

(b)(16)-(b)(23) [Reserved]. For guidance see §86.137-90.

(b)(24) Vehicles to be tested for evaporative emissions will proceed according to §86.134; vehicles to be tested with the supplemental two-diurnal test sequence for evaporative emissions will proceed according to §86.138-96(k). For all others this completes the test sequence.

[58 FR 16042, Mar. 24, 1993]

§ 86.138-90 Hot-soak test.

The hot-soak evaporative emission test shall be conducted immediately following the hot transient exhaust emission test.

(a) Prior to the completion of the hot-start transient exhaust emission sampling period, the evaporative emission enclosure shall be purged for several minutes.

(b) 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.

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

(d) If not already on, the evaporative enclosure mixing fan shall be turned on at this time.

(e) Upon completion of the hot transient exhaust emission sampling period, the vehicle engine compartment cover shall be closed, the cooling fan shall be moved, the vehicle shall be disconnected from the dynamometer and exhaust sampling system, and then driven at minimum throttle to the vehicle entrance of the enclosure.

(f) The vehicle's engine must be stopped before any part of the vehicle enters the enclosure. The vehicle may be pushed or coasted into the enclosure.

(g) The test vehicle windows and luggage compartments shall be opened, if not already open.

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

(i) The enclosure doors shall be closed and sealed within two minutes of engine shutdown and within five minutes after the end of the exhaust emission test.

(j) The 60 ± 0.5 minute hot soak begins when the enclosure doors are sealed. The enclosure atmosphere shall be analyzed for hydrocarbon and recorded. This is initial (time = 0 minutes) hydrocarbon concentration, C_{HCl} , for use in calculating evaporative losses, see §86.143. The "zero" time methanol sample shall be collected starting at the same time as the hydrocarbon analysis is started. Sampling should 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 (or HFID) 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, again analyze the enclosure atmosphere for hydrocarbons and methanol, as described in §86.138-90(j), and record time. These analyses provide the final (time = 60 minutes) hydrocarbon concentration, C_{HCl} , and the final methanol level for use in calculating evaporative losses, see §86.143. 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 14532, Apr. 11, 1989, as amended at 58 FR 16042, Mar. 24, 1993; 60 FR 43897, Aug. 23, 1995]

§ 86.138-96 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 § 86.107-96(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 § 86.134-96(g)(1)(xx), shall be the initial hydrocarbon and methanol concentration (time=0 minutes) C_{HCi} and $C_{\text{CH}_3\text{OH}_i}$, 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 collec-

tion 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 § 86.143. 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, $C_{\text{CH}_3\text{OH}_i}$, 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.

(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 minutes after the end of the running loss test.

(ix) The test vehicle windows and any luggage compartments shall be opened