§ 89.119 Emission tests.

(a) Manufacturer testing. (1) Upon completion of service accumulation, the manufacturer must test each test engine using the specified test procedures, except as provided in §89.114. The procedures to be used are set forth in:
   (i) Subpart E of this part;
   (ii) The California Regulations for New 1996 and Later Heavy-Duty Off-Road Diesel Cycle Engines. This procedure has been incorporated by reference. See §89.6; and
   (iii) Part 86, subpart I of this chapter.

(b) Confirmatory testing. The Administrator may conduct confirmatory testing or other testing on any test engine. The manufacturer must deliver test engines as directed by the Administrator. When the Administrator conducts confirmatory testing or other testing, those test results are used to determine compliance with emission standards.

(c) Use of carryover test data. In lieu of testing to certify an engine family for a given model year, the manufacturer may submit, with the Administrator’s approval, emission test data used to certify that engine family in previous years. This “carryover” data is only allowable if the submitted test data show that the test engine would comply with the emission standard(s) for the model year for which certification is being sought.

(d) The provisions of this paragraph (d) apply only to Tier 1 nonroad engines without exhaust aftertreatment rated at or above 37 kW.

(1) Particulate emission measurements from Tier 1 nonroad engines without exhaust aftertreatment rated at or above 37 kW may be adjusted to a sulfur content of 0.05 weight percent using the following equation:

\[ PM_{adj} = PM - 0.0017 \times (FSF - 0.0005) \]

Where:

- \( PM \) is the particulate measurement;
- \( PM_{adj} \) is the adjusted particulate measurement;
- \( BSFC \) is the brake specific fuel consumption;
- \( FSF \) is the fuel-specific factor.

PM_{adj} = \text{adjusted measured PM level} \ [g/KW-hr].

PM = \text{measured weighted PM level} \ [g/KW-hr].

BSFC = \text{measured brake specific fuel consumption} \ [G/KW-hr].

FSF = \text{fuel sulfur weight fraction.}

(3) Where a manufacturer certifies using test fuel with a sulfur content less than or equal to 0.050 weight percent, EPA shall not use emission data collected using test fuel with a sulfur content greater than 0.050 weight percent to determine compliance with the Tier 1 PM standards.

(4) Where a manufacturer certifies using test fuel with a sulfur content greater than 0.050 weight percent, EPA shall not use emission data collected using test fuel with a sulfur content greater than 0.050 weight percent to determine compliance with the Tier 1 PM standards, unless EPA adjusts the PM measurement using the equation specified in paragraph (d)(2) of this section.


§ 89.120 Compliance with emission standards.

(a) If all test engines representing an engine family have emissions less than or equal to each emission standard, that family complies with the emission standards.

(b) If any test engine representing an engine family has emissions greater than each emission standard, that family will be deemed not in compliance with the emission standard(s).

(c) For each nonroad engine family, except Tier 1 engine families with rated power at or above 37 kW that do not employ aftertreatment, a deterioration factor must be determined and applied.

(1) The applicable exhaust emission standards (or family emission limits, as appropriate) for nonroad compression-ignition engines apply to the emissions of engines for their useful life.

(2) [Reserved]

(3)(i) This paragraph (c)(3) 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. The NMHC + NO\_X deterioration factors shall be established based on the sum of the pollutants, except as provided in paragraph (c)(3)(iv) of this section.

When establishing deterioration factors for NMHC + NO\_X, a negative deterioration (emissions decrease from the official emissions test result) for one pollutant may not offset deterioration of the other pollutant.

(ii) Separate emission deterioration factors, determined by the manufacturer according to the requirements of §89.118, shall be provided in the certification application for each engine-system combination. Separate deterioration factors shall be established for each regulated pollutant, except that a combined NMHC + NO\_X deterioration factor shall be established for compression-ignition nonroad engines not utilizing aftertreatment technology.

For smoke testing, separate deterioration 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) Compression-ignition nonroad engines not utilizing aftertreatment technology (e.g., particulate traps). For CO, NMHC + NO\_X, and particulate, the official exhaust emission results for each emission data engine at the selected test point shall be adjusted by 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 (c)(3)(iii).

(iv) Compression-ignition nonroad engines utilizing aftertreatment technology (e.g., particulate traps). For CO, NMHC + NO\_X, and 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. Separate NMHC and NO\_X deterioration factors shall be applied to the results for these pollutants prior to combining the results. If the deterioration factor supplied by the manufacturer is less than one, it shall be one for the purposes of this paragraph (c)(3)(iv).

(iv) For acceleration smoke (“A”), lugging smoke (“B”), and peak opacity (“C”), the official exhaust emission results for each emission data engine at