

Gasmeter™ in emissions monitoring – applications:

Stack testing according to USEPA methods

Stack testing

US EPA has two stack testing methods for FTIR (Fourier Transform Infrared) - spectroscopy. Method 320 is an FTIR method for measuring wide range of organic and inorganic pollutants from stack. Method 321 is a specific version for measuring HCl at Portland cement plants. These methods define a QA/QC process to verify the accuracy of the results. The requirements for analytical equipment and software are defined on 40 CFR Part 60 Appendix B Performance Specification 15. **Gasmeter™** analyzers and **Calcmeter™** software have been designed to take the requirements of this performance specification into account.



The Gasmeter – solution:

The Portable Gasmeter Measuring System has been designed with the most demanding stack testing applications in mind. It consists of Gasmeter DX4000 – gas analyzer, Gasmeter Portable Sampling Unit, Portable probe, heated sample gas lines and a laptop PC.

All parts in contact with the sample are heated to 180 °C in order to avoid condensation.

Typical analytical procedure to complete method 320 / 321 test

From paper by Maxwell Lee and John B. Koogler: Gas Emissions Testing By EPA Methods 320: Procedures And Results, Florida Section of the Air and Waste Management Association on Sept. 7-9, 2003

PRE-TEST

- 1) Background spectrum
 - *Evaluate diagnostics of the instrumentation*
- 2) Baseline (cylinder UHP-N₂) (i.e. zero check)
 - *Determine the level of background noise*
 - *Observe spectrum for baseline tilt, i.e., indicates vibrations/perturbations affecting instrument*
- 3) Calibration Transfer Standard (cylinder 100-ppm ethylene, i.e. span check)
 - *Determine level of response to inert gas (e.g., C₄H₁₀) to evaluate the spectral response and stability of the instrument.*
- 4) Direct analyte measure (e.g. cylinder 50-ppm HCl)
 - *Create a field Reference Spectrum*
- 5) Baseline
 - *Note baseline flush/clean out FTIR sample cell*
 - *Observe spectrum for baseline tilt*
- 6) Spectra of stack gas
 - *Determine approximate stack gas analyte concentration*
- 7) Optional - 3 Spectra of QA-spike gas and makeup of UHP-N₂
 - *Create field Reference Spectrum of analyte at approx. stack gas concentration*
- 8) Optional - 3 Spectra of QA-spike gas and makeup of ambient air (typical moisture 1-2%)
 - *Determine potential interference from low moisture*
- 9) Baseline
- 10) 3 Spectra of QA-spike gas
 - *Ensure acceptable analyte recovery*

TEST - Run 1, 2, and 3 (repeat each run)

- 1) Baseline
- 2) 10 sequential spectra of stack gas (typical averaging time is 3 minutes)
- 3) Baseline
- 4) 3 Spectra of QA-spiked stack gas
 - *must indicate ±30 percent expected recovery*

POST-TEST

- 1) Baseline
- 2) Calibration Transfer Standard (i.e span check)
- 3) Direct analyte measure
- 4) Baseline