

(vi) Longer preconditioning times may be used only if prior approval is obtained from the Administrator.

(6) Within a total elapsed time of 10 minutes or less, determine by experimentation the maximum torque at the rated and intermediate speeds;

(7) Calculate the torque corresponding to 2, 25, 50, 75, and 100 percent of the maximum observed torque for the rated and intermediate speeds;

(8) Read and record all pre-test data specified in § 86.337(c);

(9) Start the test cycle, § 86.336, within 10 minutes, after determining test load using the torque values determined in paragraph (d)(6) of this section;

(10) Read and record all modal data specified in § 86.337(d) during the last 2 minutes of each mode;

(11) Continuously record the analyzer's response to the exhaust gas during each test segment;

(12) Test segments may be repeated;

(13) If a delay of more than 20 minutes occurs between the end of one segment and the beginning of another segment the test is void. The test may be restarted at paragraph (d)(8) of this section. If the delay exceeds 4 hours, the test shall be restarted at paragraph (d)(2) of this section;

(14) The engine speed and load must be maintained within the requirements of § 86.336 during the last 2 minutes of each mode. If the requirement is not met for all modes during a test segment, that segment of the test is void. The test segment may be restarted beginning with paragraph (d)(8) of this section;

(15) If at any time during a test segment, the test equipment malfunctions or the specifications in paragraph (d)(14) of this section are not met, the test segment is void, and may be aborted. The test segment may be restarted beginning with paragraph (d)(8) of this section;

(16) Fuel flow and air flow during the idle or 2-percent load conditions may be determined just prior to or immediately following the dynamometer sequence, if longer times are required for accurate measurements.

(e) *Exhaust gas measurements.* (1) Measure HC, CO, CO₂, and NO_x volume concentration in the exhaust sample.

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 per § 86.338. For exceptions to the lower limit see § 86.338. Should the fuel flow instrument read below 20 percent of full-scale value, a smaller flow measurement unit must be used unless the option in § 86.314 is desired.

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

(3) It is permitted to change filter elements between test segments.

(4) A leak check is permitted between test segments.

(5) A hang-up check is permitted between test segments.

(6) If, during the emission measurement portion of a test segment, the value of the gauges downstream of the NDIR analyzer(s) G3 or G4 differs by more than ±2 inches of water from the pretest value, the test segment is void.

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§ 86.342-79 Post-test procedures.

(a) Begin a hang-up check within 30 seconds of the completion of the last mode in the test. Use the following procedure:

(1) Introduce a zero-grade gas or room air into the sample probe or valve V2 to check the "hangup zero" response. Simultaneously start a time measurement.

(2) Select the lowest HC range used during the test;

(3) The difference between the span-zero response and the hang-up zero response shall not be greater than 5.0 percent of full scale or 10 ppmC whichever is greater, within:

(i) 50 seconds for gasoline-fueled engine test, or

(ii) 4 minutes for Diesel engine tests, or

(b) Begin the analyzer span checks within 6 minutes after the completion of the last mode in the test. Record for

each analyzer the zero and span response for each range used during the preceding test or test segment.

(c) If during the test, the filter element(s) were replaced or cleaned, a vacuum check must be performed per § 86.328 immediately after the span checks. If the vacuum side leak check does not meet the requirements of § 86.328 the test is void.

(d) Read and record the post-test data specified in § 86.337(e).

(e) For a valid test, the analyzer drift between the before-test and after-test (before-segment and after-segment for Diesels) span checks for each analyzer must meet the following requirements:

(1) The span drift (defined as the change in the difference between the zero response and the span response) must not exceed 2.0 percent of full-scale chart deflection for each range used;

(2) The zero response drift must not exceed 2.0 percent of full-scale chart deflection for each range used above 155 ppm (or ppm C), or 3 percent of full-scale chart deflection for each range below 155 ppm (or ppm C).

(Secs. 206, 301(a), Clean Air Act as amended (42 U.S.C. 7525, 7601(a)))

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§ 86.343-79 Chart reading.

(a) A computer or any other automatic data processing device(s) may be used as long as the system meets the requirements of this subpart.

(b) Determine the location on the chart of the analyzer responses corresponding to the end of each mode.

(c) For gasoline-fueled engines, determine whether the test cycle was run in accordance with § 86.335 by observing either chart event marks, speed trace, torque trace, or concentration traces. The test will be invalidated if there is a deviation of more than:

(1) 2 seconds from the specified time for each CT mode, and 4 seconds for all other modes; or,

(2) Two percent of maximum torque during the exhaust gas sampling period (last 10 seconds on each nonclosed throttle gasoline-fueled engine mode); or

(3) 5 percent of maximum torque during the remainder of the mode, excluding the first 35 seconds of the mode; or

(4) 200 rpm during the first 10 seconds of each mode, or 100 rpm during the remainder of each mode.

(d) Determine chart deflections.

(1) Locate the last 10 seconds of each gasoline-fueled engine mode except CT. Locate the last 50 seconds of each gasoline-fueled engine CT mode. For all Diesel engine modes locate the last 60 seconds.

(2)(i) Divide the last 10 seconds or 60 seconds, whichever is applicable, into a minimum of 10 equally spaced increments. Determine the chart deflection of each increment for the CO₂, CO, HC, and NO_x analyzers.

(ii) Option for Diesel engine modes. If the deviation from a straight line (other than instrument noise) during this 60 seconds is less than ±5 percent of full-scale, the average chart deflection may be determined by eye. The average value (one number) may then be used in lieu of the 10 values required by paragraph (d)(2)(i) of this section.

(3) Other methods of determining the chart deflection of the analyzers may be used only with prior approval by the Administrator.

(e) Determine CO₂, CO, HC, and NO_x concentrations for each mode.

(1) If the option in paragraph (d)(2)(ii) of this section is employed, then those chart deflections for both linear and non-linear analyzers may be substituted for the average chart deflection in step (e)(2).

(2) For linear instruments, average the chart deflections determined in paragraph (d)(2)(i) of this section. Determine the concentration for this average chart deflection using calibration data.

(3) For non-linear instruments, calculate concentrations for each chart deflection determined in paragraph (d)(2)(i) of this section. Take the average of these concentrations for each mode.

(4) For purposes of this paragraph, calibration data includes calibration curves, linearity curves, span-gas responses, and zero-gas responses.

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