§ 86.140–90 Exhaust sample analysis.

The following sequence of operations shall be performed in conjunction with each series of measurements:

(a) For CO, CO_2, NO_X, and for Otto-cycle and methanol-fueled diesel vehicle HC:

(1) Zero the analyzers and obtain a stable zero reading. Recheck after tests.

(2) Introduce span gases and set instrument gains. In order to avoid errors, span and calibrate at the same flow rates used to analyze the test sample. Span gases should have concentrations equal to 75 to 100 percent of full scale. If gain has shifted significantly on the analyzers, check the calibrations. Show actual concentrations on chart.

(3) Check zeroes; repeat the procedure in paragraphs (1) and (2) of this section if required.

(4) Check flow rates and pressures.

(5) Measure HC, CO, CO_2, and NO_X concentrations of samples.

(6) Check zero and span points. If difference is greater than 2 percent of full scale, repeat the procedure in paragraphs (a) (1) through (5) of this section.

(b) For petroleum-fueled diesel vehicle HC:

(1) Zero HFID analyzer and obtain a stable zero reading.

(2) Introduce span gas and set instrument gains. Span gas should have concentration equal to 75 to 100 percent of full scale.

(3) Check zero as in (b)(1) of this section.

(4) Introduction of zero and span gas into the analyzer can be accomplished by either of the following methods:

(i) Close heated valve in HC sample (see Figures B90–5 or B90–6), and allow gases to enter HFID. Extreme care should be taken not to introduce gases under high pressure.

(ii) Connect zero and span line directly to HC sample probe and introduce gases at a flow rate greater than 125 percent of the HFID flow rate with the CVS blower operating (see Figures B90–5 or B90–6). Excess flow must be allowed to exit probe inlet.

NOTE: In order to minimize errors, HFID flow rate and pressure during zero and span

(and background bag reading) must be exactly the same as that used during testing.

(5) Continuously record (integrate electronically if desired) dilute hydrocarbon emissions levels during test. Background samples are collected in sample bags and analyzed as in paragraphs (b)(4) (i) or (ii) of this section.

(6) Check zero and span as in paragraphs (b)(1) through (b)(4) (i) or (ii) of this section. If difference is greater than 2 percent of full scale, void test and check for HC "hangup" or electronic drift in analyzer.

(c) For CH_3OH (methanol-fueled vehicles):

(1) Introduce a reference sample of methanol (the concentration of methanol in deionized water is known and is C_{MR} in the calculations) into the gas chromatograph and measure the area of the response peak This reference sample peak area is A_{MR} in the calculations.

(2) Introduce test samples into the gas chromatograph and measure the area of the response peak. This peak area is A_{MS} in the calculations.

(d) For HCHO (methanol-fueled vehicles):

(1) Introduce a reference sample of formaldehyde (the concentration of formaldehyde as a dinitrophenyl-hydrazine derivative in acetonitrile is known (C_{FR})) into the high pressure liquid chromatograph (HPLC) and measure the area of the response peak. This reference sample peak area is A_{FR} in the calculations.

(2) Introduce test samples into the high pressure liquid chromatograph and measure the area of the responses peak. This peak area is A_{FS} in the calculations.

[54 FR 14533, Apr. 11, 1989]

§ 86.140–94 Exhaust sample analysis.

The following sequence shall be performed in conjunction with each series of measurements:

(a) For CO, CO_2, CH_4, NO_X, and for Otto-cycle and methanol-fueled, natural gas-fueled and liquefied petroleum gas-fueled (if non-heated FID option is used) diesel vehicle HC:

(1) Zero the analyzers and obtain a stable zero reading. Recheck after tests.