sub>x</sub> or particulate NCPs must equal the value of the current NO<sub>x</sub> or particulate emission standard.

*Flexible fuel vehicle (or engine)* means any motor vehicle (or motor vehicle engine) engineered and designed to be operated on any mixture of two or more different fuels.

*Methanol-fueled* means any motor vehicle or motor vehicle engine that is engineered and designed to be operated using methanol fuel (i.e., a fuel that contains at least 50 percent methanol (CH<sub>3</sub>OH) by volume) as fuel. Flexible fuel vehicles are methanol-fueled vehicles.

*Non-oxygenated hydrocarbon* means organic emissions measured by a flame ionization detector, excluding methanol.

*Otto-cycle* means type of engine with operating characteristics significantly

similar to the theoretical Otto combustion cycle. The use of a throttle during normal operation is indicative of an Otto-cycle engine.

*Primary intended service class* means:

(a) The primary service application group for which a heavy-duty diesel engine is designed and marketed, as determined by the manufacturer. The primary intended service classes are designated as light, medium, and heavy heavy-duty diesel engines. The determination is based on factors such as vehicle GVW, vehicle usage and operating patterns, other vehicle design characteristics, engine horsepower, and other engine design and operating characteristics.

(1) Light heavy-duty diesel engines usually are non-sleeved and not designed for rebuild; their rated horsepower generally ranges from 70 to 170. Vehicle body types in this group might include any heavy-duty vehicle built for a light-duty truck chassis, van trucks, multi-stop vans, recreational vehicles, and some single axle straight trucks. Typical applications would include personal transportation, light-load commercial hauling and delivery, passenger service, agriculture, and construction. The GVWR of these vehicles is normally less than 19,500 lbs.

(2) Medium heavy-duty diesel engines may be sleeved or non-sleeved and may be designed for rebuild. Rated horsepower generally ranges from 170 to 250. Vehicle body types in this group would typically include school buses, tandem axle straight trucks, city tractors, and a variety of special purpose vehicles such as small dump trucks, and trash compactor trucks. Typical applications would include commercial short haul and intra-city delivery and pickup. Engines in this group are normally used in vehicles whose GVWR varies from 19,500-33,000 lbs.

(3) Heavy heavy-duty diesel engines are sleeved and designed for multiple rebuilds. Their rated horsepower generally exceeds 250. Vehicles in this group are normally tractors, trucks, and buses used in inter-city, long-haul applications. These vehicles normally exceed 33,000 lbs. GVWR.

*Production weighted particulate average* means the manufacturer's production-weighted average particulate

emission level, for certification purposes, of all of its diesel engine families included in the light-duty particulate averaging program. It is calculated at the end of the model year by multiplying each family particulate emission limit by its respective production, summing those terms, and dividing the sum by the total production of the effected families. Those vehicles produced for sale in California or at high altitude shall each be averaged separately from those produced for sale in any other area.

*Throttle* means a device used to control an engine's power output by limiting the amount of air entering the combustion chamber.

*Total Hydrocarbon Equivalent* means the sum of the carbon mass emissions of non-oxygenated hydrocarbons, methanol, formaldehyde or other organic compounds that are separately measured, expressed as gasoline-fueled vehicle hydrocarbons. In the case of exhaust emissions, the hydrogen-to-carbon ratio of the equivalent hydrocarbon is 1.85:1. In the case of diurnal and hot soak emissions, the hydrogen-to-carbon ratios of the equivalent hydrocarbons are 2.33:1 and 2.2:1, respectively.

*Trading* means the exchange of heavy-duty engine NO<sub>x</sub> or particulate emission credits between manufacturers.

*Useful life* means:

(a) For light-duty vehicles a period of use of 5 years or 50,000 miles, whichever first occurs.

(b) For a light-duty truck engine family, a period of use of 11 years or 120,000 miles, whichever occurs first.

(c) For an Otto-cycle heavy-duty engine family, a period of use of 8 years or 110,000 miles, whichever first occurs.

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

(1) For light heavy-duty diesel engines, period of use of 8 years or 110,000 miles, whichever first occurs.

(2) For medium heavy-duty diesel engines, a period of use of 8 years or 185,000 miles, whichever first occurs.

(3) For heavy heavy-duty diesel engines, a period of use of 8 years or 290,000 miles, whichever first occurs.

(e) As an option for both light-duty truck and heavy-duty engine families,

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an alternative useful life period assigned by the Administrator under the provisions of paragraph (f) of § 86.090-21.

(f) The useful-life period for purposes of the emissions defect warranty and emissions performance warranty shall be a period of 5 years/50,000 miles whichever first occurs, for light-duty trucks, Otto cycle heavy-duty engines and light heavy-duty diesel engines. For all other heavy-duty diesel engines the aforementioned period is 5 years/100,000 miles, whichever first occurs. However, in no case may this period be less than the manufacturer's basic mechanical warranty period for the engine family.

[55 FR 30612, July 26, 1990, as amended at 60 FR 34334, June 30, 1995; 62 FR 31233, June 6, 1997]

**§ 86.090-3 Abbreviations.**

(a) The abbreviations in § 86.078-3 remain effective. The abbreviations in this section apply beginning with the 1990 model year.

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

- DNPH—2,4-dinitrophenylhydrazine.
- FEL—Family emission limit.
- GC—Gas chromatograph.
- HPLC—High-pressure liquid chromatography.
- MeOH—Methanol (CH<sub>3</sub>OH).
- Mg—Megagram(s) (1 million grams)
- MJ—Megajoule(s) (1 million joules)
- THCE—Total Hydrocarbon Equivalent
- UV—Ultraviolet.

[55 FR 30613, July 26, 1990, as amended at 60 FR 34335, June 30, 1995]

**§ 86.090-5 General standards; increase in emissions; unsafe conditions.**

(a)(1) Every new motor vehicle (or new motor vehicle engine) manufactured for sale, sold, offered for sale, introduced, or delivered for introduction to commerce, or imported into the United States for sale or resale which is subject to any of the standards prescribed in this subpart shall be covered by a certificate of conformity issued pursuant to §§ 86.090-21, 86.090-22, 86.090-23, 86.090-29, 86.090-30, 86.079-31, 86.079-32, 86.079-33, and 86.082-34.

(2) No heavy-duty vehicle manufacturer shall take any of the actions

specified in section 203(a)(1) of the Act with respect to any Otto-cycle or diesel heavy-duty vehicle which uses an engine which has not been certified as meeting applicable standards.

(3) Notwithstanding paragraphs (a) (1) and (2) of this section, a light or heavy duty motor vehicle equipped with an engine certified to the nonroad provision of 40 CFR part 89 may be sold, offered for sale or otherwise introduced into commerce by a motor vehicle manufacturer to a secondary manufacturer if the motor vehicle manufacturer obtains written assurance from the secondary manufacturer that such vehicle will be converted to a nonroad vehicle or to a piece of nonroad equipment, as defined in 40 CFR part 89, before title is transferred to an ultimate purchaser. Failure of the secondary manufacturer to convert such vehicles to nonroad vehicles or equipment prior to transfer to an ultimate purchaser shall be considered a violation of section 203(a) (1) and (3) of the Clean Air Act.

(b)(1) Any system installed on or incorporated in a new motor vehicle (or new motor vehicle engine) to enable such vehicle (or engine) to conform to standards imposed by this subpart.

(i) Shall not in its operation or function cause the emission into the ambient air of any noxious or toxic substance that would not be emitted in the operation of such vehicle (or engine) without such system, except as specifically permitted by regulation; and

(ii) Shall not in its operation, function or malfunction result in any unsafe condition endangering the motor vehicle, its occupants, or persons or property in close proximity to the vehicle.

(2) In establishing the physically adjustable range of each adjustable parameter on a new motor vehicle (or new motor vehicle engine), the manufacturer shall ensure that, taking into consideration the production tolerances, safe vehicle driveability characteristics are available within that range, as required by section 202(a)(4) of the Clean Air Act.

(3) Every manufacturer of new motor vehicles (or new motor vehicle engines)