



# Why Choose Gasmet

**Gasmet is the number one FTIR analyzer and system manufacturer. We have delivered over 4000 FTIR analyzers worldwide, and have the highest installed base for on-site and industrial applications.**

## Front Seat

We are at the forefront of development. We have 30 years of FTIR experience and we have introduced several breakthrough innovations, such as launching the world's first in-situ FTIR gas analyzer and the world's first portable ambient FTIR analyzer. Our teams of experts provide continuous improvements of our products, ensuring that your FTIR analyzer investment is continually future-proofed.

## Future First

The future belongs to everyone and we think that everyone has the right to clean air. Therefore, we are persistent to develop our future-proof solutions and support global actions in mitigating climate change. Our vision is to live on a green planet with less emissions.

## Global Presence

We know the importance of local support, globally. With our service and support network covering more than 70 countries, we ensure local, high quality technical support for our customers and secure continuous availability of spare parts to our systems during their entire lifetime.



Gasmet Technologies Oy  
Mestarintie 6  
01730 Vantaa, Finland

Tel. +358 9 7590 0400  
[contact@gasmet.fi](mailto:contact@gasmet.fi)  
[www.gasmet.com](http://www.gasmet.com)



> Know what's in the air.



# CEMS II e

# Continuous Emissions Monitoring System **CEMS II e**

Emissions monitoring of tomorrow is about declining emission limits, continuous monitoring of multiple gases and ability to measure new pollutants.



## What is CEMS II e?

Gasmet manufactures and offers a complete solution for continuous emission monitoring. The Continuous Emission Monitoring System, the CEMS II e, is a fully automatic system based on FTIR (Fourier Transform Infrared) spectroscopy with TÜV and MCERTS certifications (QAL1).

Gasmet CEMS II e consists of the following modules:

- Industrial computer
- Sampling system
- Oxygen analyzer (Optional)
- FTIR Analyzer
- Flame Ionization Detector, GFID (Optional)

The CEMS II e has a flexible design with variety of integration options. Both measuring and alarm information can be transferred to automation and reporting systems. The system is also equipped with automatic quality assurance features to assure seamless operation.

The system utilizes FTIR spectroscopy, which is a powerful technology for simultaneous measurement of multiple gases and the industry standard in many emissions monitoring applications.

Specially designed to increase flexibility with 19'' modules  
- taking care through the lifetime of the system: operation, maintenance and service.

## What is it used for?

The CEMS II e is used in a wide range of industrial processes requiring continuous emission monitoring. The system is designed for continuous measurements of pollutants from hot, wet and corrosive gas streams. The system is used in:

- > Waste Incinerations
- > Power Plants
- > Cement Plants
- > Raw Gas Measurements
- > Compliance Measurements
- > Aluminum production
- > Fertilizer & Nitric Acid Production

## Why choose the Gasmet CEMS II e?

- > EN 15267-3 certified with QAL1
- > 6-month maintenance interval for all certified compounds
- > Excellent annual availability of 98,4%
- > Flexible solution
- > Gasmet's own design and manufacture with 30 years of experience
- > Local, trusted and trained, service and support

Any questions? Ask more from our CEMS experts: [contact@gasmet.fi](mailto:contact@gasmet.fi)

## Which gases can be measured?

The CEMS II e can simultaneously measure the following certified ranges:

Component	Certification range (min/max)	Unit
Water, H <sub>2</sub> O	0 – 30 / 40	Vol.-%
Carbon Dioxide, CO <sub>2</sub>	0 – 25	Vol.-%
Carbon Monoxide, CO	0 – 75 / 1500	mg/m <sup>3</sup>
Nitrous Oxide, N <sub>2</sub> O	0 – 100 / 500	mg/m <sup>3</sup>
Nitric Oxide, NO	0 – 150 / 2000	mg/m <sup>3</sup>
Nitrogen Dioxide, NO <sub>2</sub>	0 – 200 / 500	mg/m <sup>3</sup>
Sulfur Dioxide, SO <sub>2</sub>	0 – 75 / 1500	mg/m <sup>3</sup>
Hydrogen Chloride, HCl	0 – 15 / 90	mg/m <sup>3</sup>
Hydrogen Fluoride, HF	0 – 3 / 10	mg/m <sup>3</sup>
Ammonia, NH <sub>3</sub>	0 – 15 / 50	mg/m <sup>3</sup>
Methane, CH <sub>4</sub>	0 – 15 / 150	mg/m <sup>3</sup>
Formaldehyde, CH <sub>2</sub> O	0 – 20 / 90	mg/m <sup>3</sup>
Oxygen, O <sub>2</sub>	0 – 25	Vol.-%

Certified ranges only. Please contact your local Gasmet representative for more available compounds, ranges and more information.

### CEMS II ef

CEMS II ef is available for certified TOC measurement with GFID. The certified measuring ranges are from 0-15 to 0-500 mg/m<sup>3</sup>.

Gasmet CEMS II e meets the future requirements by providing reliable operation with 6-month maintenance interval and excellent annual availability of 98,4%.

# CX4000 FTIR Gas Analyzer



## Multicomponent FTIR Gas Analyzer

Gasmet On-line Series includes industrial multicomponent gas analyzers for continuous monitoring applications. The Gasmet CX4000 incorporates a Fourier transform infrared spectrometer, a temperature-controlled sample cell, and signal processing electronics. The analyzer is fully equipped for fixed installations and it offers versatility and high performance for all industrial users.

The Gasmet CX4000 is designed for continuous emission monitoring (CEM). It is an ideal tool to analyze trace concentrations of pollutants in wet, corrosive gas mixtures. The sample cell can be heated up to 180 °C. Sample cell absorption path length is selected according to the application.

The Gasmet CX4000 allows simple calibration using only single component calibration gases. The user can easily configure the analyzer for a new set of compounds.

### General parameters

<b>Measuring principle:</b>	Fourier transform infrared, FTIR
<b>Performance:</b>	Simultaneous analysis of up to 50 gas compounds
<b>Response time, T<sub>90</sub>:</b>	Typically < 120 s, depending on the gas flow and measurement time
<b>Operating temperature:</b>	5 - 30°C, non-condensing air conditioning recommended

<b>Storage temperature:</b>	-20 - 60°C, non-condensing
<b>Power supply:</b>	100-115 or 230 V / 50 -60 Hz
<b>Power consumption:</b>	300 W max, continuous 150 W

### Spectrometer

<b>Resolution:</b>	Recommended 8 cm <sup>-1</sup> or 4 cm <sup>-1</sup>
<b>Scan frequency:</b>	10 scans / s
<b>Detector:</b>	Peltier cooled MCT
<b>Source:</b>	SiC, 1550 K
<b>Beamsplitter:</b>	ZnSe
<b>Window material:</b>	ZnSe
<b>Wave number range:</b>	900 - 4 200 cm <sup>-1</sup>

### Sample cell

<b>Structure:</b>	Multi-pass, fixed path length 5.0 m
<b>Standard material:</b>	100 % rhodium coated aluminium
<b>Mirrors:</b>	Fixed, protected gold coating
<b>Volume:</b>	0.4 liters
<b>Connectors:</b>	Inlet Swagelok 6 mm Outlet Swagelok 8 mm
<b>Gaskets:</b>	Viton® O-rings
<b>Temperature:</b>	180 °C, maximum
<b>Window material:</b>	BaF <sub>2</sub>



## Measuring parameters

<b>Zero-point calibration:</b>	24 hours, calibration with nitrogen (5.0 or higher N <sub>2</sub> recommended)
<b>Zero-point drift:</b>	< 2 % of measuring range per zero-point calibration interval
<b>Sensitivity drift:</b>	None
<b>Linearity deviation:</b>	< 2 % of measuring range
<b>Temperature drifts:</b>	< 2 % of measuring range per 10 K temperature change
<b>Pressure influence:</b>	1 % change of measuring value for 1 % sample pressure change. Ambient pressure changes measured and compensated

## Electrical connectors

<b>Digital interface:</b>	9-pole D-connector for RS-232 Analyzer is connected to an external computer via RS-232C cable. The external computer controls Gasmet.
<b>Power connection:</b>	Standard plug CEE-22

## Gas inlet and outlet conditions

<b>Gas temperature:</b>	Non-condensing, the sample gas temperature should be the same as the sample cell temperature
<b>Flow rate:</b>	120 - 600 liters per hour
<b>Gas filtration:</b>	Filtration of particulates (2 µm) required
<b>Sample gas pressure:</b>	Ambient
<b>Sample pump:</b>	External, not included

## Electronics

<b>A/D converter:</b>	Dynamic range 95 dB
<b>Signal processor:</b>	32-bit floating point DSP 120 MFLOPS
<b>Computer:</b>	External, not included

## Analysis software (for external PC)

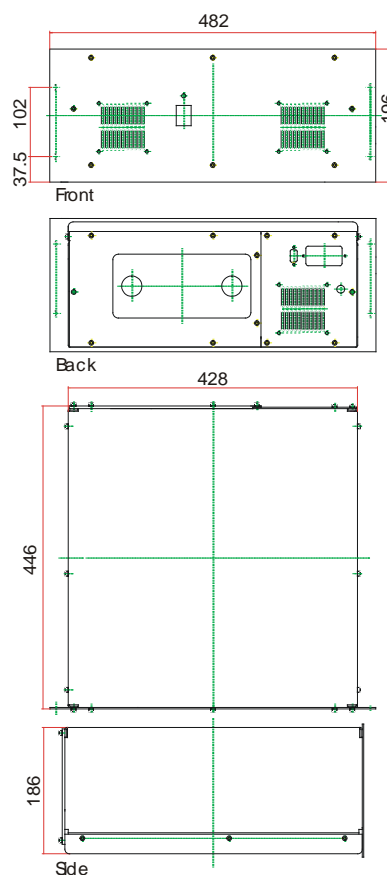
<b>Operating system:</b>	Windows 7 (32-bit)
<b>Analysis software:</b>	Calcmeter for Windows

## Options

<b>Sample cell:</b>	Multi-pass, fixed path length 2.5 m or 9.8 m
<b>Pressure measurement:</b>	Inside sample cell
<b>External PC:</b>	Gasmet PC for control and analysis with optional alarm relay boards and analog inputs or outputs
<b>Sample cell gaskets:</b>	Kalrez®

## Enclosure

<b>Sample cell material:</b>	Aluminium
<b>Dimensions (mm):</b>	482 * 196 * 450
<b>Weight:</b>	17 kg
<b>CE label:</b>	According to EMI guideline 89/336/EC





# Why Choose Gasmet

Gasmet is the number one FTIR analyzer and system manufacturer. We have delivered over 4000 FTIR analyzers worldwide, and have the highest installed base for on-site and industrial applications.

## Front Seat

We are at the forefront of development. We have 30 years of FTIR experience and we have introduced several breakthrough innovations, such as launching the world's first in-situ FTIR gas analyzer and the world's first portable ambient FTIR analyzer. Our teams of experts provide continuous improvements of our products, ensuring that your FTIR analyzer investment is continually future-proofed.

## Future First

The future belongs to everyone and we think that everyone has the right to clean air. Therefore, we are persistent to develop our future-proof solutions and support global actions in mitigating climate change. Our vision is to live on a green planet with less emissions.

## Global Presence

We know the importance of local support, globally. With our service and support network covering more than 70 countries, we ensure local, high quality technical support for our customers and secure continuous availability of spare parts to our systems during their entire lifetime.



Gasmet Technologies Oy  
Mestarintie 6  
01730 Vantaa, Finland

Tel. +358 9 7590 0400  
[contact@gasmet.fi](mailto:contact@gasmet.fi)  
[www.gasmet.com](http://www.gasmet.com)



> Know what's in the air.

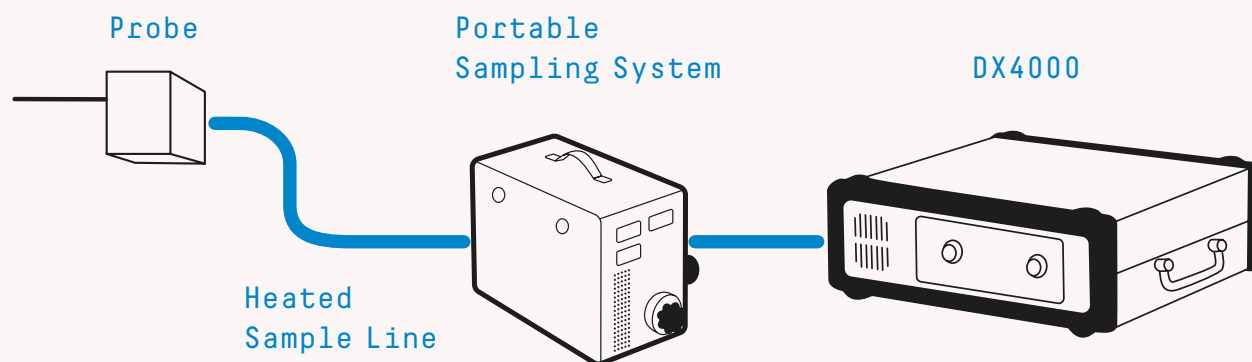


# DX4000



# Gasmet Portable FTIR Gas Analyzer DX4000

The Gasmet DX4000 FTIR Gas Analyzer is the most powerful tool available for emissions monitoring, process gas analysis and compliance testing.



## What is the DX4000?

The Gasmet DX4000 is a portable multicomponent FTIR analyzer that is designed for monitoring gas concentrations in hot, wet and corrosive gas streams. Together with the Gasmet Portable Sampling System (PSS) it forms a complete portable FTIR emissions monitoring system offering the same top of the class performance as Gasmet's fixed systems in an easily transportable package. The Gasmet DX4000 has received the MCERTS 15267-3 certification for stack emissions monitoring.

The entire sampling train of the DX4000 and PSS is heated to 180 °C and allows direct sampling of hot and wet sample gas without need for pre-conditioning of the sample. This allows for easy operation of the system and accurate results, as no analyte (sample) gases will be lost in conditioning of the sample.

The compact and modular design of the system allows the analyzer to be easily transported and quickly assembled, allowing for fast mobilisation and less wasted time waiting to conduct the analysis.

The system is operated by the powerful yet easy to use Calcmeter™ software on a PC computer. The Calcmeter software offers all the tools needed for challenging measurement campaigns.

The Gasmet DX4000 utilizes **Fourier Transform Infrared (FTIR)** spectroscopy, which is a powerful gas measurement technology. FTIR spectroscopy works by scanning and analyzing the entire infrared spectrum in order to measure all the infrared absorbing gases in the sample simultaneously. Most molecules have a characteristic absorption spectrum that can be used to identify gases and accurately measure their concentration.

DX4000 is the world's smallest FTIR emissions monitoring system.

## What is it used for?

Due to the flexibility of FTIR technology the DX4000 can be used in a wide variety of applications, ranging from research applications to process measurements and emissions monitoring. Typical uses include:

- > Stack testing: QAL2 tests for HCl, NH<sub>3</sub>, SO<sub>2</sub>, NO<sub>x</sub> and other gases
- > Scrubber and catalyst efficiency tests
- > Combustion and engine R&D
- > PFC emissions at Aluminum and Semiconductor plants
- > Carbon capture and sequestration
- > Formaldehyde emissions from biogas



## Why buy the Gaset DX4000?

- > Portable
- > Easy assembly on-site
- > Addition of new gases & ranges without hardware changes
- > No sample pre-conditioning
- > Online results
- > MCERTS certified
- > Simultaneous measurement of all gases

## Which gases can be measured?

The DX4000 can be used to measure up to 50 different gases. In combustion processes the DX4000 is typically used to simultaneously measure:

Typically measured gases	
Water, H <sub>2</sub> O	Hydrogen Fluoride, HF
Carbon Dioxide, CO <sub>2</sub>	Ammonia, NH <sub>3</sub>
Carbon Monoxide, CO	Methane, CH <sub>4</sub>
Nitrous Oxide, N <sub>2</sub> O	Ethane, C <sub>2</sub> H <sub>6</sub>
Nitric Oxide, NO	Propane, C <sub>3</sub> H <sub>8</sub>
Nitrogen Dioxide, NO <sub>2</sub>	Ethylene, C <sub>2</sub> H <sub>4</sub>
Sulfur Dioxide, SO <sub>2</sub>	Formaldehyde, CH <sub>2</sub> O
Hydrogen Chloride, HCl	Oxygen, O <sub>2</sub>

The DX4000 is one of the most powerful tools available for challenging gas measurements. The amount of measurable gases is unparalleled and the system is easily configurable to measure new compounds without need for hardware changes.

Please contact your local Gaset representative for more available compounds, ranges and more information.

# DX4015 FTIR Gas Analyzer



## Multicomponent FTIR Gas Analyzer

Gasmet On-site Series includes portable multicomponent gas analyzers for demanding applications. The Gasmet DX4015 features a Fourier transform infrared (FTIR) spectrometer, a temperature-controlled sample cell with a built-in pump, and signal processing electronics. The sample cell can be heated to 50 °C. Sample cell absorption path length is selected according to the application. This analyzer offers versatility and high performance for different applications.

The Gasmet DX4015 is designed for on-site measurements at low concentrations in ambient air. Typical usage areas include industrial hygiene and emergency response situations.

The Gasmet DX4015 is factory calibrated using certified single component calibration gases. There is no need for the user to do any span calibrations after that. The user can also easily configure the analyzer for a new set of compounds.

### General parameters

<b>Measuring principle:</b>	Fourier transform infrared, FTIR
<b>Performance:</b>	Simultaneous analysis of up to 50 gas compounds
<b>Response time, T<sub>90</sub>:</b>	Typically < 120 s, depending on the gas flow and measurement time
<b>Operating temperature:</b>	Short term 0 – 40 °C long term 5 – 30 °C non-condensing
<b>Storage temperature:</b>	-20 – 60 °C, non-condensing
<b>Power supply:</b>	100-115 or 230 V / 50 -60 Hz 12 VDC
<b>Power consumption:</b>	Average 150 W, maximum 300 W

### Spectrometer

<b>Resolution:</b>	8 cm <sup>-1</sup> or 4 cm <sup>-1</sup>
<b>Scan frequency:</b>	10 scans / s
<b>Detector:</b>	Peltier cooled MCT
<b>Source:</b>	SiC, 1550 K
<b>Beamsplitter:</b>	ZnSe
<b>Window material:</b>	ZnSe
<b>Wave number range:</b>	900 - 4 200 cm <sup>-1</sup>

## Sample cell

<b>Structure:</b>	Multi-pass, fixed path length 9.8 m
<b>Material:</b>	100 % rhodium coated aluminium
<b>Mirrors:</b>	Fixed, protected gold coating
<b>Volume:</b>	0.4 liters
<b>Connectors:</b>	Inlets Swagelok 6 mm Outlet Swagelok 6 mm
<b>Gaskets:</b>	Viton® O-rings
<b>Temperature:</b>	50 °C, maximum
<b>Valve:</b>	Manual Swagelok
<b>Window material:</b>	Ar coated ZnSe

## Measuring parameters

<b>Zero-point calibration:</b>	24 hours, calibration with nitrogen (5.0 or higher N <sub>2</sub> recommended)
<b>Zero-point drift:</b>	< 2 % of measuring range per zero-point calibration interval
<b>Sensitivity drift:</b>	none
<b>Linearity deviation:</b>	< 2 % of measuring range
<b>Temperature drifts:</b>	< 2 % of measuring range per 10 K temperature change
<b>Pressure influence:</b>	1 % change of measuring value for 1 % sample pressure change. Ambient pressure changes measured and compensated

## Electrical connectors:

<b>Digital interface:</b>	9-pole D-connector for RS-232  Analyzer is connected to an external computer via RS-232C cable. The external computer controls Gasmet.
<b>Power connection:</b>	Standard plug CEE-22

## Gas inlet and outlet conditions

<b>Gas temperature:</b>	Non-condensing, the sample gas temperature should be the same as the sample cell temperature
<b>Flow rate:</b>	~2 liters per minute
<b>Gas filtration:</b>	Filtration of particulates (2 µ) required
<b>Sample gas pressure:</b>	Ambient
<b>Sample pump:</b>	Internal, for ambient air only

## Electronics

<b>A/D converter:</b>	Dynamic range 95 dB
<b>Signal processor:</b>	32-bit floating point DSP 120 MFLOPS speed
<b>Computer:</b>	External, not included

## Analysis software (for external PC)

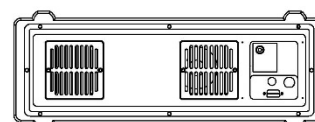
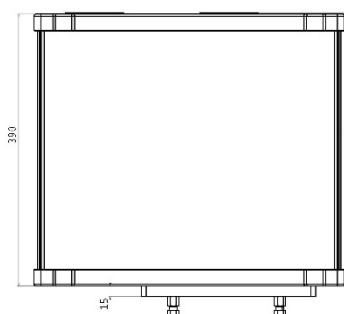
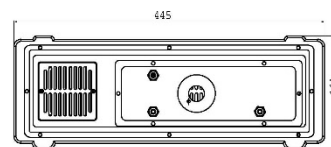
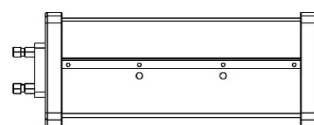
<b>Operating system:</b>	Windows 7 (32-bit)
<b>Analysis software:</b>	Calcmeter for Windows

## Options

<b>Sample cel:</b>	Multi-pass, fixed path 2.5 m or 5.0 m
<b>Pressure measurement:</b>	Inside sample cell
<b>Analog signals (ext PC):</b>	ADAM 5000/TCP module (for analog inputs, outputs, relays)
<b>Sample cell gaskets:</b>	Kalrez®
<b>Power connection:</b>	12 VDC
<b>Power supply cables:</b>	12 V cables with battery clips or cigarette lighter connector
<b>Trolley:</b>	Wheeled cart for the analyzer and laptop computer

## Enclosure

<b>Material:</b>	Aluminium
<b>Dimensions (mm):</b>	438 * 164 * 445
<b>Weight:</b>	14.9 kg
<b>CE label:</b>	According to EMI guideline 89/336/EC



# DX4040 FTIR Gas Analyzer



## The Portable FTIR Gas Analyzer

The Gasmeter DX4040 analyzer combines Fourier transform infrared (FTIR) spectrometer, rhodium-gold coated sample cell, built-in sample gas pump and signal processing electronics in a compact unit.

In battery use, operating time is 2.5 hours with one charge. AC power supply is also included. There is a filter for particulates inside the probe and no sample preparation is needed. The lightweight analyzer can be used with or without the durable Teflon coated backpack.

The Gasmeter DX4040 is designed for on-site measurements of different compounds (both organic & inorganic) at low concentrations in ambient air. Typical usage areas include industrial hygiene and emergency response situations. The communication between the analyzer module and the PDA is wireless (with Bluetooth protocol).

In the standard configuration, concentrations of 25 gases of interest can be simultaneously monitored.

Furthermore, with the optional Calcmeter 4040 Professional software the analyzer can be connected to a laptop PC for extended analysis capability (e.g. identification of unknown compounds with library spectra).

There are no consumable parts that would need replacing on regular basis. In addition, due to FTIR technology, the calibrations remain very stable. Hence no span calibrations are needed. Also, cross-interferences (i.e. interference from other gases) are automatically compensated in the analysis algorithm during the calculation of the results.

To sum up, the Gasmeter DX4040 provides a very cost-effective, easy-to-use solution for multi-component gas analysis in ambient air.



## General parameters

<b>Measuring principle:</b>	Fourier transform infrared, FTIR
<b>Performance:</b>	Simultaneous analysis of up to 25 gas compounds (PDA), 50 gas compounds with optional Calcmeter software
<b>Response time, T<sub>90</sub>:</b>	Typically < 120 s, depending on the gas flow and measurement time
<b>Operating temperature:</b>	Ambient temperature Short term 0 – 40 °C Long term 5 – 30 °C Non-condensing
<b>Storage temperature:</b>	10 – 35 °C, non-condensing
<b>Shipping temperature:</b>	-20 – 45 °C during 12 hours, non condensing
<b>Power supply:</b>	115 / 230 VAC
<b>Battery functioning time:</b>	Approximately 2.5 hour operation time with Bluetooth ON (depending of ambient temperature).

## Spectrometer

<b>Resolution:</b>	8 cm <sup>-1</sup>
<b>Scan frequency:</b>	10 scans / s
<b>Detector:</b>	Peltier cooled MCT
<b>Source:</b>	SiC, 1550 K
<b>Beamsplitter:</b>	ZnSe
<b>Window material:</b>	ZnSe
<b>Wave number range:</b>	900 - 4 200 cm <sup>-1</sup>

## Sample cell

<b>Structure:</b>	Multi-pass, fixed path length 9.8 m
<b>Material:</b>	100 % rhodium coated aluminum
<b>Mirrors:</b>	Fixed, protected gold coating
<b>Volume:</b>	0.4 liters
<b>Temperature:</b>	Ambient

## Measuring parameters

<b>Zero-point calibration:</b>	24 hours
<b>Zero-point drift:</b>	< 2 % of measuring range per zero-point calibration interval
<b>Sensitivity drift:</b>	None
<b>Linearity deviation:</b>	< 2 % of measuring range
<b>Temperature drifts:</b>	< 2 % of measuring range per 10 K temperature change
<b>Pressure influence:</b>	1 % change of measuring value for 1 % sample pressure change. Ambient pressure changes measured and compensated.

## Electrical connectors:

<b>Digital Interface:</b>	Bluetooth protocol & RS-232
	The analyzer is connected to a PDA with Bluetooth connection (RS-232 optional). The PDA provides the analysis results.
	Option: sample spectra transfer to laptop (PC) for additional analytical capabilities

## Gas inlet and outlet conditions

<b>Gas temperature:</b>	Ambient temperature (0 – 50 °C), non-condensing
<b>Gas filtration:</b>	Filtration of particulates included in the sample probe
<b>Sample gas pressure:</b>	Ambient
<b>Sample pump:</b>	Flow ~1.5 l/min, for ambient air only

## Electronics

<b>A/D converter:</b>	Dynamic range 95 dB
<b>Signal processor:</b>	32-bit floating point DSP

## Analysis software (PDA)

<b>Operating system:</b>	Windows Mobile 6.1 Professional
<b>Analysis software:</b>	Calcmeter Lite

## Options

<b>Software:</b>	Calcmeter software with DX40XX Pro key. Laptop PC + Windows 7 (32-bit) required. For more information read Calcmeter Technical data.
------------------	--

## Additional information

<b>Enclosure:</b>	161 x 390 x 406 mm (HxWxD), polyurethane
<b>Weight:</b>	13.8 kg (with battery) 12.4 kg (without battery)
<b>CE label:</b>	According to EMI guideline 89/336/EC