

OMEGA 5

● The Versatile Gas Analyzer

Innovation with Integrity

Gas Analysis

OMEGA 5 is a compact FT-IR gas analysis system in a 19 inch rack-mount box equipped with a 5 m multi-reflection gas cell for the measurement of industrial gases. It is designed for automated, high-precision and real-time monitoring of gas concentrations in many different applications. Overall cost of operation and maintenance is low due to the durability of the various components such as the interferometer, IR-source and diode laser.

Integrated Multi-Reflection Gas Cell

The OMEGA 5 gas analyzer is equipped with a multi-reflection gas cell of 5 m optical path length. The design of the gas cell is optimized for a high optical throughput to enable the quantification of gas compounds even in very low concentrations in the ppb range. The nickel-plated gas cell and gold mirrors enable the measurement of corrosive gases. Pressure and temperature of the target gas are automatically displayed and applied for the quantification within the control software OPUS GA.

Outstanding Stability in a Compact Design

OMEGA 5 is based on the industry-proven RockSolid™ interferometer which is designed to consistently produce high-quality results with outstanding stability. The spectrometer is mounted in a compact 19 inch rack-mount box, which allows for an easy integration in many industrial, scientific and even mobile applications.

The optics of OMEGA 5 is sealed and purgeable, which enables to constantly minimize the concentration of atmospheric interfering compounds like water and carbon dioxide and significantly improves the quantification results for these compounds.

Long-Life Components

Due to the thermoelectrically cooled detector and our CenterGlow™ IR-source technology, OMEGA 5 provides consistent high performance without the need for liquid nitrogen.

Overall cost of operation and maintenance is low due to the durability of the various components such as the interferometer, IR-source and diode laser.



• OMEGA 5

Fully Automated Identification and Quantification

From the measurements, the gas concentrations are retrieved automatically by a nonlinear fitting procedure within the comprehensive software package OPUS GA, without the need for gas calibrations. The influence of interfering gases as well as of varying gas temperatures and pressures is considered by the analysis routine.

Fast and Continuous Monitoring

The OMEGA 5 can detect and quantify gas components that occur in concentrations from only a few parts per billion (ppb) up to one hundred percent. Due to the vast range of gases that can be quantified (> 300 compounds are available), the OMEGA 5 can be used in a wide range of process applications. The comprehensive accessories allow to measure gases in a broad pressure and temperature range.

• Key Features

- Automated real-time monitoring of gas concentrations
- Easy-to-use and flexible software package OPUS GA
- No calibration to the target gas necessary
- Temperature-controlled 5 m gas cell (up to 191°C)
- Sealed and purgeable optics
- Equipped with a thermoelectrically cooled detector
- Integrated in a 19 inch rack mount
- Based on industry-proven RockSolid™ interferometer
- CenterGlow™ IR-source technology
- Long-life components



• OPUS GA

- **Automatic identification and quantification of the target gas**
- **Automatic compensation of interfering compounds**
- **No calibration for target gas necessary**
- **Quantitative library with more than 300 compounds available**

EASY-TO-USE.

The standalone comprehensive software package OPUS GA (OPUS Gas Analysis) establishes an easy-to-use graphical user interface to control OMEGA 5. OPUS GA allows for the fast, continuous and fully-automated identification and quantification of gas compositions, without requiring expert knowledge.

FLEXIBLE.

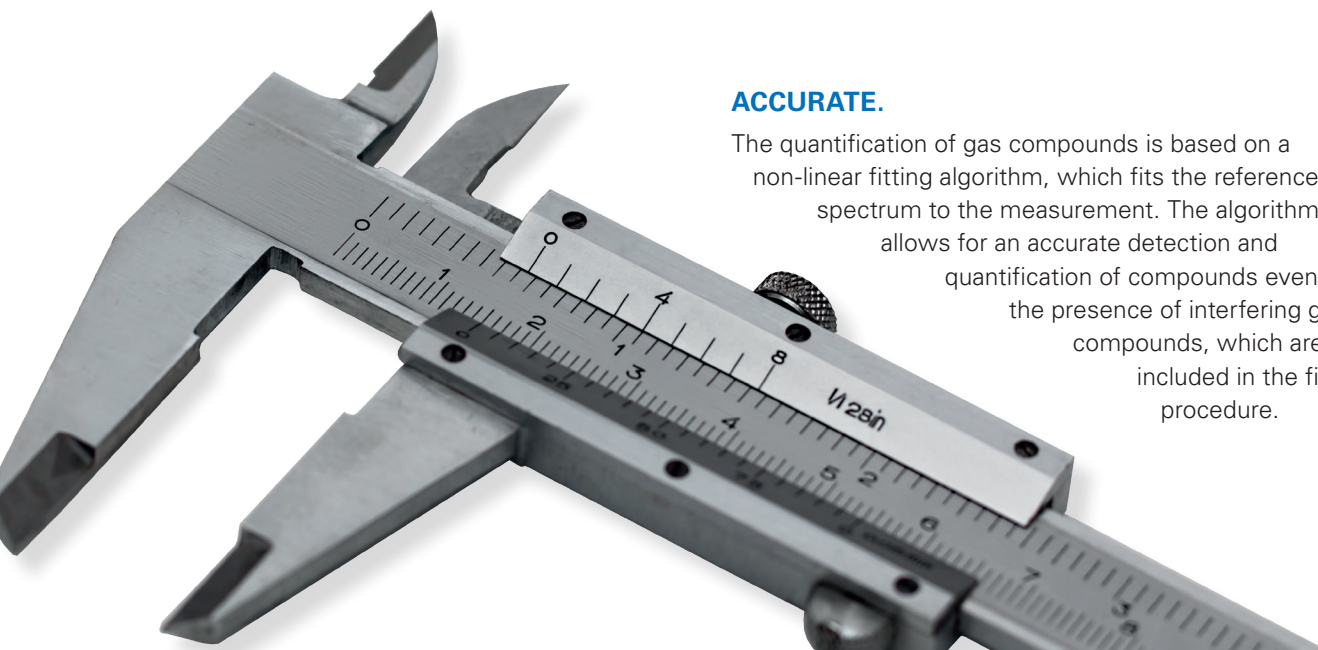
With our quantitative gas library, OPUS GA allows for the identification and quantification of more than 300 gas compounds without the need for calibration. Beyond that, OPUS GA provides an interface to measure individual reference spectra and add these to the existing library.

At any time, existing measurements can be analyzed based on an updated library of reference spectra without the need to rerun the measurement. For the expert user, the measured gas spectra can be investigated in detail within OPUS GA.



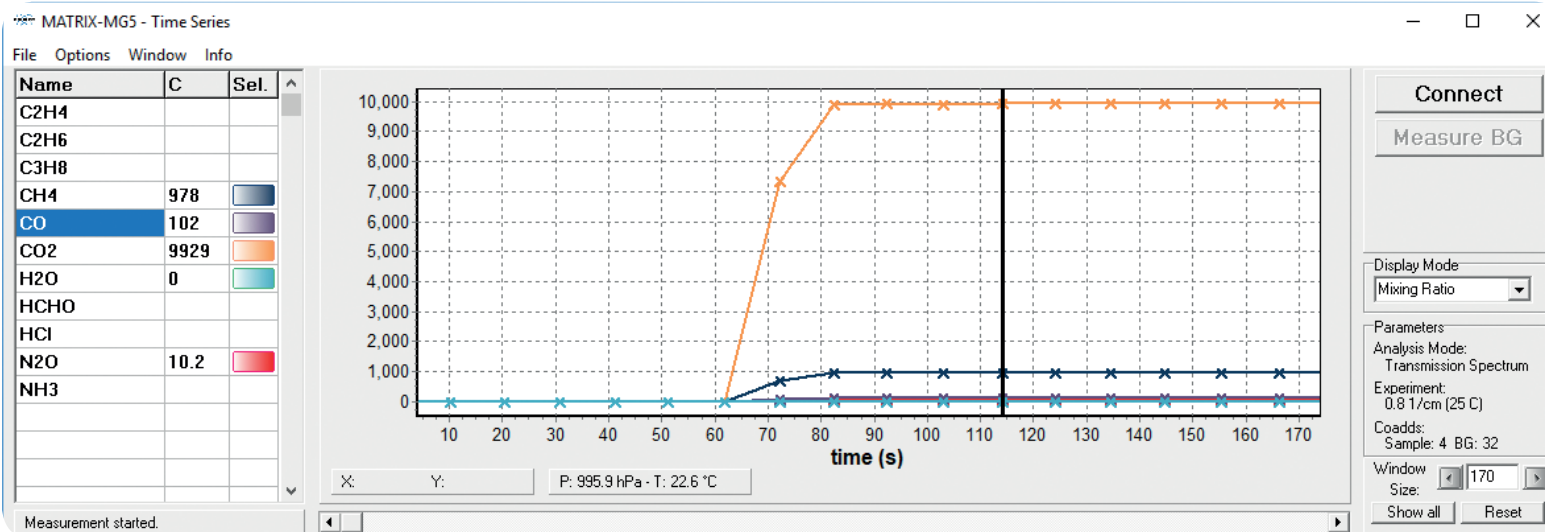
ACCURATE.

The quantification of gas compounds is based on a non-linear fitting algorithm, which fits the reference spectrum to the measurement. The algorithm allows for an accurate detection and quantification of compounds even in the presence of interfering gas compounds, which are included in the fitting procedure.

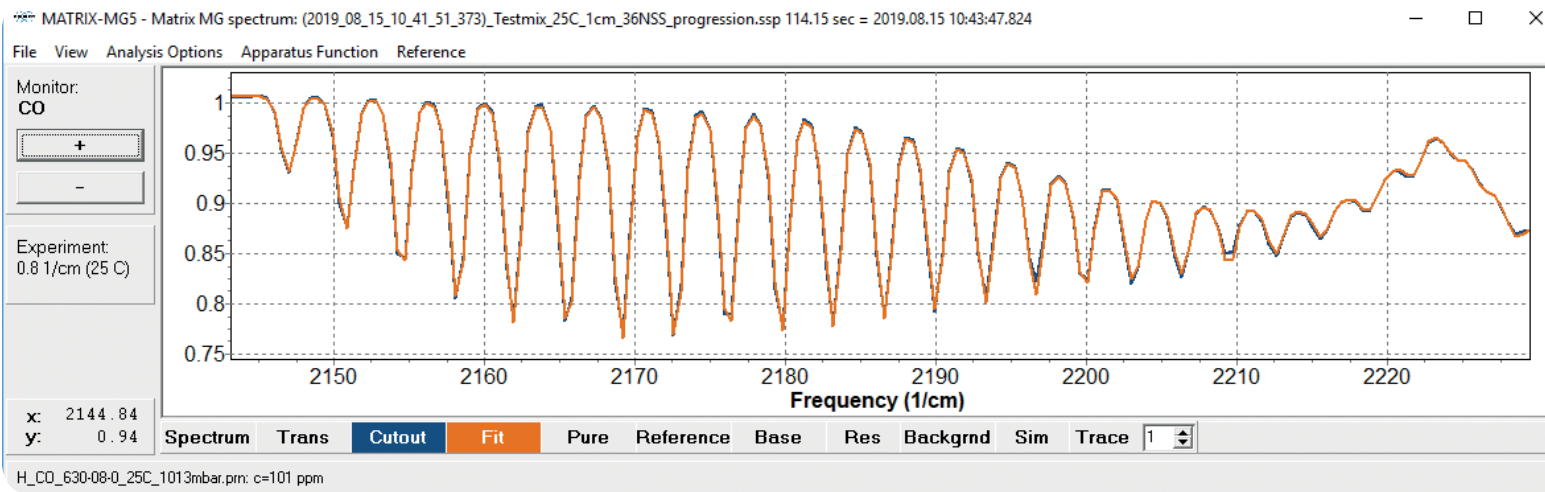


PREDICTIVE.

OPUS GA allows the user to simulate spectra based on high-resolution reference spectra of any gas compound existing in the spectral library. The spectra are simulated under real environmental conditions, like temperature, pressure and the spectral resolution of the spectrometer. The simulation module facilitates to identify unknown compounds in a gas mixture.



Software package OPUS GA for automated identification and quantification of gas compounds. The time series window displays the concentration of selected gas compounds in a gas mixture as a function of time.



Measurement (blue) and fit (orange) to quantify the amount of carbon monoxide. Also, the contributions of the interfering carbon dioxide and nitrous oxide are considered in the fitting routine such that the measurement and the result of the fitting procedure show an excellent agreement.

• Applications

Due to the vast range of detectable gas components (spectral library of more than 300 compounds), the OMEGA 5 can be used in a wide field of applications:

- Industrial applications like process surveillance in production lines



- Investigation of catalytic processes



- Determination of gas impurities



- Scientific research



- Biogas analysis

To meet the specific requirements for a broad range of applications, we offer several options for OMEGA 5:

- **High-Resolution Option**

The high-resolution option allows the ability to measure with a spectral resolution of better than 1 cm^{-1} (standard: better than 2 cm^{-1}). In many applications, this higher spectral resolution allows for the identification and quantification of gas compounds even in gas mixtures with a high degree of overlapping infrared signals.

- **DryPath™ Option**

Upgrade to measure water and carbon dioxide in low concentrations much below ambient conditions without the need for an external purge gas supply.

- **High-Pressure Option**

The high-pressure option allows the ability to measure gases at a pressure at up to 15 bar (for temperatures up to 30°C , standard: 2 bar). It is especially suited to detect very low gas concentrations, such as impurities in gas products and for industrial online measurements of gases under elevated pressure.

- **Accessories**

A variety of accessories is available to simplify the integration of OMEGA 5 into dedicated applications and processes, such as pumps, sample probes as well as heated filters and transfer lines.



● Specifications

Performance

- Spectral range: 4500 – 800 cm^{-1}
- Spectral resolution: Better than 2 cm^{-1}
Option: better than 1 cm^{-1}

Optical system

- Detector: TE-cooled detector
- IR source: CenterGlow™ IR source, guaranteeing a constantly high emission
- Interferometer: RockSolid™, permanently aligned

Specification of the gas cell

- Type: Multi-reflection cell
- Optical path length: 5 m
- Maximum gas cell temperature: 191°C
- Gas cell pressure range: Up to 2 bar (absolute, optional: 0-15 bar)
- Body: Aluminum, Nickel-coated
- Windows: Zinc selenide (other materials optional)
- Mirrors: Gold-coated
- Connections: Swagelok for 6 mm outer diameter tubing

Physical parameters

- Dimensions: Approx. 740x485x222mm (D x W x H)
(19 inch rack with 5U height and 15U depth)
- Mass: Approx. 28 kg, depending on configuration

System/Integration

- Interface: Ethernet
- Software: Gas analysis software OPUS GA, OPUS
- Spectral database: Spectral library with more than 300 compounds available

Electronics

- Data acquisition: 24 bit A/D converter
- Power supply: 100-240 VAC, 50/60 Hz
- Sensors: Integrated temperature and pressure sensors

**Bruker Optics is ISO 9001
and ISO 13485 certified.**

Laser class 1 product.

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