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(c) Exhaust emissions tests, dynamometer procedure per 40 CFR 86.137–90 with:

(1) Exhaust Benzene and 1,3-Butadiene emissions measured per §80.55; and

(2) Formaldehyde and Acetaldehyde emissions measured per §80.56.

§ 80.52 Vehicle preconditioning.

(a) Initial vehicle preconditioning and preconditioning between tests with different fuels shall be performed in accordance with the “General vehicle handling requirements” per 40 CFR 86.132–96, up to and including the completion of the hot start exhaust test.

(b) The preconditioning procedure prescribed at 40 CFR 86.132–96 shall be observed for preconditioning vehicles between tests using the same fuel.

§§ 80.53–80.54 [Reserved]

§ 80.55 Measurement methods for benzene and 1,3-butadiene.

(a) Sampling for benzene and 1,3-butadiene must be accomplished by bag sampling as used for total hydrocarbons determination. This procedure is detailed in 40 CFR 86.109.

(b) Benzene and 1,3-butadiene must be analyzed by gas chromatography. Expected values for benzene and 1,3-butadiene in bag samples for the baseline fuel are 4.0 ppm and 0.30 ppm respectively. At least three standards ranging from at minimum 50% to 150% of these expected values must be used to calibrate the detector. An additional standard of at most 0.01 ppm must also be measured to determine the required limit of quantification as described in paragraph (d) of this section.

(c) The sample injection size used in the chromatograph must be sufficient to be above the laboratory determined limit of quantification (LOQ) as defined in paragraph (d) of this section for at least one of the bag samples. A control chart of the measurements of the standards used to determine the response, repeatability, and limit of quantitation of the instrumental method for 1,3-butadiene and benzene must be reported.

(d) As in all types of sampling and analysis procedures, good laboratory practices must be used. See, Lawrence,

40 CFR Ch. I (7–1–13 Edition)

Principals of Environmental Analysis, 55 Analytical Chemistry 14, at 2210–2218 (1983) (copies may be obtained from the publisher, American Chemical Society, 1155 16th Street NW., Washington, DC 20036). Reporting reproducibility control charts and limits of detection measurements are integral procedures to assess the validity of the chosen analytical method. The repeatability of the test method must be determined by measuring a standard periodically during testing and recording the measured values on a control chart. The control chart shows the error between the measured standard and the prepared standard concentration for the periodic testing. The error between the measured standard and the actual standard indicates the uncertainty in the analysis. The limit of detection (LOD) is determined by repeatedly measuring a blank and a standard prepared at a concentration near an assumed value of the limit of detection. If the average concentration minus the average of the blanks is greater than three standard deviations of these measurements, then the limit of detection is at least as low as the prepared standard. The limit of quantitation (LOQ) is defined as ten times the standard deviation of these measurements. This quantity defines the amount of sample required to be measured for a valid analysis.

(e) Other sampling and analytical techniques will be allowed if they can be proven to have equal specificity and equal or better limits of quantitation. Data from alternative methods that can be demonstrated to have equivalent or superior limits of detection, precision, and accuracy may be accepted by the Administrator with individual prior approval.

§ 80.56 Measurement methods for formaldehyde and acetaldehyde.

(a) Formaldehyde and acetaldehyde will be measured by drawing exhaust samples from heated lines through either 2,4-Dinitrophenylhydrazine (DNPH) impregnated cartridges or impingers filled with solutions of DNPH in acetonitrile (ACN) as described in §§86.109 and 86.140 of this chapter for formaldehyde analysis. Diluted exhaust sample volumes must be at least 15 L for impingers containing

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20 ml of absorbing solution (using more absorbing solution in the impinger requires proportionally more gas sample to be taken) and at least 4 L for cartridges. As required in §86.109 of this chapter, two impingers or cartridges must be connected in series to detect breakthrough of the first impinger or cartridge.

(b) In addition, sufficient sample must be drawn through the collecting cartridges or impingers so that the measured quantity of aldehyde is sufficiently greater than the minimum limit of quantitation of the test method for at least a portion of the exhaust test procedure. The limit of quantitation is determined using the technique defined in §80.55(d).

(c) Each of the impinger samples are quantitatively transferred to a 25 mL volumetric flask (5 mL more than the sample impinger volume) and brought to volume with ACN. The cartridge samples are eluted in reversed direction by gravity feed with 6mL of ACN. The eluate is collected in a graduated test tube and made up to the 5mL mark with ACN. Both the impinger and cartridge samples must be analyzed by HPLC without additional sample preparation.

(d) The analysis of the aldehyde derivatives collected is accomplished with a high performance liquid chromatograph (HPLC). Standards consisting of the hydrazone derivative of formaldehyde and acetaldehyde are used to determine the response, repeatability, and limit of quantitation of the HPLC method chosen for acetaldehyde and formaldehyde.

(e) Other sampling and analytical techniques will be allowed if they can be proven to have equal specificity and equal or better limits of quantitation. Data from alternative methods that can be demonstrated to have equivalent or superior limits of detection, precision, and accuracy may be accepted by the Administrator with individual prior approval.

§§ 80.57–80.58 [Reserved]

§ 80.59 General test fleet requirements for vehicle testing.

(a) The test fleet must consist of only 1989–91 MY vehicles which are techno-

logically equivalent to 1990 MY vehicles, or of 1986–88 MY vehicles for which no changes to the engine or exhaust system that would significantly affect emissions have been made through the 1990 model year. To be technologically equivalent vehicles at minimum must have closed-loop systems and possess adaptive learning.

(b) No maintenance or replacement of any vehicle component is permitted except when necessary to ensure operator safety or as specifically permitted in §80.60 and §80.61. All vehicle maintenance procedures must be reported to the Administrator.

(c) Each vehicle in the test fleet shall have no fewer than 4,000 miles of accumulated mileage prior to being included in the test program.

[59 FR 7813, Feb. 16, 1994, as amended at 59 FR 36962, July 20, 1994]

§ 80.60 Test fleet requirements for exhaust emission testing.

(a) Candidate vehicles which conform to the emission performance requirements defined in paragraphs (b) through (d) of this section shall be obtained directly from the in-use fleet and tested in their as-received condition.

(b) Candidate vehicles for the test fleet must be screened for their exhaust VOC emissions in accordance with the provisions in §80.62.

(c) On the basis of pretesting pursuant to paragraph (b) of this section, the test fleet shall be subdivided into two emitter group sub-fleets: the normal emitter group and the higher emitter group.

(1) Each vehicle with an exhaust total hydrocarbon (THC) emissions rate which is less than or equal to twice the applicable emissions standard shall be placed in the normal emitter group.

(2) Each vehicle with an exhaust THC emissions rate which is greater than two times the applicable emissions standard shall be placed in the higher emitter group.

(d) The test vehicles in each emitter group must conform to the requirements of paragraphs (d)(1) through (4) of this section.

(1) Test vehicles for the normal emitter sub-fleet must be selected from the