

TABLE B124-1

| Test sequence for locomotives and locomotive engines |                                  |  |                                 |                                      |
|--|----------------------------------|--|---------------------------------|--------------------------------------|
| Mode No.   | Notch setting                    | Time in notch  | Emissions measured <sup>2</sup> | Power, and fuel consumption measured |
| Warmup .....   | Notch 8 .....                    | 5 ±1 min .....   | None .....                      | None                                 |
| Warmup .....   | Lowest Idle .....                | 15 min maximum (after engine speed reaches lowest idle speed). | None .....                      | None                                 |
| 1a .....   | Low Idle <sup>1</sup> .....      | 6 min minimum .....  | All .....                       | Both                                 |
| 1 .....  | Normal Idle .....                | 6 min minimum .....  | All .....                       | Both                                 |
| 2 .....  | Dynamic Brake <sup>1</sup> ..... | 6 min minimum .....  | All .....                       | Both                                 |
| 3 .....  | Notch 1 .....                    | 6 min minimum .....  | All .....                       | Both                                 |
| 4 .....  | Notch 2 .....                    | 6 min minimum .....  | All .....                       | Both                                 |
| 5 .....  | Notch 3 .....                    | 6 min minimum .....  | All .....                       | Both                                 |
| 6 .....  | Notch 4 .....                    | 6 min minimum .....  | All .....                       | Both                                 |
| 7 .....  | Notch 5 .....                    | 6 min minimum .....  | All .....                       | Both                                 |
| 8 .....  | Notch 6 .....                    | 6 min minimum .....  | All .....                       | Both                                 |
| 9 .....  | Notch 7 .....                    | 6 min minimum .....  | All .....                       | Both                                 |
| 10 .....   | Notch 8 .....                    | 15 min minimum .....   | All .....                       | Both                                 |

<sup>1</sup>Omit if not so equipped.

<sup>2</sup>The EPA test sequence for locomotives and locomotive engines may be performed once, with gaseous, particulate and smoke measurements performed simultaneously, or it may be performed twice with gaseous, and particulate measurements performed during one test sequence and smoke measurements performed during the other test sequence. The minimum time in notch is three minutes for test sequences in which only smoke is measured.

[63 FR 18998, Apr. 16, 1998, as amended at 70 FR 40454, July 13, 2005]

**§ 92.125 Pre-test procedures and pre-conditioning.**

(a) *Locomotive testing.* (1) Determine engine lubricating oil and coolant levels and fill as necessary to manufacturers recommended full levels.

(2) Connect fuel supply system and purge as necessary; determine that the fuel to be used during emission testing is in compliance with the specifications of §92.113.

(3) Install instrumentation, engine loading equipment and sampling equipment as required.

(4) Operate the engine until it has reached the specified operating temperature.

(b) *Engine testing.* (1) Determine engine lubricating oil level and fill as necessary to manufacturers recommended full level.

(2)(i) Connect fuel supply system and purge as necessary; determine that the fuel to be used during emission testing is in compliance with the specifications of §92.113.

(ii) Connect engine cooling system.

(3) Install instrumentation, and sampling equipment as required. Couple the engine to the dynamometer or locomotive alternator/generator.

(4) Start cooling system.

(5) Operate the engine until it has reached the specified operating temperature.

(6) Establish that the temperature of intake air entering the engine after compression and cooling in the charge air cooler(s), at each test point, is within ±5 °F of the temperatures which occur in locomotive operations at the ambient temperature represented by the test.

(c) *Both locomotive and engine testing.* (1) Allow a minimum of 30 minutes warm-up in the stand-by or operating mode prior to spanning the analyzers.

(2) Replace or clean filter elements (sampling and analytical systems) as necessary, and then vacuum leak check the system, §92.118. A pressure leak check is also permitted per §92.118. Allow the heated sample line, filters, and pumps to reach operating temperature.

(3) Perform the following system checks:

(i) If a stainless steel NO<sub>2</sub> to NO converter is used, purge the converter with air (zero-grade air, room air, or O<sub>2</sub>) for a minimum of 30 minutes. The converter must be at operational temperature while purging.

(ii) Check the sample system temperatures (see §92.114).

(iii) Check the system response time (see §92.118). System response time

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may be applied from the most recent check of response time if all of the following are met:

(A) The flow rate for each flow meter is equal to or greater than the flow rate recorded in § 92.118.

(B) For analyzers with capillaries, the response time from the sample/span valve is measured using in-use pressures and bypass flows (see § 92.118).

(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 NO<sub>2</sub> 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 sam-

pling 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.