

- (8) Idle rpm.
- (9) Fuel consumption at maximum power and torque.
- (10) Maximum air flow.
- (11) Air inlet restriction.
- (12) Exhaust pipe diameter(s).
- (13) Maximum exhaust system backpressure.
- (c) *Test data; general.* (1) Engine-system combination.
- (2) Engine identification number.
- (3) Instrument operator.
- (4) Engine operator.
- (5) Number of hours of operation accumulated on the engine prior to beginning the warm-up portion of the test.
- (6) Fuel identification.
- (7) Date of most recent analytical assembly calibration.
- (8) All pertinent instrument information such as tuning, gain, serial numbers, detector number, and calibration curve numbers. As long as this information is available for inspection by the Administrator, it may be summarized by system number or analyzer identification numbers.
- (d) *Test data; pre-test.* (1) Date and time of day.
- (2) Test number.
- (3) Intermediate speed and rated speed as defined in §89.2 and maximum observed torque for these speeds.
- (4) Recorder chart or equivalent. Identify the zero traces for each range used, and span traces for each range used.
- (5) Air temperature after and pressure drop across the charge air cooler (if applicable) at maximum observed torque and rated speed.
- (e) *Test data; modal.* (1) Recorder chart or equivalent. Identify for each test mode the emission concentration traces and the associated analyzer range(s). Identify the start and finish of each test.
- (2) Observed engine torque.
- (3) Observed engine rpm.
- (4) Record engine torque and engine rpm continuously during each mode with a chart recorder or equivalent recording device.
- (5) Intake air flow (for raw mass flow sampling method only) and depression for each mode.

- (6) Engine intake air temperature at the engine intake or turbocharger inlet for each mode.
- (7) Mass fuel flow (for raw sampling) for each mode.
- (8) Engine intake humidity.
- (9) Coolant temperature outlet.
- (10) Engine fuel inlet temperature at the pump inlet.
- (f) *Test data; post-test.* (1) Recorder chart or equivalent. Identify the zero traces for each range used and the span traces for each range used. Identify hangup check, if performed.
- (2) Total number of hours of operation accumulated on the engine.

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#### § 89.406 Pre-test procedures.

- (a) Allow a minimum of 30 minutes warmup in the standby or operating mode prior to spanning the analyzers.
- (b) Replace or clean the filter elements and then vacuum leak check the system per §89.316(a). Allow the heated sample line, filters, and pumps to reach operating temperature.
- (c) Perform the following system checks:
  - (1) Check the sample-line temperatures (see §89.309(a)(4)(ii) and (a)(5)(i)(A)).
  - (2) Check that the system response time has been accounted for prior to sample collection data recording.
  - (3) A hang-up check is permitted, but is optional.
  - (d) Check analyzer zero and span at a minimum before and after each test. Further, check analyzer zero and span any time a range change is made or at the maximum demonstrated time span for stability for each analyzer used.
  - (e) Check system flow rates and pressures.

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#### § 89.407 Engine dynamometer test run.

- (a) Measure and record the temperature of the air supplied to the engine, the fuel temperature, the intake air humidity, and the observed barometric pressure during the sampling for each mode. The fuel temperature shall be less than or equal to 43C during the sampling for each mode.