Emissions monitoring

The GASMET is an advanced gas analyzer, which is configured to match current and future requirements in emission monitoring. The GASMET provides outstanding performance in multicomponent analysis. It can rapidly and accurately measure the pollutant concentrations from the stacks of incinerator plants, turbines, or just from a diesel engines.

Both the *GASMET Cx-4000* and the *Ce-3000* feature:

- ◊ real time continuous measuring
- ◊ the measurement of the most typical stack gas components (CO, CO_2, CH_4, SO_2, NO, NO_2, N_2O)
- ◊ as well as simultaneous measurement of H_2O, HCl, HF, NH_3, COS, HCN and many more …
- ◊ typical measurement of hot and wet sample gas in 180 °C temperature
- ◊ 100% gold plated sample cell and materials that are highly resistant against corrosive compounds

FT-IR

METHOD DESCRIPTION

The GASMET operation is based on the property of polyatomic gas molecules to absorb infrared radiation. Each gas absorbs infrared radiation at characteristic frequencies (i.e. wavelengths) which provides a means to identify different species from a gas mixture. Absorption intensity is dependent on the gas concentration which makes quantitative analysis possible. Thus the infrared spectrum of the gas sample provides information for both qualitative and quantitative analysis. The FT-IR (Fourier Transform Infrared) spectrometer of the GASMET gas analyzer

The GASMET has a library of FT-IR spectra of calibration gases stored on its hard disk. These single component calibration spectra are used to analyze the measured sample spectra. Quantitative analysis is fully automated. Once the library is set up, the operator only needs to select the gas components to be measured. Analysis results are then shown on the display, stored onto the hard disk or transferred via RS-232 port or analog output board to external data systems.

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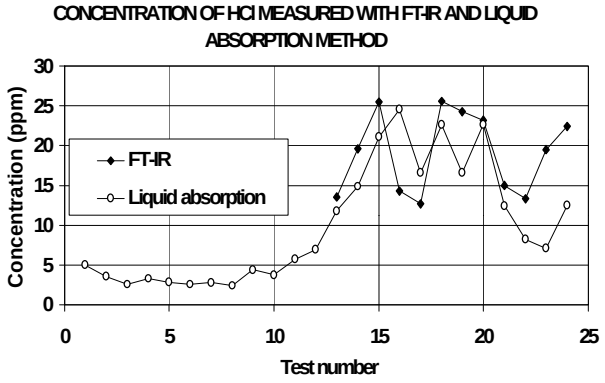

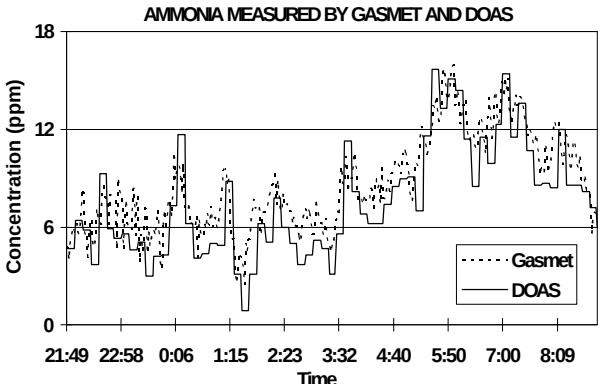

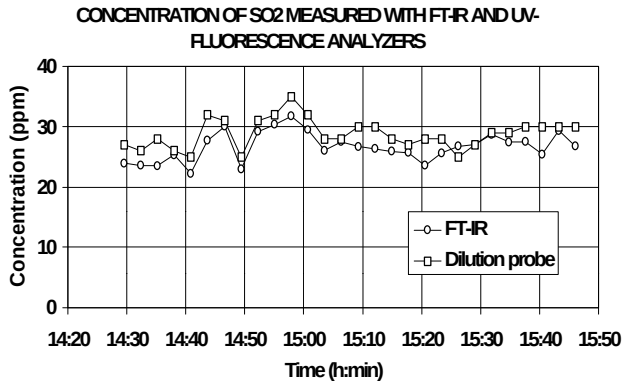

Municipal Waste Incineration

Combustion of municipal waste can result in low hydrochloric acid emissions. GASMET can be easily configured to measure HCl in addition to the criteria pollutants. The figure illustrates a comparison of measured HCl concentrations between FT-IR and liquid absorption methods. The average HCl concentration during one week monitoring period measured by the liquid absorption method was 16.3 mg/m3 compared to the 19.3 mg/m3 measured by the GASMET gas analyser. This indicates that GASMET can give results consistent with approved analysis methods for low levels of HCl in high humidity flue gases over extended periods of time.

Ammonia DE-NOx

Nitrogen oxides in combustion gases can be reduced by ammonia injection. Excessive injection can result in elevated operating cost, and undesired emissions. Continuous monitoring of ammonia can give valuable feedback for the injection control and provide data for emissions reporting. The figure shows a comparison of continuous ammonia measurement between GASMET and DOAS analysers. DOAS instrument measured the stack gas through the duct and GASMET used wet extractive sampling at 180 °C temperature. Despite different sampling methods and low concentrations, the results from the two different analysers correlate well.

SO_2 Monitoring

Sulfur dioxide is one of the most important pollutants to be continuously monitored in the gaseous emissions of electric utilities and industrial boilers. The figure displays the concentrations of sulfur dioxide in saturated stack gas measured by GASMET and in parallel by UV-fluorescence analyser. The average relative difference between the results was approximately 8 % at 28 mg/m3 concentration level. The figure shows that GASMET gives accurate results at low SO_2 concentrations comparable to approved measurement methods.

TABLE: Some examples of available components and calibration ranges

compound	low concentration range	medium concentration range	high concentration range
Nitric oxide NO	0-200 mg/m^3	0-400 mg/m^3	5000 mg/m^3
Nitrogen dioxide NO_2	0-50 mg/m^3	0-150 mg/m^3	5000 mg/m^3
Nitrous oxide N_2O	0-20 mg/m^3	0-150 mg/m^3	5000 mg/m^3
Sulfur dioxide SO_2	0-75 mg/m^3	0-300 mg/m^3	5000 mg/m^3
Ammonia NH_3	0-15 mg/m^3	0-75 mg/m^3	500 mg/m^3
Hydrogen chloride HCl	0-15 mg/m^3	0-75 mg/m^3	1000 mg/m^3
Hydrogen fluoride HF	0-20 mg/m^3	0-75 mg/m^3	500 mg/m^3
Methane CH_4	0-75 mg/m^3	0-200 mg/m^3	5000 mg/m^3
Carbon monoxide CO	0-75 mg/m^3	0-300 mg/m^3	10 000 mg/m^3
Carbon dioxide CO_2	0-20 vol-%	0-20 vol-%	0-35 vol-%
Water H_2O	0-25 vol-%	0-35 vol-%	0-60 vol-%

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