Solutions for Industrial Gas Monitoring Applications

Gasmet Technologies is a Finnish high technology company that develops and manufacturers the Gasmet™ line of gas monitoring systems. The first generation of Gasmet™ gas analyzers were introduced in 1993 and since then the success has continued with a stream of new and innovative products, including the unique Gasmet™ In Situ.

The Gasmet™ analyzers use state-of-the-art analysis methods such as Fourier Transform Infrared (FTIR) Spectroscopy, UV – fluorescence and Tunable Diode Laser technology (TDL). This ensures accurate and reproducible results - making the Gasmet™ analyzers ideal for demanding industrial and environmental applications.

The Gasmet™ FTIR analyzers can perform simultaneous measurement of both organic and inorganic compounds, as well as analyze hot, wet and corrosive gas streams. Concentrations of up to 50 different compounds can be measured within seconds. A corrosion resistant sample cell is heated up to a temperature of 180°C, eliminating the need for a complicated sample dilution or water vapour removal system. Measurement capabilities range from ppb’s up to percent levels.

Each Gasmet™ analysis system is constructed to meet the requirements of the particular measurement task; great care is paid in specifying the correct sampling system, analysis settings etc. in order to ensure, that the required performance criteria are met. Gasmet Technologies has also specialized in supplying gas analysis systems for applications, where traditional analyzers cannot perform reliably.

The Gasmet™ product range features both fixed and portable models that cater to a wide range of applications. Typical examples include continuous emissions monitoring in power plants, waste incinerators and cement kilns, comparison measurements to validate existing CEMS according to EN-directives and process control of fertilizer production plants. In addition, the new Gasmet™ CMM (Continuous Mercury Monitor) provides an innovative solution for trace mercury analysis in flue gas.

The Gasmet™ analyzers are built to meet the standards of the most stringent of certifications, including TÜV (17th Implementing Order) and MCERTS. Gasmet Technologies has also adopted the ISO 9001 Quality Management System. The Gasmet™ analyzers are sold and supported through a global distributor network that covers all continents.
The Gasmet™ Range

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Portable analyzers for demanding measurements:

**On-Site**

The Dx series analyzers are designed for mobility and they can be used in a variety of different measurements. For applications where high temperatures and high water content is to be expected, e.g. in flue gas monitoring, the Gasmet™ On-Site analyzers can be coupled with the Gasmet™ portable sampling system to form a complete portable monitoring system.

The Dx series analyzers are operated with an external laptop that runs the Calcmet™ software. This easy to use program both controls the analyzer and performs the actual analysis of the sample spectra, producing the quantitative results. The new Dx-4030 features as standard a PDA (Portable Digital Assistant) based user interface, which takes user friendliness to a whole new level.

**Gasmet™ Dx-4000** analyzers are typically used in stack emissions monitoring, catalytic process control and in a variety of different applications where multiple gas compounds need to be accurately monitored on-site.

**Gasmet™ Dx-4015** is an ideal tool for ambient air measurements in applications such as industrial air quality monitoring and occupational health measurements. The backpack mounted Dx-4030 has been specifically designed for emergency response situations after incidents involving releases of toxic chemical compounds.

**Gasmet™ ON-SITE SERIES**
- 390 x 164 x 445 mm
- weight 14 kg
- portable, rugged construction
- 12 VDC or 100–250 VAC
Complete Continuous Emissions Monitoring System

On-Line

The Gasmet™ Cx series features 19” rack mounted analyzers for quality & process control and continuous emission monitoring applications. When connected with the Gasmet™ Sampling system, Gasmet™ Industrial Computer and the Gasmet™ Oxygen analyzer it forms a complete Continuous Emissions Measurement System (CEMS).

The Gasmet™ Cx series FTIR gas analyzers are operated by an external industrial computer that runs the Calcmet™ -software, which both controls the analyzer and produces the concentration results. The Gasmet™ Cx series has received the TÜV (17th BImSchV) and MCERTS certificates and offers proven solutions for demanding measurement needs.

The capabilities of the Gasmet™ CEMS can be extended further with the new Gasmet™ CMM (Continuous Mercury Monitor). This analyzer is designed to meet the future requirements for continuous mercury monitoring in power plants & waste incinerators (e.g. U.S. EPA PS-12A and/or Part 75 provisions.)

In addition, the Gasmet™ Cx-4000 can now be optionally equipped with a built-in Tunable Diode Laser – module, which allows oxygen concentration to be measured with great accuracy and makes a separate O2 analyzer redundant. (available from 2007)

Gasmet™ Cx-4000 analyzers are typically used in continuous emissions monitoring, process control and other applications where multiple gas compounds need to be monitored in hot and wet sample gas.

Gasmet™ Cx-4015 analyzer is designed to be used for continuous ambient air measurements in applications such as industrial air quality monitoring and occupational health measurements.

Gasmet™ FCX is a special version that combines the CX-series analyzer, an industrial computer and a TFT - display into a durable IP-65 class enclosure.
The Cx series analyzers are operated by an external industrial computer that runs the Calcmet™ software, which both controls the analyzer and produces the concentration results.

**Gasmet™ CEMS**
- $800 \times 2500 \times 800$ mm
- Weight approx. 350 kg depending on model
- IP54 enclosure
INTRODUCING
an in-situ
FTIR gas analyzer.

Gasmet™

Continuous Gas Analysis

In-Situ

The Gasmet™ In-Situ combines the benefits of in-situ – design with the advanced analysis capabilities of an FTIR spectrometer. When compared with traditional in-situ analyzers, the Gasmet™ In-Situ excels both in terms of analysis performance, calibration stability and in the ease of maintenance. The Gasmet™ In-Situ analyzer offers a cost-effective alternative to extractive systems in continuous emissions & process monitoring applications where multiple gas compounds need to be monitored with great accuracy.

The Gasmet™ In-Situ incorporates a Fourier Transform Infrared spectrometer, a sample cell which is directly inserted into the sample gas flow, and signal processing electronics in a compact package. This analyzer is fully equipped for fixed installations and it offers versatility and high performance for a wide range of different applications.

Gasmet™ IN-SITU
- 1018 x 390 x 250 mm
- weight 30 kg
- 100–250 VAC
State-of-the-art Instrumentation for High Sensitivity Gas Analysis

In-Lab

The Cr series are analyzers for high sensitivity, high speed gas analysis. They are especially suitable for engine exhaust measurements, combustion research and other demanding research applications. The Cr series analyzers provide short response times and excellent specificity.

The Cr series analyzers, just like the other Gasmet™ analyzers, are factory calibrated to exact customer specification. Moreover, the calibrations are based on a physical constant – the absorption coefficient of a gas compound. Thus calibrations are constant over many years and no expensive span calibration gases are needed.

Measurement ranges vary from sub ppm’s up to vol-% level. For greater sensitivity, the Cr series can be fitted with a 100 meter sample cell. The detection limits of the Gasmet™ Cr-100m analyzer are as low as 10 ppb (parts per billion). Applications for the Cr-100m include quality control in high purity gas manufacturing and industrial hygiene measurements.

**Gasmet™ Cr-1000**
- 512 x 473 x 311 mm
- weight 22 kg
- Liquid nitrogen cooled detector
- 100–250 VAC

**Gasmet™ Cr-100m**
- 1225 x 450 x 311 mm
- weight 45 kg
- Liquid nitrogen cooled detector
- 100–250 VAC
Each Gasmet™ analyzer is carefully assembled at Gasmet Technologies, and individually calibrated and tested before shipping.
The key advantages of Gasmet™ FTIR gas analyzers include multicomponent analysis capability, good sensitivity, excellent specificity, speed and simplicity of calibration. An FTIR spectrometer is an instrument that measures the qualitative and quantitative infrared spectrum and provides information about the molecules present in a given sample.

1. **Signal processing electronics** utilizing DSP (Digital Signal Processor) technology for high speed data collection.

2. **The GICCOR Interferometer** is the most reliable interferometer on the market today. During the manufacturing process, each interferometer must pass extensive shock and temperature stability tests (± 20°C) without any decrease in modulation. The rugged Interferometer exceeds military vibration standards (mil-std-810c, part f).

3. **Long lifetime He-Ne laser** for wavenumber precision and accuracy.

4. **A high temperature gas cell** with no moving parts gives superior mechanical stability. All parts that are in contact with the sample gas are Gold or Rhodium coated for optimum corrosion resistance. Fixed path lengths for accuracy and reliability from 1 cm up to 100m.

5. **The Gold coated one-piece cell mirror** is precision machined by diamond cutting to provide excellent long term calibration stability.

6. **Temperature controlled, low noise MCT detector** provides excellent sensitivity.
The Fourier Transform Infrared (FTIR) principle.

1. Infrared source
2. Broad band IR radiation
3. Interferometer
4. Modulated IR radiation
5. Sample cell
6. Transmitted IR radiation
7. Detector
8. Measured signal
9. Signal & data processing

- MCT detector
- HeNe laser
- Sample cell
- Sample cell mirror
- GICCOR interferometer
- Signal processing electronics
THE ADVANCED, easy-to-use Calcmet™ software provides outstanding analytical performance.

From Spectrum to Results:

Calcmet™

All Gasmet™ FTIR analyzers come standard equipped with the Calcmet™ software. The Calcmet™ software analyzes the sample spectrum using sophisticated and patent protected multicomponent algorithms. The Calcmet™ is capable of simultaneous detection, identification and quantification of up to 50 different gas components. The software is also designed for easy and efficient processing of the results. Since water content of the sample gas is measured, the results can be reported on either “wet” or “dry” basis.

The Calcmet™ FTIR analyzers measure both organic and inorganic gases in concentrations from low ppm’s up to several percents. Cross-interference effects are automatically compensated for and analysis accuracy is maintained even when analyzing complex gas mixtures with spectral overlapping.

Accurate results are available within seconds. Since the sample spectra are stored as separate files on an external computer, they can be easily re-analyzed with different analysis settings even after several years. The Calcmet™ software also allows the identification of previously unknown components – a feature that has often shown its value in process control, for example.

Spectral analysis is fully automated. Analysis results can be displayed as trends.
IR spectrum contains all information of the sample gas for identification and quantitation. All analyzer parameters are stored together with the spectrum.