

# atmosFIR CEM

atmosFIR CEM is a complete emissions monitoring system incorporating the atmosFIR 19" rack FTIR analyser. Providing a completely hot and wet emissions measurement, atmosFIR CEM is ideal for monitoring of multiple gases from applications such as incineration and power. A standard gas suite of NO, NO<sub>2</sub>, N<sub>2</sub>O, SO<sub>2</sub>, NH<sub>3</sub>, HCl, CH<sub>4</sub>, O<sub>2</sub>, CO<sub>2</sub> and H<sub>2</sub>O and more is provided, but with the powerful FTIR analyser, further gases can be added easily in software.

At the heart of system is the high-resolution, robust and proven FTIR spectrometer offering high signal throughput, low-noise and long lifetime of components. atmosFIR has been developed to incorporate the latest improvements and advantages in technology. The atmosFIR FTIR analyser contains an in-built sampling system and is designed for ppm-level emissions monitoring. The analyser can be used as a portable or bench-top unit, as well as part of the installed CEM system.

For emissions applications, atmosFIR CEM contains management of the heated sampling system from within the system – heated lines, probes – as well as comprehensive span gas options, including 6 span valves that can be used to calibrate the analyser directly or “to probe”.

Protea's PAS-Pro operating software not only collects and analyses the infrared spectra with the latest in analytical algorithms (with no limit on the number of gases that can be measured) but also manages the complete automation of the system. Modbus Serial, Modbus TCP/IP and OPC Server data exchange is provided as standard, and the monitoring results are reported both Raw and Corrected in real-time.



atmosFIR CEM is a complete multigas analyser system using FTIR technology.

- \* Waste Incineration Emissions monitoring
- \* Combustion emissions from power generation
- \* Core FTIR module available for integration
- \* Meets the requirements of EN 15267-3, QAL1 and EN14181. Certification due Q2 2017

## FTIR Specifications

Double-pivot interferometer with increased robustness. Permanently aligned optics, giving repeatable measurements and high light throughput. The scanning mechanism has a lifetime guarantee.

Resolution	1cm <sup>-1</sup> , 2cm <sup>-1</sup> , 4cm <sup>-1</sup> , 8cm <sup>-1</sup> variable resolutions. 1cm <sup>-1</sup> for standard emissions monitoring
Optics	Zinc Selenide beamsplitter (non-hygroscopic)
Spectral Range	485 - 8500cm <sup>-1</sup>
Reference laser	Solid state laser (no scheduled maintenance required). Long lifespan (10 years) compared with HeNe laser
Source	Mid-IR source, with electronic stabilization for long lifespan
Detector	DTGS with signal sampling at 24-bit ADC
Sample Cell	Materials: Ni-coated Al cell. Proprietary alloy mirror substrate with multi-layer coating. Volume: 300ml Pathlength: 4.2m standard pathlength Temperature: 180°C
FTIR Sampling system	Heated pre-cell filter for extra protection against dust Zirconia oxygen sensor for parallel O <sub>2</sub> measurement Automated Nitrogen Purge Valve

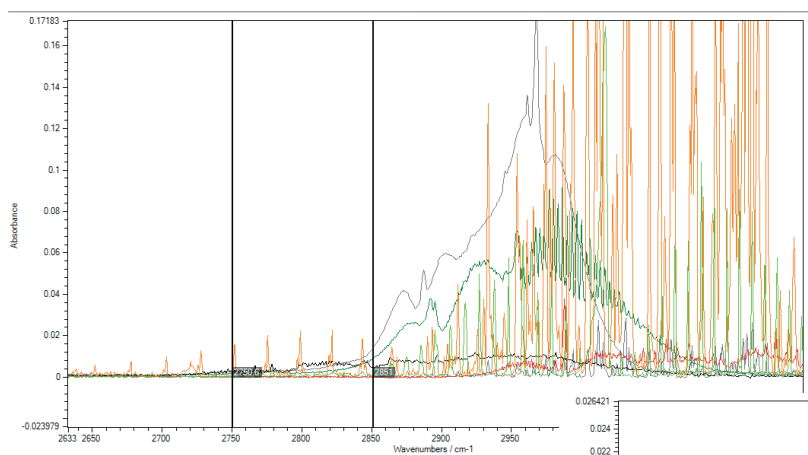
## Measurements for atmosFIR CEM

atmosFIR CEM can be provided with core atmosFIR FTIR gas analyser set-up for any number of different process or emissions applications. Contact Protea for specific gas analysis requirements.  
The standard incineration emissions application includes the following gases and ranges

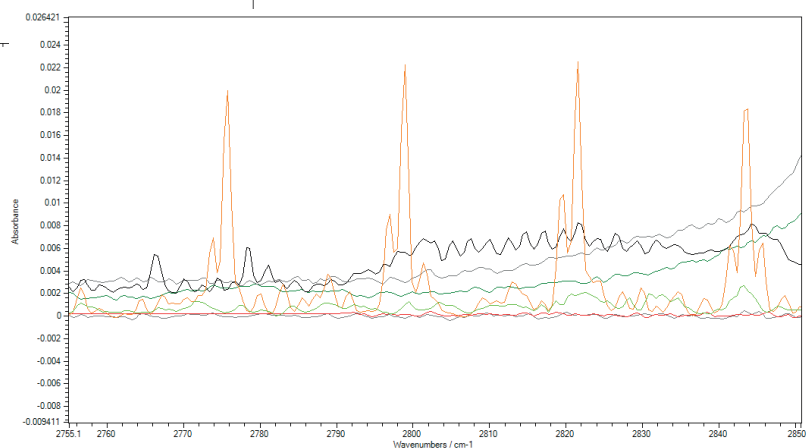
Typical Response Time	120secs at 1cm <sup>-1</sup> resolution. (T90)				
Linearity	<2% range	Repeatability (σ)	<1% range	Temperature Drift	<2% range per 10K

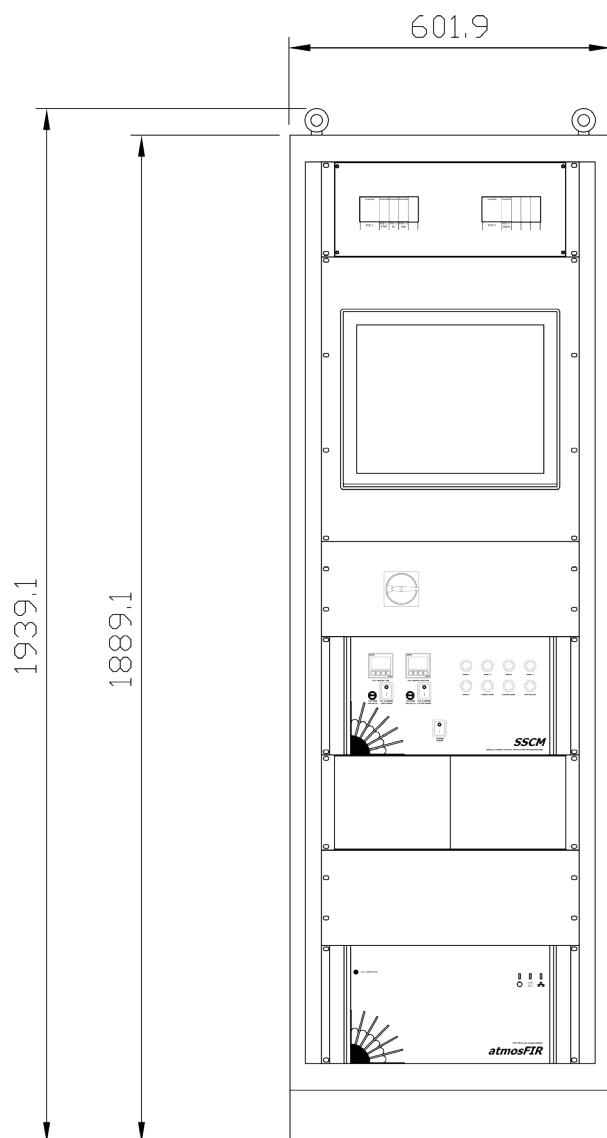
## Standard Combustion Emissions Model

Component	Ranges / mg/m3	Lower detection Limit (LDL) / mg/m3	Component	Ranges / mg/m3	Lower detection Limit (LDL) / mg/m3
CO	0-75; 0-1000	0.6	CH <sub>4</sub> (Methane)	0-50; 0-1000	0.1
NO	0-200; 0-600	1.0	C <sub>2</sub> H <sub>6</sub> (Ethane)	0-50; 0-1000	0.1
NO <sub>2</sub>	0-200; 0-600	0.6	C <sub>3</sub> H <sub>8</sub> (Propane)	0-50; 0-1000	0.8
N <sub>2</sub> O	0-50; 0-400	0.4	C <sub>2</sub> H <sub>4</sub> (Ethene)	0-50; 0-1000	0.4
SO <sub>2</sub>	0-75; 0-1000	0.6	HCHO (Formaldehyde)	0-20; 0-100	0.2
NH <sub>3</sub>	0-15; 0-50	0.1	TOC (Indication only)	0-50; 0-1000	-
HCl	0-15; 0-100	0.2	H <sub>2</sub> O	0-40%	0.02%
HF	0-15; 0-50	0.2	CO <sub>2</sub>	0-20%	0.005%



High Resolution FTIR Analysis – no limit to number of gases that can be measured via multigas analysis of full IR spectrum.





### Installation and Utilities

Cabinet	Approx. 1800(h) x 600(w) x 800(d) plus 100mm plinth for installation
Weight	250kg
Supply and Power Consumption	1 x 13A for cabinet. Probe powered locally at stack 2.5kW (including 10m heated line and sample probe)
Ambient Temperature	5°C < T < 30°C without air conditioner on cabinet
Gas Utilities	Instrument Air @ 4 bar g for eductor. Dry, oil and particle free. 99.999% N2 @ 0.5 bar g for instrument zero gas. Automatic zero every 24 hours. Span gases @ 1 bar g for system checking

### atmosFIR CEM Sampling Specifications

Sampling Rate	2.5lpm, controlled via with venturi orifice
Sample Control	Heated eductor post-FTIR
Sample Line	4/6mm PTFE core heated to 180°C. Sample line temperature alarm
Sample Probe	2um PTFE filter heated to 180°C. Sample probe temperature alarm
Span Gases	6 span gas valves, assignable to various gases and concentration levels
Span Gas Delivery	"Direct" to analyser or "Span to Probe" selectable



- \* Complete Emissions Supplied by Protea
- \* FTIR and Sampling Control integrated in software
- \* Expandable system –
  - \* Multiple Sampling Points
  - \* No limit on number of gases



This Datasheet is a guide to the product and Protea Ltd reserve the right to modify the product without notification.

Supplier: