

SUMMARY TABLE OF QA/QC—Continued

Status	Process or element	QA/QC specification	Acceptance criteria	Checking frequency	Suggested corrective action
M-A ³	Alternative Data Quality Check.	Dynamic spike	> 5 1-min avgs. with average 100 ±5% recovery for pretest and 100 ±10% for post-test or ≤0.2 ppmv. See section 12.3 for equation.	Before and after each test & in place of pre- and post-run sampling system bias tests and interference check.	Redo after correcting problem, retest.
M-A	Data Quality Assessment Using Dynamic spike Recovery data.	Calculate upper and lower uncertainty limits for each test using the mean measured data, and converter efficiency and the largest (and smallest) spike recovery.	See section 12.6.2 for equations and conditions.	Each test.	

¹ S = Suggested.² M = Mandatory.³ A = * * *.

10.0 Calibration and Standardization

What Measurement System Calibrations Are Required?

10.1 Initial Analyzer Calibration. You may introduce the calibration gases in any sequence. Make all necessary adjustments to calibrate the gas analyzer and data recorder. If your analyzer measures NO and NO₂ separately, then you must use both NO and NO₂ calibration gases. You may use a non-linear calibration curve to convert your gas analyzer's response to the equivalent gas concentration. However, you must establish the non-linear calibration curve before conducting the analyzer calibration error test. If you use a non-linear calibration curve, you must use it for all sample and calibration measurements. You must also include a copy of the manufacturer's certification of the calibration gases which include the 13 documentation requirements in the EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards, September 1997, as amended August 25, 1999 (<http://www.epa.gov/ttn/emc/>) as part of the test report. Then you must pass the analyzer calibration error check. In addition, unless you follow the alternative dynamic spiking option, you must pass the sampling system bias test before you start measurements.

11.0 Analytical Procedures

Because sample collection and analysis are performed together (see section 8), additional discussion of the analytical procedure is not necessary.

12.0 Calculations and Data Analysis

12.1 Nomenclature. The terms used in the equations are defined as follows:

B = Sampling system bias.

B_{WS} = Moisture content of sample gas as measured with Method 4 or other approved method, percent/100.

C_{adj} = Pollutant concentration corrected to 15 percent O₂ ppmv.

C_d = Pollutant or diluent concentration adjusted to dry conditions, ppmv or percent.

C_{dir} = Direct calibration concentration (ppmv) of a calibration gas, dry basis, reported by gas analyzer.

C_h = Concentration (ppmv) corresponding to the emission standard (determined in section 12.1.1).

C_s = System calibration concentration (ppmv) of a calibration gas, dry basis, reported by gas analyzer.

C_v = Manufacturer certified concentration (ppmv) of a calibration gas, dry basis.

C_w = Pollutant or diluent concentration measured under moist sample conditions, ppmv, percent, or ng/sm³ (lb/scf).

%CO₂ = Measured CO₂ concentration measured, dry basis, percent.

%CO_{2w} = Measured CO₂ concentration measured on a moist sample basis, percent.

DF = Dilution factor of the spike gas; this value shall be ≥10.

E = Mass emission rate of pollutant per gross calorific value of the fuel from Method 19, ng/J (lb/10⁶ Btu).

Eff_{NO2} = NO₂ to NO converter efficiency.

F_c = Ratio of the volume of carbon dioxide produced to the gross calorific value of the fuel from Method 19, dsm³/J (dscf/10⁶ Btu).

F_d = Ratio of the volume of dry effluent gas to the gross calorific value of the fuel from Method 19, dsm³/J (dscf/10⁶ Btu).

F_o = Fuel factor based on the ratio of oxygen volume to the ultimate CO₂ volume produced by the fuel at zero percent excess air, dimensionless.

GCV = Gross calorific value of the fuel consistent with the ultimate analysis, kJ/kg (Btu/lb).

K = Conversion factor.

M = Mass of NO_x.

%O₂ = Measured O₂ concentration dry basis, percent.

SF_{6(dir)} = SF₆ (or tracer gas) concentration measured directly in undiluted spike gas.

SF_{6(spk)} = Diluted SF₆ (or tracer gas) concentration measured in a spiked sample.

Spike_{dir} = Concentration of NO_x in the spike standard measured in direct calibration mode.

X_{CO2} = CO₂ correction factor, percent.

0.209 = Fraction of air that is oxygen, percent/100.

5.9 = 20.9 percent O₂ – 15 percent O₂, the defined O₂ correction value, percent.

12.1.1 Concentration equivalent of the emission standard. *What if my emission standard is not in units of concentration?*

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