(v) The complex emission model described at § 80.45 shall be used to adjust the emission performance of the addition and extension fuels to compensate for differences in fuel compositions that are incorporated in the complex model, as described at § 80.48. Compensating adjustments for naturally-resulting variations in fuel parameters shall also be made using the complex model. The adjustment process is described in paragraph (d) of this section.

(d) The complex emission model described at § 80.45 shall be used to adjust the emission performance of addition and extension fuels to compensate for differences in fuel parameters other than the parameter being tested. Compensating adjustments for naturally-resulting variations in fuel parameters shall also be made using the complex model. These adjustments shall be calculated as follows:

(1) Determine the exhaust emissions performance of the actual addition or extension fuels relative to the exhaust emissions performance of Clean Air Act baseline fuel using the complex model. For addition fuels, set the level of the parameter being tested at baseline levels for purposes of emissions performance evaluation using the complex model. For extension fuel #1, set the level of the parameter being extended at the level specified in extension fuel #2. Also determine the exhaust emissions performance of the addition fuels specified in paragraph (a)(1) of this section with the level of the parameter being tested set at baseline levels.

(2) Calculate adjustment factors for each addition fuel as follows:

(i) Adjustment factors shall be calculated using the formula:

$$A = \frac{[1 + (P(\text{actual})/100)]}{[1 + (P(\textit{nominal})/100)]}$$

where

A = the adjustment factor
P(actual) = the performance of the actual fuel used in testing according to the complex model
P(nominal) = the performance that would have been achieved by the test fuel defined in paragraph (a)(1) of this section according to the complex model (as described in paragraph (d)(1) of this section).

(ii) Adjustment factors shall be calculated for each pollutant and for each emitter class.

(3) Multiply the measured emissions from each vehicle by the corresponding adjustment factor for the appropriate addition or extension fuel, pollutant, and emitter class. Use the resulting adjusted emissions to conduct all modeling and emission effect estimation activities described in § 80.48.

(e) All fuels included in vehicle testing programs shall have an octane number of 87.5, as measured by the (R+M)/2 method following the ASTM D4814 procedures, to within the measurement and blending tolerances specified in paragraph (c) of this section.

(f) A single batch of each addition or extension fuel shall be used throughout the duration of the testing program.

[59 FR 7813, Feb. 16, 1994, as amended at 59 FR 36962, July 20, 1994; 71 FR 74567, Dec. 15, 2005]

§ 80.50   General test procedure requirements for augmentation of the emission models.

(a) The following test procedure must be followed when testing to augment the complex emission model described at § 80.45.

(1) VOC, NO$_X$, CO, and CO$_2$ emissions must be measured for all fuel-vehicle combinations tested.

(2) Toxics emissions must be measured when testing the extension fuels per the requirements of § 80.49(b) or when testing addition fuels 1, 2, or 3 per the requirements of § 80.49(a).

(3) When testing addition fuels 4, 5, 6, and 7 per the requirements of § 80.49(a), toxics emissions need not be measured. However, EPA reserves the right to require the inclusion of such measurements in the test program prior to approval of the test program if evidence exists which suggests that adverse interactive effects of the parameter in question may exist for toxics emissions.

(b) The general requirements per 40 CFR 86.130–96 shall be met.

(c) The engine starting and restarting procedures per 40 CFR 86.136–90 shall be followed.

(d) Except as provided for at § 80.59, general preparation of vehicles being

tested shall follow procedures detailed in 40 CFR 86.130–96 and 86.131–96.

[59 FR 7813, Feb. 16, 1994, as amended at 71 FR 74567, Dec. 15, 2005]

§ 80.51 Vehicle test procedures.

The test sequence applicable when augmenting the emission models through vehicle testing is as follows:

(a) Prepare vehicles per § 80.50.

(b) Initial preconditioning per § 80.52(a)(1). Vehicles shall be refueled randomly with the fuels required in § 80.49 when testing to augment the complex emission model.

(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 Acetelaldehyde 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, 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,