

# atmosFIR<sup>i</sup>

## Multi-component FTIR gas analyser for continuous measurement of %Vol

atmosFIR is the latest generation of FTIR gas analyser technology from Protea. The atmosFIR system improves upon previous FTIR technology and represents one of the most cost-effective and flexible analytical products on the market today.

At the heart of atmosFIR is a 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, including:

- \* Low cost of ownership
- \* Low maintenance cost
- \* Robust and light, including the latest in fabrication materials
- \* AtmosFIRi combines an FTIR analyser with an in-built sampling system and is designed for high ppm to %Vol ranged measurements as a portable or bench-top unit or as part of an installed fixed system.

These advantages come with the benefit of improved performance over existing products, due to the new small, robust, high resolution interferometer with low noise measurement. AtmosFIR is fitted with a sensitive DTGS detector, operating at ambient temperature without need for liquid nitrogen or other cooled detectors. Protea continues to offer our powerful PAS software suite, training and support, so that the user is able to achieve the best performance out of the product. PLS algorithms offer great advantages over more traditional chemometrics - please refer to the PAS brochure.



### Multi-component, multi-range FTIR gas analyser

Measure 1000's of gases with a single unit

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

Data is saved and can be re-analysed for new components

Data can be downloaded and re-analysed offline for new gases

Built in O2 sensor, heated inlet filter and sampling control

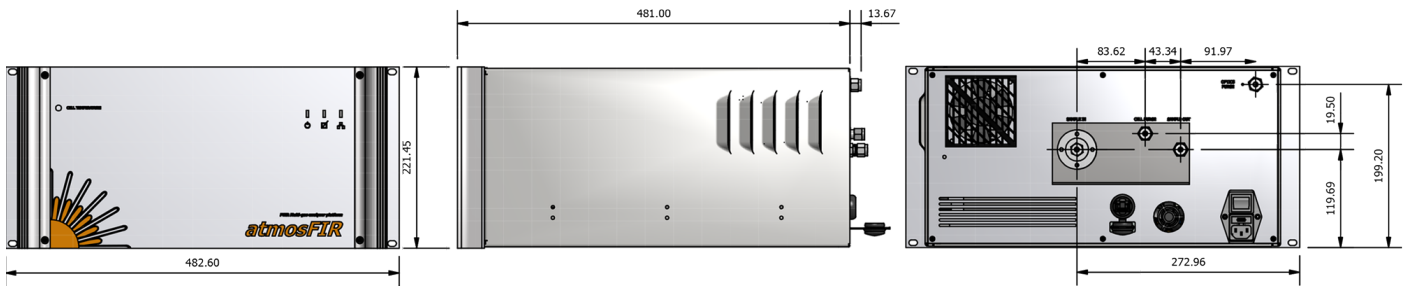
### Specific Applications for atmosFIRi:

- \* Scrubber control and abatement studies
- \* Carbon Bed Optimisation
- \* Syngas and Gasification testing
- \* LEL and safety monitoring
- \* Heat Exchanger breakthrough

## Hardware 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> typical resolutions, variable on application : 0.5cm <sup>-1</sup> available as special	
Optics:	Zinc Selenide beam splitter (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: Stainless Steel with propriety coating for corrosion resistance. Aluminium available as option Volume: 200ml Pathlength: 0.2m, single pass. No mirrors in cell. Temperature: 60°C typical. Heatable to 180°C for specific applications Windows: Zinc Selenide	
On-board Sampling system:	Heated pre-cell filter for extra protection against dust Zirconia oxygen sensor for parallel O2 measurement Automated Zero Purge valve, with flow control Mass Flow Control for dilution and/or analyte spiking No need for separate pre-analyser sample conditioning box	Alarm relays Sample Signal Output 4-20mA outputs (optional)
Weight	18-20kg, depending on options	
Dimensions	48cm x 48cm x 5U (19" rack mountable)	
Supply	100 - 250 V / 50-60 Hz	
Consumption	250W	



atmosFIR products are available as stand-alone gas monitoring units or can be customised for specific applications as portable or fixed systems. They are flexible and can be set-up according to the needs of the user; from fully automated systems through to a feature rich analyser for the expert user. As always, the user is fully supported by Protea's in-house technical support team.

atmosFIR<sup>i</sup> is a new concept in FTIR. The unit is designed as a general gas analyser that is simple to use, portable and a very low cost product that provides real-time online measurement suitable for plant systems. Often, gas monitoring applications require high concentration and quick response, and low level detection limits are not necessary. atmosFIR<sup>i</sup> has achieved low cost through a simpler design suitable for these applications, from 10ppm up to 100%, but retaining the same repeatability and reliability of the other atmosFIR products. With Protea's in-house application support able to assist remotely, chemometric models can be uploaded and atmosFIR<sup>i</sup> can be changed to measure hundreds of different processes.

With long-lifetime VCSEL reference laser diode, non-mirrored cell and air cooled DTGS detector with 24-bit ADC, atmosFIR<sup>i</sup> is a step-change in value and service lifetime for FTIR gas analysis.

### Typical Measurements for atmosFIR<sup>i</sup>

atmosFIR<sup>i</sup> can be customised via application-specific chemometric modelling. This can be achieved remotely.

Measurement range	0 – 100% Vol
Standard detection limit	Typically <10ppm (gas dependent)
Response Time (T90, direct)	20secs (2cm <sup>-1</sup> )

#### Example Applications:

Heat Exchanger Off-gas			Pre-incinerator Waste Gas			Gasification			CFC Abatement Inlet		
Gas	Range/%Vol	LDL / ppm	Gas	Range/%Vol	LDL/ppm	Gas	Range/%Vol	LDL/ppm	Gas	Range/%Vol	LDL/ppm
CO	0 – 30	80	DCM	0 – 20	10	CO <sub>2</sub>	0 – 50	100	R11	0 – 5	5
CH <sub>4</sub>	0 – 4	10				CO	0 – 30	80	R141b	0 – 5	5
HCl	0 – 5%	40				CH <sub>4</sub>	0 – 50	10	R12	0 – 5	5
SO <sub>2</sub>	0 – 1000ppm	2				CnHx	0 – 10	50	R22	0 – 5	5
COS	0 – 2	0.5							R32	0 – 5	5
									R125	0 – 5	5
									R134a	0 – 5	5

Linearity	<1% range	Repeatability (σ)	<0.5% range
Low Level Performance	Repeatable sub-100ppm measurements can be achieved with the atmosFIR <sup>i</sup> , with longer integration times.		
Unlimited measurements	Standard Analysis Model ranges are not fixed – increase via simple span correction. Any number of additional gases can be added to the above list. Please contact Protea for specific gas requirements.		
Measurement Units	Concentration: ppb, ppm, mg/m <sup>3</sup> , %Vol Mass Emission: mg/hr, g/hr, kg/hr, te/a (utilising external flow input)		