Protea
technology leadership
in measurement solutions

ProtIR 204M

With a proven track record and full mCerts certification, the ProtIR 204M FTIR gas analyser is the tool of choice for environmental stack emissions testing. In use for Waste Incineration and other combustion process, the 204M has shown, with its powerful high resolution spectrometer, on-board sampling system (including mCerts approved O2 sensor) and easy to use software, that accurate multi-component gas measurement with FTIR does not have to be the realm of the expert spectroscopist.

The ProtIR 204M is based upon a high-resolution, robust and proven FTIR spectrometer that offers high signal throughput and low-noise measurements. The 204M has been developed **by stack testing professionals, for stack testing professionals** incorporating hardware and software features to make deployment of this FTIR as straight forward as possible, including:

- On-board sampling system - N_2 purge, MFC for dilution/analyte spiking, inlet filtration
- Standard Analysis Mode - fixed, controlled acquisition and analysis procedure without the need for complex set-up
- Powerful chemometric modelling - Standard Analysis Model providing measurement for 30 gases "out-of-the-box"
- True multi-range analysis with FTIR - software selects best model (analysis band) for each measurement
- Software reporting features - mean/max/min, LDL and drift calculations

These advantages come with the benefit of Protea's UK-based, training and support, so that the user is able to achieve the best performance out of the product.

Hardware Specifications

Resolution:	1cm^{-1} (Standard) 2cm^{-1}, 4cm^{-1}, 8cm^{-1}, 16cm^{-1}, 64cm^{-1}, 128cm^{-1}
Optics:	Zinc Selenide beam splitter (non-hygroscopic)
Spectral Range:	700 – 5000cm^{-1} (variable with optics)
Reference laser:	Long-life HeNe
Source:	Mid-IR source, ceramic Globar
Detector:	DTGS offering wide range Mid-IR measurement with excellent linearity
Cell material	Nickel-plated Aluminium
Cell volume	2.7 litre
Pathlength	6.4m (standard) Variable from 1m to 9.6m for custom applications
Sampling system:	Flow Control Automated Nitrogen Purge Valve Mass Flow Control for dilution and/or analyte spiking Cell and Venturi pressure sensors Cell inlet filter No need for separate pre-analyser sample conditioning box
Pump	Post-analyser vacuum sample pump with PTFE wetted parts
On-board IO	16 4-20mA output channels; 9 4-20mA input channels 5 Digital input; 2 Digital output
Ethernet	OPC Server and Client
Operating environment	5°C – 40 °C
Weight	71kg, mounted on trolley for transport
Dimensions	117 x 66.5 x 43cm

Multi-component, multi-range FTIR gas analyser

Standard Analysis Mode – simple but complete multi-gas analysis

Measure 1000's of gases with single unit

PAS software offers no-limit on number of gas measurements at once

Data can be re-analysed offline for new gases

Specific Applications for ProtIR 204M:

Stack Emission Testing

Back-up to Continuous Emission Monitoring Systems

Combustion gases under WID, LCPD

*Real*TOC™ measurement

Speciated VOC with benefit of high resolution

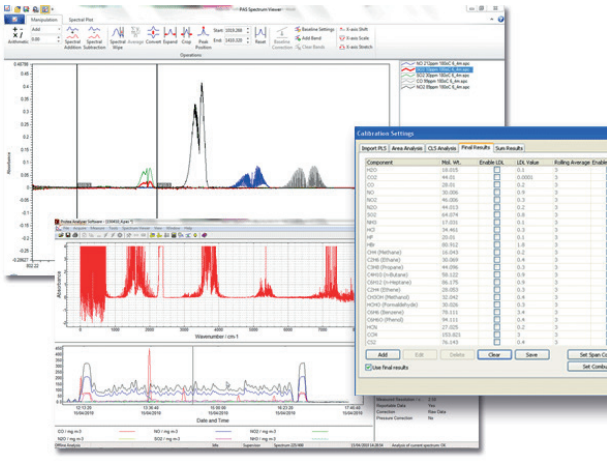
Component	Standard Range / mg/m3	Extended Range / mg/m3*	Lower Detection Limit
CO	0 - 75 mCerts	0 – 18750	0.2
NO	0 - 200 mCerts	0 – 2000	0.9
NO_2	0 – 200	0 – 2000	0.3
N_2O	0 – 100	0 – 1000	0.2
SO_2	0 - 75 mCerts	0 – 30000	0.8
NH_3	0 - 15 mCerts	-	0.1
HCl	0 - 15 mCerts	0 – 4000	0.3
HF	0 – 15	0 – 70	0.1
HBr	0 – 200	-	1.8
CH_4 (Methane)	0 – 70	0 – 700	0.2
C_2H_6 (Ethane)	0 – 50	0 – 1400	0.4
C_3H_8 (Propane)	0 – 50	0 – 2000	0.3
C_4H_{10} (n-Butane)	0 – 50	0 – 300	0.9
C_6H_{14} (n-Hexane)	0 – 50	0 – 400	0.9
C_2H_4 (Ethene)	0 – 25	0 – 1250	0.3
CH_3OH (Methanol)	0 – 70	-	0.4
HCHO (Formaldehyde)	0 – 20	-	0.3
C_6H_6 (Benzene)	0 – 250	-	3.4
C_6H_6O (Phenol)	0 – 100	-	0.4
HCN	0 – 15	0 – 600	0.2
CCl_4	0 – 200	0 – 1400	3.0
CS_2	0 – 100	0 – 400	0.4
COS	0 – 50	-	0.05
CF_4	0 – 40	0 – 600	0.05
SF_6	0 – 65	-	0.05
TOC (Indication only)	0 – 50	0 – 2000	0.4
H_2O	0 - 40%mCerts	-	<1000ppm
CO_2	0 - 20%	0 - 60%	<2 ppm
O_2 (via zirconia sensor)	0 - 20.9%mCerts	N/A	<0.4%

The ProtIR 204M and PAS software have been designed to allow stack emission monitoring to be carried out to the **Environment Agency's Technical Guidance Note M22 Measuring Stack Gas Emissions Using FTIR Instruments (TGN M22)** as simply and quickly as possible. With the built-in Standard Analysis Model for common gases there is no complex set-up of analysis required. The software has built-in calculations for drift and residual analysis, following the methods described in TGN M22. The 204M analyser is also equally suitable for deployment in US procedures Method 320 and ASTM 6348.

Skilled users of the FTIR can use the chemometric building routines of the PAS software to build analytical methods for specific applications. Set up this way, the 204M can measure thousands of possible gas species over ranges from ppm to %Vol in applications such as speciated VOC measurements.

The only FTIR gas analyser specifically tested as a transportable CEM, the 204M has passed the Environment Agencies MCERTS test programme for use on waste incineration processes. This allows the instrument to be used by stack testing organisations with guarantees on quality of product build and on analytical accuracy.

The possibilities with the ProtIR 204M do not stop with combustion stack emissions testing. With variable resolution ($1cm^{-1}$ to $128cm^{-1}$) and a gas cell with variable pathlength up to 9.6m Protea can tailor the 204M to meet many niche applications such as process control and ambient air measurements.



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