

be rounded, in accordance with ASTM E 29-67 (reapproved 1980) (as referenced in paragraph (a)(6)(iii) of this section), to the number of decimal places contained in the applicable emission standard expressed to one additional significant figure.

(3) Whenever a manufacturer intends to operate and test a vehicle (or engine) which may be used for emission data, the manufacturer shall retain in its records all information concerning all emissions tests and maintenance, including vehicle (or engine) alterations to represent other vehicle (or engine) selections. This information shall be submitted, including the vehicle (or engine) description and specification information required by the Administrator, to the Administrator following the emission data test.

(4)-(5) [Reserved]

(6) Emission testing of any type with respect to any certification vehicle or engine other than that specified in this subpart is not allowed except as such testing may be specifically authorized by the Administrator.

[58 FR 4021, Jan. 12, 1993, as amended at 59 FR 36369, July 18, 1994; 62 FR 11082, Mar. 11, 1997; 62 FR 44875, Aug. 22, 1997]

EDITORIAL NOTE: At 65 FR 47325, Aug. 2, 2000, § 86.094-26 was amended in paragraph (a)(6)(iii) by revising the phrase "401 M Street SW" to read "401 M St., SW."; however this exact phrase does not exist in this paragraph in the 2000 edition of this volume.

#### § 86.094-28 Compliance with emission standards.

(a)(1) Paragraph (a) of this section applies to lightduty vehicles.

(2) Each exhaust and evaporative emission standard (and family particulate emission limit, as appropriate) of § 86.094-8 applies to the emissions of vehicles for the appropriate useful life as defined in §§ 86.094-2 and 86.094-8.

(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 mileage equal to the specified useful life will be used as the basis for determining compliance with the standard (or family particulate emission limit, as appropriate).

(4) The procedure for determining compliance of a new motor vehicle

with exhaust and evaporative emission standards (or family particulate emission limit, as appropriate) is as described in paragraphs (a)(4) (i) through (v) of this section, except where specified by paragraph (a)(7) of this section for the Production AMA 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 evaporative emission deterioration factor shall be determined for each evaporative emission family-evaporative emission control system combination from the testing conducted by the manufacturer (gasoline-fueled and methanol-fueled vehicles only).

(A) The applicable results to be used, unless excluded by paragraph (a)(4)(i)(A)(4) of this section, in determining the exhaust emission deterioration factors for each engine-system combination shall be those described in paragraphs (a)(4)(i)(A) (I) through (3) of this section.

(I) All valid exhaust emission data from the tests required under § 86.094-26(a)(4) except the zero-mile tests. This shall include the official test results, as determined in § 86.094-29 for all tests conducted on all durability data vehicles of the combination selected under § 86.094-24(c) (including all vehicles elected to be operated by the manufacturer under § 86.094-24(c)(1)(ii)).

(2) All exhaust emission data from the tests conducted before and after the scheduled maintenance provided in § 86.094-25.

(3) All exhaust emission data from tests required by maintenance approved under § 86.094-25, 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 § 86.094-26(a)(6)(i)) to the same data set, the outlier procedure shall be completed prior to applying the averaging procedure.

(B)(1) *Line crossing.* For each exhaust constituent to which a standard in § 86.094-8 applies, all applicable exhaust emission results shall be rounded to the nearest mile and plotted as a function of the mileage on the system. The best fit straight line, fitted by the method of least squares, shall be drawn through all these data points. The data for a given exhaust constituent will be acceptable for use in the calculation of deterioration factors only if the first official test point as determined in § 86.094-26(a)(4)(i)(C), the interpolated intermediate useful life mile point, and the interpolated full useful life mile point on this line, as applicable, are each less than or equal to the respective low-altitude standards provided in § 86.094-8. An exception to this where data are still acceptable is when a best fit straight line crosses an applicable standard but no data points exceeded the standard. This exception shall not apply when mileage accumulation has been curtailed before the durability useful life has been reached, under the provisions of § 86.094-26(a)(4)(i)(B).

(2) *Exhaust deterioration factor determination.* Multiplicative exhaust emission deterioration factors shall be calculated for each standard and for each engine-system combination from points on the regression line derived in paragraph (a)(4)(i)(B)(1) of this section, and in accordance with paragraphs (a)(4)(i)(B)(2) (i) and (ii) of this section.

(i) Factor=Exhaust emissions at the useful life mileage for that standard divided by exhaust emissions at 4,000 miles.

(ii) 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 (re-approved 1980) ("Standard recommended practice for indicating which places of figures are to be considered significant in specified limiting values," American Society for Testing and Materials). This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from American Society for Testing and Materials, 1916 Race St., Philadelphia, PA 19103. Copies may be inspected at the U.S. Environmental Protection Agency, Air Docket Section, room M-1500, 1200 Pennsylvania Ave., NW., Washington, DC 20460 or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

(iii) When calculating intermediate and full useful life deterioration factors all data points should be included in the calculations, except that total hydrocarbon (THC) test points beyond the 50,000-mile (useful life) test point shall not be included in the calculations.

(iv) The calculation specified in paragraph (a)(4)(i)(B)(2) of this section may be modified with advance approval of the Administrator for engine-system combinations which are certified under the Alternative Service Accumulation Durability Program specified in § 86.094-13(e).

(C) *Evaporative deterioration factor determination.* An evaporative emissions deterioration factor (gasoline-fueled and methanol-fueled vehicles only) shall be determined from the testing conducted as described in § 86.094-21(b)(4)(i) and in accordance with paragraphs (a)(4)(i)(C) (1) and (2) of this section, for each evaporative emission family-evaporative emission control system combination to indicate the

evaporative emission level at the applicable useful life relative to the evaporative emission level at 4,000 miles.

(I) Factor=Evaporative emission level at the useful life mileage for that standard minus the evaporative emission level at 4,000 miles.

(2) The factor shall be established to a minimum of two places to the right of the decimal.

(ii)(A)(I) The official exhaust emission test results for each applicable exhaust emission standard 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.

(2) The calculation specified in paragraph (a)(4)(ii)(A)(I) of this section may be modified with advance approval of the Administrator for engine-system combinations which are certified under the Alternative Service Accumulation Durability Program specified in § 86.094-13(e).

(B) The official evaporative emission test results (gasoline-fueled and methanol-fueled vehicles only) 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 (reapproved 1980) (as referenced in paragraph (a)(4)(i)(B)(2)(ii) of this section), 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 § 86.094-8(a)(1)(iv), or the composite particulate standard defined in § 86.094-2, as appropriate, at the end of the production year.

(7) The procedure to determine the compliance of new motor vehicles in the Production AMA Durability Program described in § 86.094-13 is the same as described in paragraphs (a)(4)(iii) through (v) of this section. For the engine families that are included in the Production AMA Durability Program, the exhaust emission deterioration factors used to determine compliance shall be those that the Administrator has approved under § 86.094-13. 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 emission deterioration factors required under § 86.094-13(d) are as described in paragraphs (a)(7)(i) and (ii) of this section.

(i) Separate deterioration factors shall be determined from the exhaust emission results of the durability data vehicles for each emission standard applicable under § 86.094-8, 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 § 86.094–24(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 vehicle selected under § 86.094–24(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 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.* The line-crossing criteria of § 86.094–28 (a)(4)(i)(B) apply.

(1) The Administrator will not accept for certification line-crossing data from preproduction durability data vehicles selected under § 86.094–24(c).

(2) The Administrator will not accept for certification line-crossing data from production durability data vehicles selected under § 86.094–24(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) Each exhaust and evaporative emission standard (and family particulate emission limit, as appropriate) of § 86.094–9 applies to the emissions of vehicles for the appropriate useful life as defined in §§ 86.094–2 and 86.094–9.

(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. If the manufacturer certifies under the Standard Self-Approval Program as specified in § 86.094–13(f), the manufacturer supplies the deterioration factors. If the manufacturer certifies under the Alternative Service Accumulation Durability Program as specified in § 86.094–13(e), the applicable procedure for the determination of deterioration factors for light-duty trucks is the same as that described in paragraph (a)(4) of this section for light-duty vehicles.

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

(iii) The official exhaust emission results for each applicable exhaust emission standard 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 (reapproved 1980) (as referenced in paragraph (a)(4)(i)(B)(2)(ii) of this section) for each emission data engine.

(5)(i) Paragraphs (b)(5)(i) (A) and (B) of this section apply 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 (reapproved 1980) (as referenced in paragraph (a)(4)(i)(B)(2)(ii) of this section), must comply with the particulate standards in §86.094-9(a)(1)(iv) or (d)(1)(iv), or the composite particulate standard as defined in §86.094-2, as appropriate, at the end of the product year.

(ii) Paragraphs (b)(5)(ii) (A) and (B) of this section apply only to manufacturers electing to participate in the NO<sub>x</sub> averaging program.

(A) If a manufacturer chooses to change the level of any family NO<sub>x</sub> 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<sub>x</sub> emission limits of all applicable engine families, rounded to two significant figures in accordance with ASTM E 29-67 (reapproved 1980) (as referenced in paragraph (a)(4)(i)(B)(2)(ii) of this section), must comply with the NO<sub>x</sub> emission standards of §86.094-9(a)(1)(iii) (A) or (B) of §86.094-9(d)(1)(iii) (A) or (B), or the composite NO<sub>x</sub> standard as defined in §86.094-2, at the end of the product year.

(6) [Reserved]

(7)(i) Paragraph (b)(7) of this section describes the procedure for determining compliance of a new vehicle with 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 (reapproved 1980) (as referenced in paragraph (a)(4)(i)(B)(2)(ii) of this section) 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 §86.094-10 or for diesel-cycle engines in §86.094-11 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 engines, separate factors shall be established for transient HC (THCE), CO, and NO<sub>x</sub>; and idle CO, for those engines utilizing aftertreatment technology (e.g., catalytic converters). For diesel-cycle engines, separate factors shall be established for transient HC (THCE), CO, NO<sub>x</sub>, and exhaust particulate. For diesel-cycle 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) Paragraphs (c)(4)(iii)(A) (1) and (2) of this section apply to Otto-cycle heavy-duty engines.

(1) *Otto-cycle heavy-duty engines not utilizing aftertreatment technology (e.g., catalytic converters)*. For transient HC (THCE), CO, and NO<sub>x</sub>, 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), CO, and NO<sub>x</sub>, 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-cycle heavy-duty engines.

(1) *Diesel-cycle heavy-duty engines not utilizing aftertreatment technology (e.g., particulate traps)*. For transient HC (THCE), CO, NO<sub>x</sub>, 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-cycle heavy-duty engines utilizing aftertreatment technology (e.g., particulate traps)*. For transient HC (THCE), CO, NO<sub>x</sub>, 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-cycle 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 (re-approved 1980) (as referenced in paragraph (a)(4)(i)(B)(2)(ii) of this section), 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 equipped with gasoline-fueled or methanol-fueled engines.

(2) The applicable evaporative emission standard in § 86.091-10 or § 86.094-11 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 evaporative 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 § 86.094-23(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 (reapproved 1980) (as referenced in paragraph (a)(4)(i)(B)(2)(ii) of this section), 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.

[58 FR 4025, Jan. 12, 1993]

EDITORIAL NOTE: At 65 FR 47325, Aug. 2, 2000, § 86.094-28 was amended in paragraph (a)(4)(i)(B)(2)(ii) by revising the phrase "401 M Street SW" to read "401 M St., SW."; however this exact phrase does not appear in this paragraph in the 2000 edition of this volume.

#### § 86.094-30 Certification.

(a)(1)(i) If, after a review of the test reports and data submitted by the manufacturer, data derived from any inspection carried out under § 86.091-7(c) and any other pertinent data or information, the Administrator determines that a test vehicle(s) (or test en-

gine(s)) meets the requirements of the Act and of this subpart, he will issue a certificate of conformity with respect to such vehicle(s) (or engine(s)) except in cases covered by paragraphs (a) (1)(ii) and (c) of this section.

(ii) *Gasoline-fueled and methanol-fueled heavy-duty vehicles.* If, after a review of the statement(s) of compliance submitted by the manufacturer under § 86.094-23(b)(4) and any other pertinent data or information, the Administrator determines that the requirements of the Act and this subpart have been met, he will issue one certificate of conformity per manufacturer with respect to the evaporative emission family(ies) covered by paragraph (c) of this section.

(2) Such certificate will be issued for such period not to exceed one model year as the Administrator may determine and upon such terms as he may deem necessary or appropriate to assure that any new motor vehicle (or new motor vehicle engine) covered by the certificate will meet the requirements of the Act and of this part.

(3)(i) One such certificate will be issued for each engine family. For gasoline-fueled and methanol-fueled light-duty vehicles and light-duty trucks, one such certificate will be issued for each engine family evaporative emission family combination.

(A) *Light-duty vehicles.* Each certificate will certify compliance with no more than one set of in-use and certification standards (or family emission limits, as appropriate).

(B) *Light-duty trucks.* Each certificate will certify compliance with no more than one set of in-use and certification standards (or family emission limits, as appropriate), except where there are both low-altitude standards and high altitude standards applicable. The certificate shall state that it covers vehicles sold or delivered to an ultimate purchaser for principal use at a designated high-altitude location only if the vehicle conforms in all material respects to the design specifications that apply to those vehicles described in the application for certification at high altitude.

(ii) For gasoline-fueled and methanol-fueled heavy-duty vehicles, one such certificate will be issued for each