(ii) FIDppm=FID reading in ppmC.

(iii) SAMppm=methanol concentration in the sample bag, or gas bottle, in ppmC. SAMppm for sample bags:

$$= \frac{0.02406 \times \text{Fuel injected} \times \text{Fuel density}}{\text{Air volume} \times \text{Mol. Wt. } CH_3OH}$$

Where:

(iv) 0.02406=volume of one mole at 29.92 in Hg and 68 °F, m^3.

(v) Fuel injected = volume of methanol injected, ml.

(vi) Fuel density=density of methanol, 0.7914 g/ml.

(vii) Air volume=volume of zero-grade air, m^3.

(viii) Mol. Wt. CH3OH=32.04.

(d) *FID response factor to methane.* When the FID analyzer is to be used for the analysis of natural gas-fueled vehicle hydrocarbon samples, the methane response factor of the analyzer shall be established. To determine the total hydrocarbon FID response to methane, known methane in air concentrations traceable to National Institute of Standards and Technology (NIST) shall be analyzed by the FID. Several methane concentrations shall be analyzed by the FID in the range of concentrations in the exhaust sample. The total hydrocarbon FID response to methane is calculated as follows:

r_{CH4}=FIDppm/SAMppm

Where:

(1) r_{CH4}=FID response factor to methane.

(2) FIDppm=FID reading in ppmC.

(3) SAMppm=the known methane concentration in ppmC.

[59 FR 48531, Sept. 21, 1994, as amended at 60 FR 34371, June 30, 1995; 62 FR 47128, Sept. 5, 1997; 70 FR 40438, July 13, 2005]

§ 86.1322–84 Carbon monoxide analyzer calibration.

The NDIR carbon monoxide analyzer shall receive the following initial and periodic calibration.

(a) *Initial and periodic interference check.* Prior to its introduction into service and annually thereafter, the NDIR carbon monoxide analyzer shall be checked for response to water vapor and CO_2:

(1) Follow good engineering practices for instrument start-up and operation. Adjust the analyzer to optimize performance on the most sensitive range to be used.

(2) Zero the carbon monoxide analyzer with either zero-grade air or zero-grade nitrogen.

(3) Bubble a mixture of 3 percent CO_2 in N_2 through water at room temperature and record analyzer response.

(4) An analyzer response of more than 1 percent of full scale for ranges above 300 ppm full scale or more than 3 ppm on ranges below 300 ppm full scale requires corrective action. (Use of conditioning columns is one form of corrective action which may be taken.)

(b) *Initial and periodic calibration.* Prior to its introduction into service and monthly thereafter, the NDIR carbon monoxide analyzer shall be calibrated.

(1) Adjust the analyzer to optimize performance.

(2) Zero the carbon monoxide analyzer with either zero-grade air or zero-grade nitrogen.

(3) Calibrate on each used operating range with a minimum of 6, approximately equally spaced, carbon monoxide-in-N_2 calibration gases (e.g., 15, 30, 45, 60, 75, and 90 percent of that range). For each range calibrated, if the deviation from a least-squares best-fit straight line is within ±2 percent of the value at each non-zero data point and within ±0.3 percent of full scale on the zero data point, then concentration values may be calculated by using the linear calibration equation for that range. If the deviation exceeds these limits, then the best-fit not-linear equation which represents the data within these limits shall be used to determine concentration values.

(c) The initial and periodic interference, system check, and calibration test procedures specified in 40 CFR part 86, subpart D may be used in lieu of the procedures specified in this section.

[48 FR 52210, Nov. 16, 1983, as amended at 62 FR 47128, Sept. 5, 1997]

§ 86.1323–84 Oxides of nitrogen analyzer calibration.

The chemiluminescent oxides of nitrogen analyzer shall receive the following initial and periodic calibration.