

§ 92.126

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(C) The response time measured in step in paragraph (c)(3)(iii)(B) of this section is equal to or less than the slowest response time determined for *Capillary flow analyzers* in § 92.118 plus 2 seconds.

(iv) A hang-up check is permitted.

(v) A converter-efficiency check is permitted. The check need not conform to § 92.121. The test procedure may be aborted at this point in the procedure in order to repair the NO₂ to NO converter. If the test is aborted, the converter must pass the efficiency check described in § 92.121 prior to starting the test run.

(4) Introduce the zero-grade gases at the same flow rates and pressures used to calibrate the analyzers and zero the analyzers on the lowest anticipated range that will be used during the test. Immediately prior to each test, obtain a stable zero for each anticipated range that will be used during the test.

(5) Introduce span gases to the instruments under the same flow conditions as were used for the zero gases. Adjust the instrument gains on the lowest range that will be used to give the desired value. Span gases should have a concentration greater than 70 percent of full scale for each range used. Immediately prior to each test, record the response to the span gas and the span-gas concentration for each range that will be used during the test.

(6) Check the zero responses. If they have changed more than 0.5 percent of full scale, repeat paragraphs (c)(4) and (5) of this section.

(7) Check system flow rates and pressures. Note the values of gauges for reference during the test.

§ 92.126 Test run.

(a) The following steps shall be taken for each test:

(1) Prepare the locomotive, engine, dynamometer, (as applicable) and sampling system for the test. Change filters, etc. and leak check as necessary.

(2) Connect sampling equipment as appropriate for the sampling procedure employed; i.e. raw or dilute (evacuated sample collection bags, particulate, and raw exhaust sampling equipment, particulate sample filters, fuel flow measurement equipment, etc.).

(3) Start the particulate dilution tunnel, the sample pumps, the engine cooling fan(s) (engine dynamometer testing) and the data collection and sampling systems (except particulate sample collection). The heated components of any continuous sampling systems(s) (if applicable) shall be preheated to their designated operating temperatures before the test begins.

(4) Adjust the sample flow rates to the desired flow rates and set gas flow measuring devices to zero (particulate dilution tunnel).

(5) Read and record all required general and pre-test data (i.e., all required data other than data that can only be collected during or after the emission test).

(6) Warm-up the locomotive or locomotive engines according to normal warm-up procedures.

(7) Begin the EPA Test Sequence for Locomotives and Locomotive Engines (see § 92.124). Record all required general and test data throughout the duration of the test sequence.

(i) Mark the start of the EPA Test Sequence for Locomotives and Locomotive Engines on all data records.

(ii) Begin emission measurement after completing the warmup phase of the EPA Test Sequence for Locomotives and Locomotive Engines, as specified in paragraph (b) of this section. Mark the start and end of each mode on all data records.

(iii) A mode shall be voided where the requirements of this subpart that apply to that test mode are not met. This includes the following:

(A) The data acquisition is terminated prematurely; or

(B) For engine testing, the engine speed or power output exceeds the tolerance bands established for that mode; or

(C) Measured concentrations exceed the range of the instrument; or

(D) The test equipment malfunctions.

(iv) Modes within the test sequence shall be repeated if it is voided during the performance of the test sequence. A mode can be repeated by:

(A) Repeating the two preceding modes and then continuing with the test sequence, provided that the locomotive or engine is not shut down after the voided test mode; or

(B) Repeating the preceding mode and then continuing with the test sequence from that point, provided that the locomotive or engine is not operated in any mode with lower power than the preceding mode after the voided test mode. For example, if the Notch 2 mode is voided, then the locomotive or engine would be returned to Notch 1 while any repairs are made.

(b) *Sampling and measurement timing.*

(1) Gaseous emissions shall be sampled and measured continuously.

(2)(i) Sampling of particulate emissions from the raw exhaust (for dilution) shall be conducted continuously.

(ii) Sampling of particulates from the diluted exhaust shall begin within ten seconds after the beginning of each test mode, and shall end six minutes after the beginning of each test mode.

(iii) Sampling of CO₂ in the dilution air and diluted exhaust does not need to be continuous, but the measurements used for the calculations must be made after the first two minutes of each mode.

(3) Fuel flow rate shall be measured continuously. The value reported for the fuel flow rate shall be a one-minute average of the instantaneous fuel flow measurements taken during the last minute of the minimum sampling period listed in Table B124-1 in §92.124; except for testing during idle modes, where it shall be a three-minute average of the instantaneous fuel flow measurements taken during the last three minutes of the minimum sampling period listed in Table B124-1 in §92.124. Sampling periods greater than one minute, but no greater than three minutes are allowed for modes 2, 3, and 4, where required by good engineering practice.

(4) Engine power shall be measured continuously. The value reported for the engine power shall be a one-minute average of the instantaneous power measurements taken during the last minute of the minimum sampling period listed in Table B124-1 in §92.124.

(c) *Exhaust gas measurements.* (1) Should the analyzer response exceed 100 percent of full scale or respond less than 15 percent of full scale, the next higher or lower analyzer range shall be used.

(2) Each analyzer range that may be used during a test sequence must have the zero and span responses recorded prior to the execution of the test sequence. Only the range(s) used to measure the emissions during a test sequence are required to have their zero and span recorded after the completion of the test sequence.

(3) It is permitted to change filter elements between test modes, provided such changes do not cause a mode to be voided.

(4) A leak check is permitted between test modes, provided such changes do not cause a mode to be voided.

(5) A hang-up check is permitted between test modes, provided such changes do not cause a mode to be voided.

(6) If, during the emission measurement portions of a test, the value of the gauges downstream of the NDIR analyzer(s) differs by more than ± 2 inches of water from the pretest value, the test is void.

(7)(i) For bag samples, as soon as possible transfer the exhaust and dilution air bag samples to the analytical system and process the samples.

(ii) A stabilized reading of the exhaust sample bag on all applicable analyzers shall be made within 20 minutes of the end of the sample collection phase of the mode.

§92.127 Emission measurement accuracy.

(a) Good engineering practice dictates that exhaust emission sample analyzer readings below 15 percent of full scale chart deflection should generally not be used.

(b) Some high resolution read-out systems such as computers, data loggers, etc., can provide sufficient accuracy and resolution below 15 percent of full scale. Such systems may be used provided that additional calibrations are made to ensure the accuracy of the calibration curves. The following procedure for calibration below 15 percent of full scale may be used:

(1) If a 16-point gas divider is used, 50 percent of the calibration points shall be below 10 percent of full scale. The gas divider shall conform to the accuracy requirements specified in §92.112.