

supplemental hot soak test (see § 86.138-96(k)) and the supplemental diurnal emission test (see § 86.133-96(p)).

(n) With prior approval of the Administrator, manufacturers may use an alternative canister loading method in lieu of the applicable canister loading method described in the provisions of paragraphs (h), (j)(1) and (j)(2) of this section, provided the alternative method is shown to be equivalent or result in a more fully loaded canister (a canister that has adsorbed an equal or greater amount of hydrocarbon vapors) than the applicable canister loading method required by the provisions of paragraphs (h), (j)(1) and (j)(2) of this section. Additionally, the Administrator may conduct confirmatory certification testing and in-use testing using the alternative canister loading method used by the manufacturer to test applicable certification and/or in-use vehicles or the appropriate method outlined in the provisions of paragraphs (h), (j)(1) and (j)(2) of this section.

[58 FR 16037, Mar. 24, 1993, as amended at 59 FR 16296, Apr. 6, 1994; 59 FR 48509, Sept. 21, 1994; 60 FR 43895, Aug. 23, 1995; 64 FR 23922, May 4, 1999; 70 FR 72927, Dec. 8, 2005]

§ 86.133-96 Diurnal emission test.

(a)(1) The diurnal emission test for gasoline-, methanol- and gaseous-fueled vehicles consists of three 24-hour test cycles following the hot soak test. Emissions are measured for each 24-hour cycle, with the highest emission level used to determine compliance with the standards specified in subpart A of this part. The Administrator may truncate a test after any 24-hour cycle without affecting the validity of the collected data. Sampling of emissions from the running loss and hot soak tests is not required as preparation for the diurnal emission test. The diurnal emission test may be conducted as part of either the three-diurnal test sequence or the supplemental two-diurnal test sequence, as described in § 86.130-96.

(2) For the full three-diurnal test sequence, the diurnal emission test outlined in paragraphs (b) through (o) of this section follows the high-temperature hot soak test concluded in § 86.138-96(j).

(3) For the supplemental two-diurnal test sequence, the diurnal emission test outlined in paragraph (p) of this section follows the alternate hot soak test specified in § 86.138-96(k). This test is not required for gaseous-fueled vehicles.

(b) The test vehicle shall be soaked for not less than 6 hours nor more than 36 hours between the end of the hot soak test and the start of the diurnal emission test. For at least the last 6 hours of this period, the vehicle shall be soaked at 72 ± 3 °F. The temperature tolerance may be waived for up to 10 minutes to allow purging of the enclosure or transporting the vehicle into the enclosure at the beginning of the diurnal emission test.

(c) The test vehicle shall be exposed to ambient temperatures cycled according to the profile specified in § 86.133 and appendix II of this part.

(1) Temperatures measured with the underbody temperature sensor shall follow the profile with a maximum deviation of 3 °F at any time and an average temperature deviation not to exceed 2 °F, where the average deviation is calculated using the absolute value of each measured deviation. In addition, the temperature from the sidewall temperature sensors shall follow the profile with a maximum deviation of 5 °F at any time.

(2) Ambient temperatures shall be measured at least every minute. Temperature cycling shall begin when time=0 minutes, as specified in paragraph (i)(5) of this section.

(d) The diurnal enclosure shall be purged for several minutes prior to the test. WARNING: If at any time the concentration of hydrocarbons, of methanol or of methanol and hydrocarbons exceeds 15,000 ppm C the enclosure should be immediately purged. This concentration provides at least a 4:1 safety factor against the lean flammability limit.

(e) The test vehicle, with the engine shut off and the test vehicle windows and luggage compartment(s) opened, shall be moved into the diurnal enclosure.

(f)-(g) [Reserved]

(h) Prior to sampling for emissions and throughout the period of cycled ambient temperatures, the mixing

fan(s) shall circulate the air at a rate of 0.8 ± 0.2 cfm per cubic foot of ambient volume. The mixing fan(s), plus any additional fans if needed, shall also maintain a minimum wind speed of 5 mph (8 km/hr) under the fuel tank of the test vehicle. The Administrator may adjust fan speed and location to ensure sufficient air circulation around the fuel tank. The wind speed requirement may be satisfied by consistently using a fan configuration that has been demonstrated to maintain a broad 5-mph air flow in the vicinity of the vehicle's fuel tank, subject to verification by the Administrator.

(i) Emission sampling may begin as follows:

(1) The FID (or HFID) hydrocarbon analyzer shall be zeroed and spanned immediately prior to the sampling.

(2) Impingers charged with known volumes of pure deionized water shall be placed in the methanol sampling system (methanol-fueled vehicles only).

(3) Turn off purge blowers (if not already off).

(4) Close and seal enclosure doors (if not already closed and sealed).

(5) Within 10 minutes of closing and sealing the doors, analyze enclosure atmosphere for hydrocarbons and record. This is the initial (time=0 minutes) hydrocarbon concentration, C_{HCl} , required in § 86.143. Hydrocarbon emissions may be sampled continuously during the test period.

(6) Analyze the enclosure atmosphere for methanol, if applicable, and record. The methanol sampling must start simultaneously with the initiation of the hydrocarbon analysis and continue for 4.0 ± 0.5 minutes. This is the initial methanol concentration, C_{CH_3OH} , required in § 86.143. Record the time elapsed during this analysis. If the 4-minute sample period is inadequate to collect a sample of sufficient concentration to allow accurate GC analysis, rapidly collect the methanol sample in a bag and then bubble the bag sample through the impingers at the specified flow rate. The time elapsed between collection of the bag sample and flow through the impingers should be minimized to prevent any losses. If the test is conducted in a fixed-volume enclosure that allows airflow into and

out of the enclosure, the effect of makeup air dilution must be factored into the analysis.

(j) If testing indicates that a vehicle design may result in fuel temperature responses during enclosure testing that are not representative of in-use summertime conditions, the Administrator may adjust air circulation and temperature during the test as needed to ensure that the test sufficiently duplicates the vehicle's in-use experience.

(k) The FID (or HFID) hydrocarbon analyzer shall be zeroed and spanned immediately prior to the end of each emission sampling period.

(l) Fresh impingers shall be installed in the methanol collection system immediately prior to the end of each emission measurement, if applicable.

(m) The end of the first, second, and third emission sampling period shall occur 1440 ± 6 , 2880 ± 6 , 4320 ± 6 minutes, respectively, after the beginning of the initial sampling, as specified in paragraph (i)(5) of this section.

(1) At the end of each emission sampling period, analyze the enclosure atmosphere for hydrocarbons and record. This is the final hydrocarbon concentration, C_{HCl} , required in § 86.143. The emission measurement at the end of each period becomes the initial hydrocarbon concentration, C_{HCl} , of the next emission sampling period.

(2) Analyze the enclosure atmosphere for methanol, if applicable, and record. The methanol sampling must start simultaneously with the initiation of the hydrocarbon analysis and continue for 4.0 ± 0.5 minutes. This is the final (time=1440 minutes) methanol concentration, C_{CH_3OH} , required in § 86.143. Record the time elapsed during this analysis. If the 4-minute sample period is inadequate to collect a sample of sufficient concentration to allow accurate GC analysis, rapidly collect the methanol sample in a bag and then bubble the bag sample through the impingers at the specified flow rate. The time elapsed between collection of the bag sample and flow through the impingers should be minimized to prevent any losses. If the test is conducted in a fixed-volume enclosure that allows airflow into and out of the enclosure, the effect of makeup air dilution must be factored into the analysis.

(n) At the end of the temperature cycling period the enclosure doors shall be unsealed and opened, the test vehicle windows and luggage compartments may be closed and the test vehicle, with the engine shut off, shall be removed from the enclosure.

(o) This completes the full three-diurnal evaporative emission test sequence described in § 86.130-96.

(p) For the supplemental two-diurnal test sequence described in § 86.130-96, the following steps shall be performed in lieu of the steps described in paragraphs (b) through (n) of this section.

(1) For the supplemental two-diurnal test sequence, the test vehicle shall be soaked for not less than 6 hours nor more than 36 hours between the end of the hot soak test described in § 86.138-96(k), and the start of the two-diurnal emission test. For at least the last 6 hours of this period, the vehicle shall be soaked at 72 ± 3 °F.

(2) The vehicle shall be tested for diurnal emissions according to the procedures specified in paragraphs (c) through (n) of this section, except that the test includes only two 24-hour periods. Therefore the end of the first and second emission sampling periods shall occur 1440 ± 6 and 2880 ± 6 minutes, respectively, after the initial sampling.

(3) This completes the supplemental two-diurnal test sequence for evaporative emission measurement.

[58 FR 16039, Mar. 24, 1993, as amended at 59 FR 48509, Sept. 21, 1994; 60 FR 43896, Aug. 23, 1995]

§ 86.134-96 Running loss test.

(a) *Overview.* Gasoline- and methanol-fueled vehicles are to be tested for running loss emissions during simulated high-temperature urban driving; this test is not required for gaseous-fueled vehicles. During operation, tank temperatures are controlled according to a prescribed profile to simulate in-use conditions. If the vehicle is determined to have exceeded the standard before the end of the running loss test, the test may be terminated without invalidating the data. The test can be run either in a sealed enclosure or with the point-source method, as specified in paragraph (g) of this section. Measurement of vapor temperature is optional during the running loss test; however,

if testing by the Administrator shows that a vehicle has exceeded an emission standard without measurement of vapor temperatures, the manufacturer may, utilizing its own resources, conduct subsequent testing on that vehicle to determine if the exceedance is attributable to inadequate control of vapor temperatures.

(b) *Driving schedule.* Conduct the running loss test by operating the test vehicle through one Urban Dynamometer Driving Schedule (UDDS), a 2-minute idle, two New York City Cycles, another 2-minute idle, another UDDS, then another 2-minute idle (see § 86.115 and appendix I of this part). Fifteen seconds after the engine starts, place the transmission in gear. Twenty seconds after the engine starts, begin the initial vehicle acceleration of the driving schedule. The transmission shall be operated according to the specifications of § 86.128 during the driving cycles.

(c) *Dynamometer operation.* (1) The exhaust from the vehicle must be routed outside the test cell or enclosure. Exhaust gases may, but need not, be collected and sampled.

(2) Provisions of § 86.135-90(c) shall apply.

(3) Practice runs over the prescribed driving schedule may not be performed at test point.

(4) Provisions of § 86.135-90 (e) and (f) shall apply.

(5) If the dynamometer horsepower must be adjusted manually, it shall be set within 1 hour prior to the running loss test phase. The test vehicle shall not be used to make this adjustment. Dynamometers using automatic control of preselectable power settings may be set any time prior to the beginning of the emissions test.

(6) Dynamometer roll or shaft revolutions shall be used to determine the actual driving distance for the running loss test, D_{RL} , required in § 86.143. The revolutions shall be measured on the same roll or shaft used for measuring the vehicle's speed.

(7) Provisions of § 86.135-90(i) shall apply.

(8) The test run may be stopped if a warning light or gauge indicates that the vehicle's engine coolant has overheated.