

(h) The temperature recording system shall be started and the time of engine shut off shall be noted on the evaporative emissions hydrocarbon data recording system.

(i) The enclosure doors shall be closed and sealed within two minutes of engine shutdown and within seven minutes after the end of the exhaust emission test. The steps after the end of the driving cycle should be done as quickly as possible to minimize the time needed to start the hot soak test.

(j) The 60 ± 0.5 minute hot soak begins when the enclosure doors are sealed. The enclosure atmosphere shall be analyzed and recorded. This is the initial (time = 0 minutes) hydrocarbon concentration, C_{HCi} , for use in calculating evaporative losses (see § 86.1243). The "zero" time methanol sample shall be collected starting at the same time as the hydrocarbon analysis is started. Sampling shall continue for four minutes.

(k) The test vehicle shall be permitted to soak for a period of one hour in the enclosure.

(l) The FID hydrocarbon analyzer shall be zeroed and spanned immediately prior to the end of the test.

(m) Fresh impingers shall be installed in the methanol collection system immediately prior to the end of the test, if applicable.

(n) At the end of the 60 ± 0.5 minute test period, the enclosure atmosphere shall again be analyzed (as described in § 86.1238-90(j) and the time recorded. This is the final (time = 60 minutes) hydrocarbon concentration, C_{HCf} and the final methanol level for use in calculating evaporative losses (see § 86.1243). This operation completes the evaporative emission measurement procedure.

(o) *Alternate method for methanol sampling.* Since sample times of longer than four minutes may be necessary in order to collect an adequate and representative sample of methanol at the end of a test (when SHED concentrations are usually increasing rapidly), it may be necessary to 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 flowing through

the impingers should be minimized in order to prevent any losses. This alternative must be adopted if the four minute sample period is inadequate to collect a sample of sufficient concentration to allow accurate GC analysis.

[54 FR 14569, Apr. 11, 1989, as amended at 58 FR 16061, Mar. 24, 1993; 60 FR 43906, Aug. 23, 1995]

§ 86.1238-96 Hot soak test.

(a)(1) *Gasoline- and methanol-fueled vehicles.* For gasoline- and methanol-fueled vehicles, the hot soak test shall be conducted immediately following the running loss test. However, sampling of emissions from the running loss test is not required as preparation for the hot soak test.

(2) *Gaseous-fueled vehicles.* Since gaseous-fueled vehicles are not required to perform a running loss test, the hot soak test shall be conducted within seven minutes after completion of the hot start exhaust test.

(b) The hot soak test may be conducted in the running loss enclosure as a continuation of that test or in a separate enclosure.

(1) If the hot soak test is conducted in the running loss enclosure, the driver may exit the enclosure after the running loss test. If exiting, the driver should use the personnel door described in § 86.1207-96(a)(2), exiting as quickly as possible with a minimum disturbance to the system. The final hydrocarbon and methanol concentration for the running loss test, measured in § 86.1234-96(g)(1)(xx), shall be the initial hydrocarbon and methanol concentration (time=0 minutes) C_{HCi} and $C_{CH_3OH_i}$, for the hot soak test.

(2) If the vehicle must be moved to a different enclosure, the following steps must be taken:

(i) The enclosure for the hot soak test shall be purged for several minutes prior to completion of the running loss 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.

(ii) The FID hydrocarbon analyzer shall be zeroed and spanned immediately prior to the test.

(iii) Fresh impingers shall be installed in the methanol sample collection system immediately prior to the start of the test, if applicable.

(iv) If not already on, the mixing fan(s) shall be turned on at this time. Throughout the hot soak test, the mixing fan(s) shall circulate the air at a rate of 0.8 ± 0.2 cfm per cubic foot of the nominal enclosure volume.

(v) Begin sampling as follows:

(A) Analyze the enclosure atmosphere for hydrocarbons and record. This is the initial (time = 0 minutes) hydrocarbon concentration, C_{HCi} , required in § 86.1243. Hydrocarbon emissions may be sampled continuously during the test period.

(B) 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 (time=0 minutes) methanol concentration, $C_{CH_3OH_i}$, required in § 86.1243. 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.

(vi) The vehicle engine compartment cover shall be closed (if not already closed), the cooling fan shall be moved, the vehicle shall be disconnected from the dynamometer and any sampling system, and then driven at minimum throttle to the enclosure for the hot soak test. These steps should be done as quickly as possible to minimize the time needed to start the hot soak test.

(vii) The vehicle's engine must be stopped before any part of the vehicle enters the enclosure.

(viii) The vehicle shall enter the enclosure; the enclosure doors shall be closed and sealed within 2 minutes of engine shutdown and within seven min-

utes after the end of the running loss test.

(ix) The test vehicle windows and any luggage compartments shall be opened (if not already open). The vehicle engine compartment cover shall be closed (if not already closed).

(c) [Reserved]

(d) The temperature recording system shall be started and the time of engine shutoff shall be noted on the evaporative emission hydrocarbon data recording system.

(e) For the first 5 minutes of the hot soak test, the ambient temperature shall be maintained at 95 ± 10 °F. For the remainder of the hot soak test, the ambient temperature shall be maintained at 95 ± 5 °F (95 ± 2 °F on average).

(f) The 60 ± 0.5 minute hot soak begins when the enclosure doors are sealed (or when the running loss test ends, if the hot soak test is conducted in the running loss enclosure).

(g) The FID (or HFID) hydrocarbon analyzer shall be zeroed and spanned immediately prior to the end of the test.

(h) Fresh impingers shall be installed in the methanol collection system immediately prior to the end of the test, if applicable.

(i) [Reserved]

(j) At the end of the 60 ± 0.5 minute test period:

(1) Analyze the enclosure atmosphere for hydrocarbons and record. This is the final (time=60 minutes) hydrocarbon concentration, C_{HCf} , required in § 86.1243.

(2) Analyze the enclosure atmosphere for methanol and record, if applicable. 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=60 minutes) methanol concentration, $C_{CH_3OH_f}$, required in § 86.1243. 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

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impingers should be minimized to prevent any losses.

(k) For the supplemental two-diurnal test sequence (see § 86.1230-96), the hot soak test described in § 86.1238-90 shall be conducted immediately following the dynamometer run. This test requires ambient temperatures between 68° and 86 °F at all times. The equipment and calibration specifications of §§ 86.1207-90 and 86.1207-90 may apply for this testing. Enclosures meeting the requirements of §§ 86.1207-96 and 86.1217-96 may also be used. This hot soak test is followed by two consecutive diurnal heat builds, described in § 86.1233-96(p).

(l) If the vehicle is to be tested for diurnal emissions, follow the procedure outlined in § 86.1233-96.

[58 FR 16061, Mar. 24, 1993, as amended at 59 FR 48524, Sept. 21, 1994; 60 FR 43906, Aug. 23, 1995]

§ 86.1242-90 Records required.

The following information shall be recorded with respect to each test:

- (a) Test number.
- (b) System or device tested (brief description).
- (c) Date and time of day for each part of the test schedule.
- (d) Instrument operator.
- (e) Driver or operator.
- (f) Vehicle: ID number; Manufacturer; Model Year; Engine family; Evaporative emissions family; Basic engine description (including displacement, number of cylinders, and catalyst usage); Engine maximum power rating and rated speed; Fuel system (including number of carburetors, number of carburetor barrels, fuel injection type, fuel tank(s) capacity and location, and number and size (volume and working capacity)) of evaporative control canisters, Engine code; Gross vehicle weight rating; Actual curb weight at zero miles; Actual road load at 50 mph; Transmission configuration; Axle ratio; Vehicle line; Odometer reading; Idle rpm; and Drive wheel tire pressure, as applicable.

(g) Indicated road load power absorption at 50 mph (80 km/hr) and dynamometer serial number. As an alternative to recording the dynamometer serial number, a reference to a vehicle test cell number may be used, provided

the test cell records show the pertinent information.

(h) All pertinent instrument information such as tuning, gain, serial number, detector number and range. As an alternative, a reference to a vehicle test cell number may be used, with the advance approval of the Administrator, provided test cell calibration records show the pertinent instrument information.

(i) Recorder charts: Identify zero, span and enclosure gas sample traces.

(j) Test cell barometric pressure and ambient temperature.

NOTE: A central laboratory barometer may be used: *Provided*, That individual test cell barometric pressures are shown to be within ± 0.1 percent of the barometric pressure at the central barometer location.

(k) Fuel temperatures as prescribed.

(l) *For methanol-fueled vehicles:* (1) Volume of sample passed through the methanol sampling system and the volume of deionized water in each impinger.

(2) The concentration of the GC analyses of the test samples (methanol).

(m) *For natural gas-fueled vehicles.* Composition, including all carbon containing compounds; e.g. CO₂, of the natural gas-fuel used during the test. C₁ and C₂ compounds shall be individually reported. C₃ and heavier hydrocarbons, and C₆ and heavier hydrocarbons may be reported as a group.

(n) *For liquefied petroleum gas-fueled vehicles.* Composition of the liquefied petroleum gas-fuel used during the test. Each hydrocarbon compound present, through C₄ compounds, shall be individually reported. C₅ and heavier hydrocarbons may be reported as a group.

[54 FR 14570, Apr. 11, 1989, as amended at 59 FR 48524, Sept. 21, 1994; 60 FR 34363, June 30, 1995]

§ 86.1243-90 Calculations; evaporative emissions.

(a) The calculation of the net hydrocarbon, methanol and hydrocarbon plus methanol mass change in the enclosure is used to determine the diurnal and hot soak mass emissions. The mass changes are calculated from initial and final hydrocarbon and methanol concentrations in ppm carbon, initial and final enclosure ambient temperatures, initial and final barometric pressures,