

Environmental Protection Agency

§ 86.339-79

and the span traces for each range used.

(3) Ambient temperature in the dynamometer testing room (gasoline-fueled engines only).

(4) Total number of hours of operation accumulated on the engine.

[42 FR 45154, Sept. 8, 1977, as amended at 46 FR 50495, Oct. 13, 1981; 47 FR 49807, Nov. 2, 1982]

§ 86.338-79 Exhaust measurement accuracy.

(a) The analyzers must be operated between 15 percent and 100 percent of full-scale chart deflection during the measurement of the emissions for each mode. The exceptions to the lower limit of this operating rule are:

(1) The analyzer's response may be less than 15 percent of full-scale if the full-scale value is 155 ppm (or ppm C) or less.

(2) *Option.* For CO analysis the analyzer's response may be less than 15 percent of full scale if the full-scale value is 5500 ppm or less.

(3) The analyzer's response may be less than 15 percent of full scale if the emissions from the engine are erratic and the average chart-deflection value is greater than 15 percent of full scale.

(4) For gasoline-fueled engines, the analyzer's response may be less than 15 percent of full scale during the initial part of the CT mode provided that average chart-deflection value is greater than 15 percent of full scale.

(5) The analyzer's response may be less than 15 percent of full scale if the contribution of all modes read below the 15 percent level is less than 10 percent by mass of the final test results.

(6) The HC analyzer's response may be less than 15 percent of full-scale when transient emissions (spikes) can be reasonably expected to exceed 90 percent of full-scale. Higher analyzer ranges may be used provided that the precision and linearity of the analyzer at the level of the readings below 15 percent meets the specifications of the range that would be required if the transient emissions did not exist.

(b) [Reserved]

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

[42 FR 45154, Sept. 8, 1977, as amended at 44 FR 16917, Mar. 20, 1979; 46 FR 50495, Oct. 13, 1981, and 47 FR 49807, Nov. 2, 1982]

§ 86.339-79 Pre-test procedures.

(a) Allow a minimum of 30 minutes warm-up in the stand-by or operating mode prior to spanning the analyzers.

(b) Replace or clean the filter elements and then vacuum leak check the system, § 86.328(a). A pressure leak check is also permitted per § 86.328(b). Allow the heated sample line, filters, and pumps to reach operating temperature.

(c) Perform the following system checks:

(1) If a stainless steel NO₂ to NO converter is used, prior to gasoline-fueled engine tests, purge the converter with air (zero-grade air, room air, or O₂) for a minimum of 30 minutes. The converter must be at operational temperature while purging.

(2) Check the sample-line temperature (see § 86.310).

(3) Check the system response time (see § 86.329). System response time may be applied from the most recent check of response time if all of the following are met:

(i) The flow rate for each flow meter is equal to or greater than the flow rate recorded in § 86.329(b)(1)(ii).

(ii) For analyzers with capillaries, the response time from the sample/span valve is measured using in-use pressures and bypass flows (see § 86.329(b)(2)).

(iii) The response time measured in step (ii) is equal to or less than the response time determined in § 86.329(b)(2)(vii).

(4) A hang-up check is permitted.

(5) A converter-efficiency check is permitted. The check need not conform to § 86.332(b). 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 § 86.332(b) prior to starting the dynamometer test run.

(d) 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 (segment, for Diesel engines), obtain a stable zero for each anticipated range that will be used during the test.

(e) 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 and also prior to each segment of the Diesel test, record the response to the span gas and the span-gas concentration for each range that will be used during the test.

(f) *Check the zero responses.* If they have changed more than 0.5 percent of full scale, repeat paragraphs (d) and (e) of this section.

(g) Check system flow rates and pressures. Note the values of gauges G3 and G4 for reference during the test.

§ 86.340-79 Gasoline-fueled engine dynamometer test run.

(a) This section applies to gasoline-fueled engines only. Diesel engines are covered in § 86.341.

(b)(1) Mount test engine on the engine dynamometer.

(2) Install instrumentation and sample probe.

(3) Read and record the general test data as specified in § 86.337(b).

(c) Precondition the engine by the following continuous steps:

(1) The engine shall be started and operated at:

(i) Zero load in accordance with the manufacturer's start-up and warm-up procedures for 1 minute \pm 30 sec;

(ii) A torque equivalent to 10 ± 3 percent of the most recent determination of maximum torque for 4 minutes \pm 30 second at 2,000 rpm. This torque level may be exceeded if the choke and fast idle cam mechanism would normally result in a stabilized idle speed in excess of 2,000 rpm.

(iii) A torque equivalent to 55 ± 5 percent of the most recent determination of maximum torque for 35 minutes \pm 1 minute at 2000 rpm;

(iv) *Option.* If the engine has been operating on service accumulation for a minimum of 40 minutes, the service accumulation may be substituted for steps (i) through (iii).

(2) If tested under the provisions of § 86.079-29, check specifications as required. This check must be performed within 20 minutes after completion of engine preconditioning;

(3) Determine the maximum torque of the engine at 2000 rpm \pm 100 rpm;

(i) Operate the engine with the throttle fully opened for a maximum of three minutes. During the second minute of operation, record the high and low torque readings. The average of these two readings will be the maximum torque value at 2000 rpm.

(ii) Calculate the torque corresponding to 10, 25, 55, and 90 percent of the observed maximum torque value.

(4) Determine the analyzer ranges required for each mode specified in § 86.335 to meet the range specifications of § 86.338. Prior to determining the range selection, the automatic dynamometer controller, if used, may be calibrated for the prevailing ambient conditions. The engine must not be operated for more than 30 minutes. Cycle 1, or cycles 1 and 2, specified in § 86.335, may be used for this purpose.

(5) The engine shall be turned off and allowed to stand for at least 1 hour, but not more than 2 hours, at an average ambient temperature of $25 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$ ($77 \text{ }^\circ\text{F} \pm 9 \text{ }^\circ\text{F}$).

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

(1) Maintain dynamometer test cell average ambient temperature at $25 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$ ($77 \text{ }^\circ\text{F} \pm 9 \text{ }^\circ\text{F}$);

(2) Observe pre-test procedures; § 86.339;

(3) Start cooling system;

(4) Start engine and operate in accordance with manufacturer's start-up and warm-up procedures. The duration of the warm-up procedures shall be 5 minutes \pm 30 seconds. Sample flow may begin during the warm-up;

(5) Read and record all pre-test data specified in § 86.337(c) during the 5 minute warm-up;

(6) Release the choke idle-stop (if necessary) and return the engine throttle control to the curb-idle position, start sample flow and recorders if not