GASMET™ DX-4000SYS

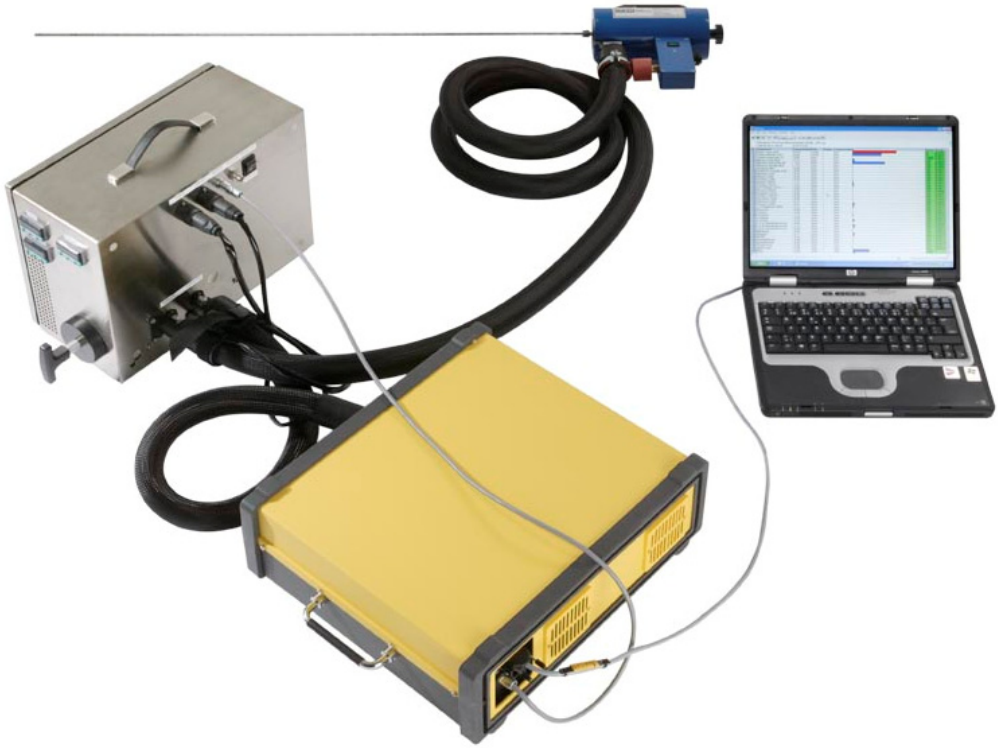
Reciprocating Internal Combustion Engines (RICE)
ASTM 6348 / EPA 320 Test Applications

On February 25, 2009, the Environmental Protection Agency (EPA) proposed national emission standards for hazardous air pollutants (NESHAP) for stationary reciprocating internal combustion engines (RICE) that are not already covered by earlier EPA regulations. The proposed rule under 40CFR63 subpart ZZZZ (***Quad Z***) would reduce emissions of a number of toxic air pollutants including: formaldehyde, benzene and acrolein. This rule would set emissions limits for engines that:

- have a site rating of less than or equal to 500 horsepower & are located at major sources of air toxics emissions & were constructed or reconstructed before June 12, 2006.
- have a site rating of greater than 500 horsepower, are located at major sources of air toxics emissions, and were constructed or reconstructed before December 19, 2002.

Quad Z requires use of FTIR reference methods (ASTM 6348 or EPA Method 320) for determination of the Formaldehyde (CH2O) emission rate, Water Vapor (H2O) volume percent and Carbon Monoxide (CO) concentrations. Conditional Test Method 323 (Acetyl Acetone Derivitization Method) will not be allowed.

The **Gasmet-USA DX-4000SYS** FTIR gas analyzing system is specifically designed for ***Quad Z*** measurements, utilizing the proven Gasmet technologies. The system includes a heated probe/filter, extruded silicon foam insulated heated sample line and a sampling system which provides all pneumatic connections and flow controllers for both reference methods. The Gasmet DX-4000 and the patented Calcmet CLS spectral software allow for Parts Per Billion (PPB) detection levels. All sales, service and support for the **Gasmet–USA DX-4000SYS** is provided by Gasmet-USA in Austin, Texas. Gasmet-USA has been supplying Gasmet FTIR gas analyzing systems since 1998. Please contact us for our extensive list of satisfied customers.



Typical Analytical Procedure
EPA Method 320 / ASTM 6348 Test

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*
   - *Measure Sample Flow Rate*
3) Calibration Transfer Standard (CTS) (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 10-ppm CH2O)
   - *Determine system bias and Upscale Response Time (may be used as CTS)*
5) Baseline
   - *Determine system bias and Downscale Response Time, MDC#1, MDC#2, MAU etc.*
   - *Note baseline flush/clean out FTIR sample cell*
6) Spectra of stack gas (minimum 3 x Response Time)
   - *Determine stack gas analytes concentration*
7) Field Reference Spike gas and makeup of UHP-N2 (minimum 3 x Response Time)
   - *Optional*
   - *Create field Reference Spectrum of analyte at approx. stack gas concentration*
   - *Requires 10:1 Dilution*
8) Spectra of Stack Gas and QA-spike gas
   - *Ensure acceptable analytes recovery*

TEST Runs 1, 2, and 3

1) Baseline
2) 5 sequential spectra of stack gas
   - Exclude 3 x response time
3) 3 Spectra of QA-spiked stack gas
4) 5 sequential spectra of stack gas

POST-TEST

1. Baseline
2. Calibration Transfer Standard