

## Environmental Protection Agency

## § 86.1339-90

allowed to cool (naturally or forced) and the dynamometer test rerun per paragraph (a) or (b) of this section.

[58 FR 16065, Mar. 24, 1993, as amended at 59 FR 48533, Sept. 21, 1994; 60 FR 34375, June 30, 1995; 62 FR 47133, Sept. 5, 1997]

### § 86.1338-84 Emission measurement accuracy.

(a) *Measurement accuracy—Bag sampling.* (1) Good engineering practice dictates that exhaust emission sample analyzer readings below 15 percent of full scale chart deflection should generally not be used.

(2) Some high resolution read-out systems such as computers, data loggers, etc., can provide sufficient accuracy and resolution below 15 percent of full scale. Such systems may be used provided that additional calibrations of at least 4 non-zero nominally equally spaced points, using good engineering judgement, below 15 percent of full scale are made to ensure the accuracy of the calibration curves.

(3) The following procedure shall be followed:

(i) Span the analyzer using a calibration gas that meets the accuracy requirements of § 86.1314-84(f)(2), is within the operating range of the analyzer and at least 90% of full scale.

(ii) Generate calibration data over the full concentration range at a minimum of 6, approximately equally spaced, points (e.g. 15, 30, 45, 60, 75 and 90 percent of the range of concentrations provided by the gas divider). If a gas divider or blender is being used to calibrate the analyzer and the requirements of paragraph (a)(2) of this section are met, verify that a second calibration gas with a concentration between 10 and 20 percent of full scale can be named within 2 percent of its certified concentration. If more calibration points are needed to meet the requirements of paragraph (a)(2) of this section, continue with paragraph (a)(3)(iii) of this section.

(iii) If a gas divider or blender is being used to calibrate the analyzer, input the value of a second calibration gas (a span gas may be used for calibrating a CO<sub>2</sub> analyzer) having a named concentration between 10 and 20 percent of full scale. This gas shall be included on the calibration curve. Con-

tinue adding calibration points by dividing this gas until the requirements of paragraph (a)(2) of this section are met.

(iv) Fit a calibration curve per §§ 86.1321 through 86.1324 for the full scale range of the analyzer using the calibration data obtained with both calibration gases.

(b) *Measurement accuracy—Continuous sampling.* (1) Analyzers used for continuous analysis must be operated such that the measured concentration falls between 15 and 100 percent of full scale chart deflection. Exceptions to these limits are:

(i) Analyzer response less than 15 percent or more than 100 percent of full scale may be used if automatic range change circuitry is used and the limits for range changes are between 15 and 100 percent of full scale chart deflection;

(ii) Analyzer response less than 15 percent of full scale may be used if one of the following is true:

(A) Alternative (a)(2) of this section is used to ensure that the accuracy of the calibration curve is maintained below 15 percent; or

(B) The full scale value of the range is 155 ppm (C) or less.

(iii) Analyzer response over 100% of full scale may be used if it can be shown that readings in this range are accurate.

(iv) The HC and CO readings are allowed to "spike" above full scale of the analyzer's maximum operating range for a maximum accumulation of 5 seconds. These analyzer readings shall default to the maximum readable value during this time.

(c) If a gas divider is used, the gas divider shall conform to the accuracy requirements specified in § 86.1314-84(g), and shall be used according to the procedures contained in (a) and (b) of this section.

[62 FR 47133, Sept. 5, 1997]

### § 86.1339-90 Particulate filter handling and weighing.

(a) At least 1 hour before the test, place a filter pair in a closed (to eliminate dust contamination) but unsealed (to permit humidity exchange) petri dish and place in a weighing chamber

meeting the specifications of § 86.1312 for stabilization.

(b) At the end of the stabilization period, weigh each filter pair on a balance having a precision of 20 micrograms and a readability of 10 micrograms. This reading is the tare weight of the filter pair and must be recorded (see § 86.1344(e)(18)).

(c) The filter pair shall then be stored in a covered petri dish or a sealed filter holder, either of which shall remain in the weighing chamber until needed for testing.

(d) If the filter pair is not used within 1 hour of its removal from the weighing chamber, it must be re-weighed before use. This limit of 1 hour may be replaced by an 8-hour limit if either of the following three conditions are met:

(1) A stabilized filter pair is placed and kept in a sealed filter holder assembly with the ends plugged; or

(2) A stabilized filter pair is placed in a sealed filter holder assembly, which is then immediately placed in a sample line through which there is no flow; or

(3) A combination of the conditions specified in paragraphs (d) (1) and (2) of this section.

(e) After the emissions test, remove the filters from the filter holder and place them face to face in a covered but unsealed petri dish. They must then be conditioned in the weighing chamber for at least one hour. The filters are then weighed as a pair. This reading is the gross weight of the filters (Pf) and must be recorded (see § 86.1344-90(e)(19)).

(f) The net particulate weight (Pf) on each filter pair is the gross weight minus the tare weight. Should the sample on the filters (exhaust or background) contact the petri dish or any other surface, the test is void and must be rerun.

(g) Static neutralizers shall be used on petri dishes in accordance with good engineering judgement.

[62 FR 47134, Sept. 5, 1997]

**§ 86.1340-90 Exhaust sample analysis.**

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

(1) For bag analysis, the analyzer response must be stable at greater than 99 percent of the final reading for the dilute exhaust sample bag. A single value representing the average chart deflection over a 10-second stabilized period shall be stored. For the background bag, all readings taken during the 10-second interval must be stable at the final value to within  $\pm 1$  percent of full scale.

(2) For continuous analysis systems, the ADC system must read at least two analyzer readings per second. A single value representing the average integrated concentration over a cycle shall be stored.

(3) The chart deflections or average integrated concentrations required in paragraphs (a) (1) and (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 the data from ADC equipment is used as permanent records, the ADC equipment and the analyzer values as interpreted by the ADC equipment are subject to the calibration specifications in §§ 86.1316 through 86.1326, as if the ADC equipment were part of the analyzer.

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

(c) *Software zero and span.* (1) The use of "software" zero and span is permitted. The process of software zero and span refers to the technique of initially adjusting the analyzer zero and span responses to the calibration curve values, but for subsequent zero and span checks the analyzer response is simply recorded without adjusting the analyzer gain. The observed analyzer response recorded from the subsequent check is mathematically corrected back to the calibration curve values for zero and span. The same mathematical correction is then applied to the analyzer's response to a sample of exhaust gas in order to compute the true sample concentration.

(2) The maximum amount of software zero and span mathematical correction