

does not meet the requirements of § 90.324(a), the test is void.

(d) Read and record the post-test data specified in § 90.405(e).

(e) For a valid test, the analyzer drift between the before-segment and after-segment span checks for each analyzer must meet the following requirements:

(1) The span drift (defined as the change in the difference between the zero response and the span response) may not exceed two percent of full-scale chart deflection for each range used.

(2) The zero response drift may not exceed two percent of full-scale chart deflection for each range used above 155 ppm (or ppm C), or three percent of full-scale chart deflection for each range below 155 ppm (or ppm C).

#### § 90.412 Data logging.

(a) A computer or any other automatic data collection (ADC) device(s) may be used as long as the system meets the requirements of this subpart.

(b) Determine from the data collection records the analyzer responses corresponding to the end of each mode.

(c) Record data at a minimum of rate of one Hz (one time per second).

(d) Determine the final value for power by averaging the individually calculated power points for each value of speed and torque recorded during the sampling period. As an alternative, the final value for power can be calculated from the average values for speed and torque, collected during the sampling period.

(e) Determine the final value for CO<sub>2</sub>, CO, HC, and NO<sub>x</sub> concentrations by averaging the concentration of each point taken during the sample period for each mode.

#### § 90.413 Exhaust sample procedure—gaseous components.

(a) *Automatic data collection equipment requirements.* The analyzer response may be read by automatic data collection (ADC) equipment such as computers, data loggers, and so forth. If ADC equipment is used, the following is required:

(1) For dilute grab (“bag”) sample analysis, the analyzer response must be stable at greater than 99 percent of the final reading for the dilute exhaust

sample. The ADC must store a single value representing the average chart deflection over a 10-second stabilized period. Alternatively, the ADC may store the individual instantaneous chart deflections collected over a 10-second stabilized period.

(2) For continuous analysis systems, the ADC must store a single value representing the average integrated concentration over a measurement period. Alternatively, the ADC may store the individual instantaneous values collected during the measurement period.

(3) The chart deflections or average integrated concentrations required in paragraphs (a)(1) and (a)(2) of this section may be stored on long-term computer storage devices such as computer tapes, storage discs, punch cards, or they may be printed in a listing for storage. In either case a chart recorder is not required and records from a chart recorder, if they exist, need not be stored.

(4) If ADC equipment is used to interpret analyzer values, the ADC equipment is subject to the calibration specifications of the analyzer as if the ADC equipment is part of analyzer system.

(b) Data records from any one or a combination of analyzers may be stored as chart recorder records.

(c) *Grab sample analysis.* For dilute grab sample analysis perform the following procedure:

(1) Calibrate analyzers using the procedure described in § 90.326.

(2) Record the most recent zero and span response as the pre-analysis values.

(3) Measure and record HC, CO, CO<sub>2</sub>, and NO<sub>x</sub> concentrations in the exhaust sample bag(s) and background sample bag(s) using the same flow rates and pressures.

(4) Good engineering practice dictates that exhaust emission sample bag analyzer readings below 15 percent of full scale should generally not be used.

(5) A post-analysis zero and span calibration check of each range must be performed and the values recorded. The number of events that may occur between the pre- and post-checks is not specified. However, the difference between pre-analysis zero and span values (recorded in paragraph (c)(2) or