

test vehicle has a history of normally using the fuel treatment(s), and the fuel additive(s) is not prohibited in the vehicle's owner or operator manual or in the engine manufacturer's published fuel-additive recommendations.

(6) You may take fuel samples from test vehicles to ensure that appropriate fuels were used during in-use testing. If a vehicle fails the vehicle-pass criteria and you can show that an inappropriate fuel was used during the failed test, that particular test may be voided. You may drain the vehicle's fuel tank(s) and refill the tank(s) with diesel fuel conforming to the ASTM D 975 specifications described in paragraph (c)(1) of this section. You must report any fuel tests that are the basis of voiding a test in your report under §86.1920.

(d) You must test the selected engines while they remain installed in the vehicle. Use portable emission-sampling equipment and field-testing procedures referenced in §86.1375. Measure emissions of THC, NMHC (by any method specified in 40 CFR part 1065, subpart J), CO, NO_x, PM (as appropriate), O₂, and CO₂.

(e) For Phase 1 testing, you must test the engine under conditions reasonably expected to be encountered during normal vehicle operation and use consistent with the general NTE requirements described in §86.1370-2007(a). For the purposes of this subpart, normal operation and use would generally include consideration of the vehicle's normal routes and loads (including auxiliary loads such as air conditioning in the cab), normal ambient conditions, and the normal driver.

(f) For Phase 2 testing, we may give specific directions, as described in §86.1915(c)(2).

(g) Once an engine is set up for testing, test the engine for at least one shift-day. To complete a shift-day's worth of testing, start sampling at the beginning of a shift and continue sampling for the whole shift, subject to the calibration requirements of the portable emissions measurement systems. A shift-day is the period of a normal workday for an individual employee. If the first shift-day of testing does not involve at least 3 hours of accumulated non-idle operation, repeat the testing

for a second shift-day. If the second shift-day of testing also does not result in at least 3 hours of accumulated non-idle operation, you may choose whether or not to continue testing with that vehicle. If after two shift-days you discontinue testing before accumulating 3 hours of non-idle operation on either day, evaluate the valid NTE samples as described in §86.1912 and include the data in the reporting and record keeping requirements specified in §§86.1920 and 1925. Count the engine toward meeting your testing requirements under this subpart and use the data for deciding whether additional engines must be tested under the applicable Phase 1 or Phase 2 test plan.

(h) You have the option to test longer than the two shift-day period described in paragraph (g) of this section.

(i) You may count a vehicle as meeting the vehicle-pass criteria described in §86.1912 if a shift day of testing or two-shift days of testing (with the requisite non-idle/idle operation time as in paragraph (g) of this section), or if the extended testing you elected under paragraph (h) of this section does not generate a single valid NTE sampling event, as described in §86.1912(b). Count the engine towards meeting your testing requirements under this subpart.

(j) You may ask us to waive measurement of particular emissions if you can show that in-use testing for such emissions is not necessary.

§86.1912 How do I determine whether an engine meets the vehicle-pass criteria?

In general, the average emissions for each regulated pollutant must remain at or below the NTE threshold in paragraph (a) of this section for at least 90 percent of the valid NTE sampling events, as defined in paragraph (b) of this section. For 2007 through 2009 model year engines, the average emissions from every NTE sampling event must also remain below the NTE thresholds in paragraph (f)(2) of this section. Perform the following steps to determine whether an engine meets the vehicle-pass criteria:

(a) Determine the NTE threshold for each pollutant subject to an NTE

standard by adding all three of the following terms and rounding the result to the same number of decimal places as the applicable NTE standard:

- (1) The applicable NTE standard.
- (2) The in-use compliance testing margin specified in § 86.007-11(h), if any.
- (3) An accuracy margin for portable in-use equipment when testing is performed under the special provisions of § 86.1930, depending on the pollutant, as follows:
 - (i) NMHC: 0.17 grams per brake horsepower-hour.
 - (ii) CO: 0.60 grams per brake horsepower-hour.
 - (iii) NO_x: 0.50 grams per brake horsepower-hour.
 - (iv) PM: 0.10 grams per brake horsepower-hour.
- (4) Accuracy margins for portable in-use equipment for testing not performed under the special provisions of § 86.1930, to be determined by rule-making as indicated in § 86.1935.

(b) For the purposes of this subpart, a valid NTE sampling event consists of at least 30 seconds of continuous operation in the NTE control area. An NTE event begins when the engine starts to operate in the NTE control area and continues as long as engine operation remains in this area (see § 86.1370). When determining a valid NTE sampling event, exclude all engine operation in approved NTE limited testing regions under § 86.1370-2007(b)(6) and any approved NTE deficiencies under § 86.007-11(a)(4)(iv). Engine operation in the NTE control area of less than 30 contiguous seconds does not count as a valid NTE sampling event; operating periods of less than 30 seconds in the NTE control area, but outside of any allowed deficiency area or limited testing region, will not be added together to make a 30 second or longer event. Exclude any portion of a sampling event that would otherwise exceed the 5.0 percent limit for the time-weighted carve-out defined in § 86.1370-2007(b)(7). For EGR-equipped engines, exclude any operation that occurs during the cold-

temperature operation defined by the equations in § 86.1370-2007(f)(1).

(c) Calculate the average emission level for each pollutant over each valid NTE sampling event as specified in 40 CFR part 1065, subpart G, using each NTE event as an individual test interval. This should include valid NTE events from all days of testing.

(d) Calculate a time-weighted vehicle-pass ratio (R_{pass}) for each pollutant. To do this, first sum the time from each valid NTE sampling event whose average emission level is at or below the NTE threshold for that pollutant, then divide this value by the sum of the engine operating time from all valid NTE events for that pollutant. Round the resulting vehicle-pass ratio to two decimal places.

(1) Calculate the time-weighted vehicle-pass ratio for each pollutant as follows:

$$R_{pass} = \frac{\sum_{m=1}^{n_{pass}} t}{\sum_{k=1}^{n_{total}} t}$$

Where:

n_{pass} = the number of valid sampling events for which the average emission level is at or below the NTE threshold.

n_{total} = the total number of valid NTE sampling events.

(2) For both the numerator and the denominator of the vehicle-pass ratio, use the smallest of the following values for determining the duration, t, of any NTE sampling event:

- (i) The measured time in the NTE control area that is valid for an NTE sampling event.
- (ii) 600 seconds.
- (iii) 10 times the length of the shortest valid NTE sampling event for all testing with that engine.

(e) The following example illustrates how to select the duration of NTE sampling events for calculations, as described in paragraph (d) of this section:

| NTE sample | Duration of NTE sample (seconds) | Duration Limit Applied? | Duration used in calculations (seconds) |
|------------|----------------------------------|--|---|
| 1 | 45 | No | 45 |
| 2 | 168 | No | 168 |
| 3 | 605 | Yes. Use 10 times shortest valid NTE. | 450 |

| NTE sample | Duration of NTE sample (seconds) | Duration Limit Applied? | Duration used in calculations (seconds) |
|------------|----------------------------------|--|---|
| 4 | 490 | Yes. Use 10 times shortest valid NTE. | 450 |
| 5 | 65 | No | 65 |

(f) Engines meet the vehicle-pass criteria under this section if they meet both of the following criteria:

(1) The vehicle-pass ratio calculated according to paragraph (d) of this section must be at least 0.90 for each pollutant.

(2) For model year 2007 through 2009 engines, emission levels from every valid NTE sampling event must be less than 2.0 times the NTE thresholds calculated according to paragraph (a) of this section for all pollutants, except that engines certified to a NO_x FEL at or below 0.50 g/bhp-hr may meet the vehicle-pass criteria for NO_x if measured NO_x emissions from every valid NTE sample are less than either 2.0 times the NTE threshold for NO_x or 2.0 g/bhp-hr, whichever is greater.

§86.1915 What are the requirements for Phase 1 and Phase 2 testing?

For all selected engine families, you must do the following:

(a) To determine the number of engines you must test from each selected engine family under Phase 1 testing, use the following criteria:

(1) Start by measuring emissions from five engines using the procedures described in §86.1375. If all five engines comply fully with the vehicle-pass criteria in §86.1912 for all pollutants, you may stop testing. This completes your testing requirements under this subpart for the applicable calendar year for that engine family.

(2) If one of the engines tested under paragraph (a)(1) of this section fails to comply fully with the vehicle-pass criteria in §86.1912 for one or more pollutants, test one more engine. If this additional engine complies fully with the vehicle-pass criteria in §86.1912 for all pollutants, you may stop testing. This completes your testing requirements under this subpart for the applicable calendar year for that engine family.

(3) If your testing results under paragraphs (a)(1) and (2) of this section do not satisfy the criteria for completing

your testing requirements under those paragraphs for all pollutants, test four additional engines so you have tested a total of ten engines.

(4) An engine that fails to fully comply with the vehicle-pass criteria in §86.1912 for any pollutant does not comply with the vehicle-pass criteria in §86.1912 for the purposes of determining the number of engines to test from each selected engine family under this paragraph.

(b) For situations where a total of ten engines must be tested under paragraph (a)(3) of this section, the results of Phase 1 testing lead to the following outcomes:

(1) If at least eight of the ten engines comply fully with the vehicle-pass criteria in §86.1912 for all pollutants, you may stop testing. This completes your testing requirements under this subpart for the applicable calendar year for that engine family.

(2) If six or seven vehicles from the Phase 1 sample of test vehicles comply fully with the vehicle-pass criteria in §86.1912 for all pollutants, then you must engage in follow-up discussions with us to determine whether any further testing (including Phase 2 testing), data submissions, or other actions may be warranted.

(3) If fewer than six of the ten engines tested under paragraph (a) of this section comply fully with the vehicle-pass criteria in §86.1912 for all pollutants, we may require you to initiate Phase 2 testing, as described in paragraph (c) of this section.

(4) You may under any circumstances elect to conduct Phase 2 testing following the completion of Phase 1 testing. All the provisions of paragraph (c) of this section apply to this Phase 2 testing.

(c) If you perform Phase 2 testing for any reason, test your engines as follows: