

credits as given in § 86.091-15, the resulting type (NO_x or particulate) and number of credits generated/required, and the NCPs in use on a similar NCP family. Manufacturers shall also submit how and where credit surpluses were dispersed (or are to be banked) and how and through what means credit deficits were met. Copies of contracts related to credit trading must also be included or supplied by the broker if applicable. The report shall also include a calculation of credit balances to show that net mass emissions balances are within those allowed by the emission standards (equal to or greater than a zero credit balance). The credit discount factor described in 86.091-15 must be included as required.

(iii) The 49-state production counts for end-of-year reports shall be based on the location of the first point of retail sale (*e.g.*, customer, dealer, secondary manufacturer) by the manufacturer.

(iv) Errors discovered by EPA or the manufacturer in the end-of-year report, including errors in credit calculation, may be corrected up to 90 days subsequent to submission of the end-of-year report. Errors discovered by EPA after 90 days shall be corrected if credits are reduced. Errors in the manufacturer's favor will not be corrected if discovered after the 90 day correction period allowed.

(i) Failure by a manufacturer participating in the averaging, trading, or banking programs to submit any quarterly or end-of-year report (as applicable) in the specified time for all vehicles and engines that are part of an averaging set is a violation of section 203(a)(1) of the Clean Air Act for each such vehicle and engine.

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

(k) Engine families certified using NCPs are not required to meet the requirements outlined above.

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

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§ 86.091-28 Compliance with emission standards.

(a)(1) Paragraph (a) of this section applies to light-duty vehicles.

(2) The applicable exhaust and fuel evaporative emissions standards (and family particulate emission limits, as appropriate) of this subpart apply to the emissions of vehicles for their useful life.

(3) Since it is expected that emission control efficiency will change with mileage accumulation on the vehicle, the emission level of a vehicle which has accumulated 50,000 miles will be used as the basis for determining compliance with the standards (or family particulate emission limit, as appropriate).

(4) The procedure for determining compliance of a new motor vehicle with exhaust emission standards (or family particulate emission limit, as appropriate) is as follows, except where specified by paragraph (a)(7) of this section for the Alternative Durability Program:

(i) Separate emission deterioration factors shall be determined from the exhaust emission results of the durability-data vehicle(s) for each engine-system combination. A separate factor shall be established, as required for compliance with applicable emission standards for exhaust HC, exhaust THCE, exhaust NMHC, exhaust CO, exhaust NO_x and exhaust particulate for each engine-system combination. A separate evaporative emission deterioration factor, as required for compliance with applicable emission standards, shall be determined for each evaporative emission family-evaporative emission control system combination from the testing conducted by the manufacturer.

(A) The applicable results to be used unless excluded by paragraph

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(a)(4)(i)(A)(4) of this section in determining the exhaust emission deterioration factors for each engine-system combination shall be:

(1) All valid exhaust emission data from the tests required under § 86.084-26(a)(4) except the zero-mile tests. This shall include the official test results, as determined in § 86.091-29 for all tests conducted on all durability-data vehicles of the combination selected under § 86.085-24(c) (including all vehicles elected to be operated by the manufacturer under § 86.085-24(c)(1)(ii)).

(2) All exhaust emission data from the tests conducted before and after the scheduled maintenance provided in § 86.088-25.

(3) All exhaust emission data from tests required by maintenance approved under § 86.088-25, in those cases where the Administrator conditioned his approval for the performance of such maintenance on the inclusion of such data in the deterioration factor calculation.

(4) The manufacturer has the option of applying an outlier test point procedure to completed durability data within its certification testing program for a given model year. The outlier procedure will be specified by the Administrator. For any pollutant, durability-data test points that are identified as outliers shall not be included in the determination of deterioration factors if the manufacturer has elected this option. The manufacturer shall specify to the Administrator before the certification of the first engine family for that model year, if it intends to use the outlier procedure. The manufacturer may not change procedures after the first engine family of the model year is certified. Where the manufacturer chooses to apply both the outlier procedure and averaging (as allowed under § 86.084-26(a)(6)(i)) to the same data set, the outlier procedure shall be completed prior to applying the averaging procedure.

(B) All applicable exhaust emission results shall be plotted as a function of the mileage on the system, rounded to the nearest mile, and the best fit straight lines, fitted by the method of least squares, shall be drawn through all these data points. The data will be acceptable for use in the calculation of

the deterioration factor only if the interpolated 4,000-mile and 50,000-mile points on this line are within the low-altitude standards provided in § 86.087-8. Exceptions to this where data are still acceptable are when a best fit straight line crosses an applicable standard but no data points exceeded the standard, or the best fit straight line crosses an applicable standard with a negative slope (the 4,000-mile interpolated point is higher than the 50,000-mile interpolated point) but the 50,000-mile actual data point is below the standard. An multiplicative exhaust emission deterioration factor shall be calculated for each engine-system combination as follows:

Factor=Exhaust emissions interpolated to 50,000 miles divided by exhaust emissions interpolated to 4,000 miles.

These interpolated values shall be carried out to a minimum of four places to the right of the decimal point before dividing one by the other to determine the deterioration factor. The results shall be rounded to three places to the right of the decimal point in accordance with ASTM E 29-67.

(C)(1) An evaporative emissions deterioration factor shall be determined from the testing conducted as described in § 86.090-21(b)(4)(i), for each evaporative emission family- evaporative emission control system combination to indicate the evaporative emission level at 50,000 miles relative to the evaporative emission level at 4,000 miles as follows:

Factor = Evaporative emission level at 50,000 miles minus the evaporative emission level at 4,000 miles.

(2) The factor in paragraph (a)(4)(i)(C)(1) of this section shall be established to a minimum of two places to the right of the decimal.

(ii)(A) The official exhaust emission test results for each emission-data vehicle at the selected test point shall be multiplied by the appropriate deterioration factor: *Provided*, that if a deterioration factor as computed in paragraph (a)(4)(i)(B) of this section is less than one, that deterioration factor shall be one for the purposes of this paragraph.

(B) The official evaporative emission test results for each evaporative emission-data vehicle at the selected test point shall be adjusted by addition of the appropriate deterioration factor: *Provided*, that if a deterioration factor as computed in paragraph (a)(4)(i)(C) of this section is less than zero, that deterioration factor shall be zero for the purposes of this paragraph.

(iii) The emissions to compare with the standard (or the family particulate emission limit, as appropriate) shall be the adjusted emissions of paragraphs (a)(4)(ii) (A) and (B) of this section for each emission-data vehicle. Before any emission value is compared with the standard (or the family particulate emission limit, as appropriate), it shall be rounded, in accordance with ASTM E 29-67, to two significant figures. The rounded emission values may not exceed the standard (or the family particulate emission limit, as appropriate).

(iv) Every test vehicle of an engine family must comply with the exhaust emission standards (or the family particulate emission limit, as appropriate), as determined in paragraph (a)(4)(iii) of this section, before any vehicle in that family may be certified.

(v) Every test vehicle of an evaporative emission family must comply with the evaporative emission standard, as determined in paragraph (a)(4)(iii) of this section, before any vehicle in that family may be certified.

(5) If a manufacturer chooses to change the level of any family particulate emission limit(s) in the particulate averaging program, compliance with the new limit(s) must be based upon existing certification data.

(6) If a manufacturer chooses to participate in the diesel particulate averaging program, the production-weighted average of the family particulate emission limits of all affected engine families must comply with the particulate standards in § 86.087-8(a)(1)(iv), or the composite particulate standard defined in § 86.085-2, as appropriate, at the end of the production year.

(7) The procedure to determine the compliance of new motor vehicles in the Alternative Durability Program (described in § 86.085-13) is the same as described in paragraphs (a)(4)(iii) through (a)(4)(v) of this section. For

the engine families that are included in the Alternative Durability Program, the exhaust emission deterioration factors used to determine compliance shall be those that the Administrator has approved under § 86.085-13(c). The evaporative emission deterioration factor for each evaporative emission family shall be determined and applied according to paragraph (a)(4) of this section. The procedures to determine the minimum exhaust emissions deterioration factors required under § 86.085-13(d) are as follows:

(i) Separate deterioration factors shall be determined from the exhaust emission results of the durability-data vehicles for each engine family group. A separate factor as necessary to establish compliance with applicable emission standards shall be established for exhaust HC, exhaust THCE, exhaust NMHC, exhaust CO and exhaust NO_x for each engine family group. The evaporative emission deterioration factor for each evaporative family will be determined and applied in accordance with paragraph (a)(4) of this section.

(ii) The deterioration factors for each engine family group shall be determined by the Administrator using historical durability data from as many as three previous model years. These data will consist of deterioration factors generated by durability-data vehicles representing certified engine families and of deterioration factors from vehicles selected under § 86.085-24(h). The Administrator shall determine how these data will be combined for each engine family group.

(A) The test result to be used in the calculation of each deterioration factor to be combined for each engine family group shall be those test results specified in paragraph (a)(4)(i)(A) of this section.

(B) For each durability-data vehicles selected under § 86.085-24(h), all applicable exhaust emissions results shall be plotted as a function of the mileage on the system rounded to the nearest mile, and the best fit straight lines, fitted by method of least squares, shall be drawn through all these data points. The exhaust deterioration factor for each durability-data vehicles shall be calculated as specified in paragraph (a)(4)(i)(B) of this section.

(C) *Line-crossing.* For the purposes of paragraph (a)(5) of this section, line crossing occurs when either of the interpolated 4,000- and 50,000-mile points of the best fit straight line exceeds the applicable emission standard and at least one applicable data point exceeds the standard.

(1) The Administrator will not accept for certification line-crossing data from preproduction durability-data vehicles selected under § 86.085-24(c), § 86.085-24(h)(2), or (h)(3).

(2) The Administrator will not accept for certification line-crossing data from production durability-data vehicles selected under § 86.085-24(h)(1) unless the 4,000-mile test result multiplied by the engine family group deterioration factor does not exceed the applicable emission standards. The deterioration factors used for this purpose shall be those that were used in the certification of the production vehicle. Manufacturers may calculate this product immediately after the 4,000-mile test of the vehicle. If the product exceeds the applicable standards, the manufacturer may, with the approval of the Administrator, discontinue the vehicle and substitute a new vehicle. The manufacturer may continue the original vehicle, but the data will not be acceptable if line crossing occurs.

(b)(1) Paragraph (b) of this section applies to light-duty trucks.

(2) The exhaust and evaporative emission standards (and family emission limits, as appropriate) of § 86.091-9 apply to the emissions of vehicles for their useful life.

(3) Since emission control efficiency generally decreases with the accumulation of mileage on the vehicle, deterioration factors will be used in combination with emission-data vehicle test results as the basis for determining compliance with the standards (or family emission limits, as appropriate).

(4)(i) Paragraph (b)(4) of this section describes the procedure for determining compliance of a new vehicle with exhaust emission standards (or family emission limits, as appropriate), based on deterioration factors supplied by the manufacturers, except where specified by paragraph (b)(5) of this section for the Alternative Durability Program.

(ii) Separate exhaust emission deterioration factors, determined from tests of vehicles, engines, subsystems or components conducted by the manufacturer, shall be supplied for each engine-system combination. Separate factors shall be established as required for compliance with applicable emission standards for transient HC, THCE, NMHC, CO, and NO_x, idle CO and exhaust particulate.

(iii) For transient HC, THCE, NMHC and CO, and NO_x, idle CO and/or exhaust particulate as appropriate, the official exhaust emission results for each emission-data vehicle at the selected test point shall be adjusted by multiplication by the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than one, it shall be one for the purposes of this paragraph.

(iv) The emission values to compare with the standards (or family emission limits, as appropriate) shall be the adjusted emission values of paragraph (b)(4)(iii) of this section rounded to two significant figures in accordance with ASTM E 29-67 for each emission-data engine.

(5)(i) Paragraph (b)(5)(i) of this section applies only to manufacturers electing to participate in the particulate averaging program.

(A) If a manufacturer chooses to change the level of any family particulate emission limit(s), compliance with the new limit(s) must be based upon existing certification data.

(B) The production-weighted average of the family particulate emission limits of all applicable engine families, rounded to two significant figures in accordance with ASTM E 29-67, must comply with the particulate standards in § 86.088-9 (a)(1)(iv) or (d)(1)(iv), or the composite particulate standard as defined in § 86.085-2, as appropriate, at the end of the product year.

(ii) Paragraph (b)(5)(ii) of this section applies only to manufacturers electing to participate in the NO_x averaging program.

(A) If a manufacturer chooses to change the level of any family NO_x emission limit(s), compliance with the new limit(s) must be based upon existing certification data.

(B) The production-weighted average of the family NO_x emission limits of all applicable engine families, rounded to two significant figures in accordance with ASTM E 29-67, must comply with the NO_x emission standards of § 86.088-9(a)(1)(iii) (A) or (B), or of § 86.088-9(d)(1)(iii) (A) or (B), or the composite NO_x standard as defined in § 86.088-2, at the end of the product year.

(6) The procedure to determine the compliance of new motor vehicles in the Alternative Durability Program (described in § 86.085-13) is the same as described in paragraph (b)(4)(iv), (b)(7)(iv) and (b)(8) of this section. For the engine families that are included in the Alternative Durability Program, the exhaust emission deterioration factors used to determine compliance shall be those that the Administrator has approved under § 86.085-13(c). The evaporative emission deterioration factor for each evaporative emission family shall be determined and applied according to paragraph (b)(7) of this section. The procedures to determine the minimum exhaust emissions deterioration factors required under § 86.085-13(d) are as follows:

(i) Separate deterioration factors shall be determined from the exhaust emission results of the durability-data vehicles for each engine family group. A separate factor shall be established for exhaust HC, exhaust THCE or exhaust NMHC as appropriate, and exhaust CO and exhaust NO_x for each engine family group. The evaporative emission deterioration factor for each evaporative family will be determined and applied in accordance with paragraph (b)(6) of this section.

(ii) The deterioration factors for each engine family group shall be determined by the Administrator using historical durability data from as many as three previous model years. These data will consist of deterioration factors generated by durability-data vehicles representing certified engine families and of deterioration factors from vehicles selected under § 86.085-24(h). The Administrator shall determine how these data will be combined for each engine family group.

(A) The test results to be used in the calculations of each deterioration factor to be combined for each engine

family group shall be those test results specified in paragraph (a)(4)(i)(A) of this section.

(B) For each durability-data vehicle selected under § 86.085-24(h), all applicable exhaust emission results shall be plotted as a function of the mileage on the system rounded to the nearest mile, and the best fit straight lines, fitted by the method of least squares, shall be drawn through all these data points. The exhaust deterioration factor for each durability-data vehicle shall be calculated as specified in paragraph (a)(4)(i)(B) of this section.

(C) *Line crossing.* For the purposes of paragraph (b)(5) of this section, line crossing occurs when either of the interpolated 4,000- and 120,000-mile points of the best fit straight line exceeds the applicable emission standard and at least one applicable data point exceeds the standard.

(1) The Administrator will not accept for certification line-crossing data from preproduction durability-data vehicles selected under § 86.085-24(c)(1), or § 86.085-24 (h)(2) or (h)(3).

(2) The Administrator will not accept for certification line-crossing data from production durability-data vehicles selected under § 86.085-24(h)(1) unless the 4,000-mile test result multiplied by the engine family group deterioration factor does not exceed the applicable emission standard. The deterioration factors used for this purpose shall be those that were used in the certification of the production vehicle. Manufacturers may calculate this product immediately after the 4,000-mile test of the vehicle. If the product exceeds the applicable standard, the manufacturer may, with the approval of the Administrator, discontinue the vehicle and substitute a new vehicle. The manufacturer may continue the original vehicle, but the data will not be acceptable if line crossing occurs.

(7)(i) Paragraph (b)(7) of this section describes the procedure for determining compliance of a new vehicle with fuel evaporative emission standards. The procedure described here shall be used for all vehicles in all model years.

(ii) The manufacturer shall determine, based on testing described in

§ 86.091-21(b)(4)(i), and supply an evaporative emission deterioration factor for each evaporative emission family-evaporative emission control system combination. The factor shall be calculated by subtracting the emission level at the selected test point from the emission level at the useful life point.

(iii) The official evaporative emission test results for each evaporative emission-data vehicle at the selected test point shall be adjusted by the addition of the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than zero, it shall be zero for the purposes of this paragraph.

(iv) The emission value to compare with the standards shall be the adjusted emission value of paragraph (b)(7)(iii) of this section rounded to two significant figures in accordance with ASTM E 29-67 for each evaporative emission-data vehicle.

(8) Every test vehicle of an engine family must comply with all applicable standards (and family emission limits, as appropriate), as determined in paragraphs (b)(4)(iv) and (b)(7)(iv) of this section, before any vehicle in that family will be certified.

(c)(1) Paragraph (c) of this section applies to heavy-duty engines.

(2) The exhaust emission standards (or family emission limits, as appropriate) for Otto-cycle engines in § 86.090-10 or for diesel engines in § 86.091-11 apply to the emissions of engines for their useful life.

(3) Since emission control efficiency generally decreases with the accumulation of service on the engine, deterioration factors will be used in combination with emission-data engine test results as the basis for determining compliance with the standards.

(4)(i) Paragraph (c)(4) of this section describes the procedure for determining compliance of an engine with emission standards (or family emission limits, as appropriate), based on deterioration factors supplied by the manufacturer.

(ii) Separate exhaust emission deterioration factors, determined from tests of engines, subsystems or components conducted by the manufacturer, shall be supplied for each engine-system combination. For Otto-cycle en-

gines, separate factors shall be established for transient HC, THCE or NMHC as appropriate, CO and NO_x; and idle CO, for those engines utilizing aftertreatment technology (e.g., catalytic converters). For diesel engines, separate factors shall be established for transient HC, THCE or NMHC as appropriate, CO, NO_x and exhaust particulate. For diesel smoke testing, separate factors shall also be established for the acceleration mode (designated as "A"), the lugging mode (designated as "B"), and peak opacity (designated as "C").

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

(1) *Otto-cycle heavy-duty engines not utilizing aftertreatment technology (e.g., catalytic converters).* For transient HC, THCE or NMHC as appropriate, CO and NO_x, the official exhaust emission results for each emission-data engine at the selected test point shall be adjusted by the addition of the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than zero, it shall be zero for the purposes of this paragraph.

(2) *Otto-cycle heavy-duty engines utilizing aftertreatment technology (e.g., catalytic converters).* For transient HC, THCE or NMHC as appropriate, CO and NO_x, and for idle CO, the official exhaust emission results for each emission-data engine at the selected test point shall be adjusted by multiplication by the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than one, it shall be one for the purposes of this paragraph.

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

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

(2) *Diesel heavy-duty engines utilizing aftertreatment technology (e.g., particulate traps).* For transient HC, THCE or NMHC as appropriate, CO, NO_x and exhaust particulate, the official exhaust emission results for each emission-data engine at the selected test point shall be adjusted by multiplication by the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than one, it shall be one for the purposes of this paragraph.

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

(iv) The emission values to compare with the standards (or family emission limits, as appropriate) shall be the adjusted emission values of paragraph (c)(4)(iii) of this section, rounded to the same number of significant figures as contained in the applicable standard in accordance with ASTM E 29-67, for each emission-data engine.

(5)-(6) [Reserved]

(7) Every test engine of an engine family must comply with all applicable standards (or family emission limits, as appropriate), as determined in paragraph (c)(4)(iv) of this section, before any engine in that family will be certified.

(d)(1) Paragraph (d) of this section applies to heavy-duty vehicles required to comply with evaporative emission standards.

(2) The applicable evaporative emission standard in § 86.091-10 or § 86.091-11 applies to the emissions of vehicles for their useful life.

(3)(i) For vehicles with a GVWR of up to 26,000 pounds, because it is expected that emission control efficiency will change during the useful life of the vehicle, an evaporative emission deterioration factor shall be determined from the testing described in § 86.088-23(b)(3) for each evaporative emission family- evaporative emission control system combination to indicate the evapo-

rative emission control system deterioration during the useful life of the vehicle (minimum 50,000 miles). The factor shall be established to a minimum of two places to the right of the decimal.

(ii) For vehicles with a GVWR of greater than 26,000 pounds, because it is expected that emission control efficiency will change during the useful life of the vehicle, each manufacturer's statement as required in § 86.088-23(b)(4)(ii) shall include, in accordance with good engineering practice, consideration of control system deterioration.

(4) The evaporative emission test results, if any, shall be adjusted by the addition of the appropriate deterioration factor: *Provided*, That if the deterioration factor as computed in paragraph (d)(3) of this section is less than zero, that deterioration factor shall be zero for the purposes of this paragraph.

(5) The emission level to compare with the standard shall be the adjusted emission level of paragraph (d)(4) of this section. Before any emission value is compared with the standard, it shall be rounded, in accordance with ASTM E 29-67, to two significant figures. The rounded emission values may not exceed the standard.

(6) Every test vehicle of an evaporative emission family must comply with the evaporative emission standard, as determined in paragraph (d)(5) of this section, before any vehicle in that family may be certified.

(e) Unless a manufacturer develops specific cold temperature deterioration factors, 68-86 °F deterioration factors shall be used to determine compliance with cold temperature emission standards.

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

[50 FR 10669, Mar. 15, 1985, as amended at 51 FR 24609, July 7, 1986; 54 FR 14484, Apr. 11, 1989; 57 FR 31897, July 17, 1992; 59 FR 48493, Sept. 21, 1994]

§ 86.091-29 Testing by the Administrator.

(a)(1) Paragraph (a) of this section applies to light-duty vehicles and light-duty trucks.