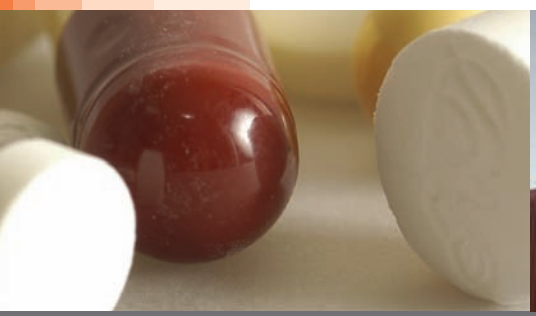
Aspectrics

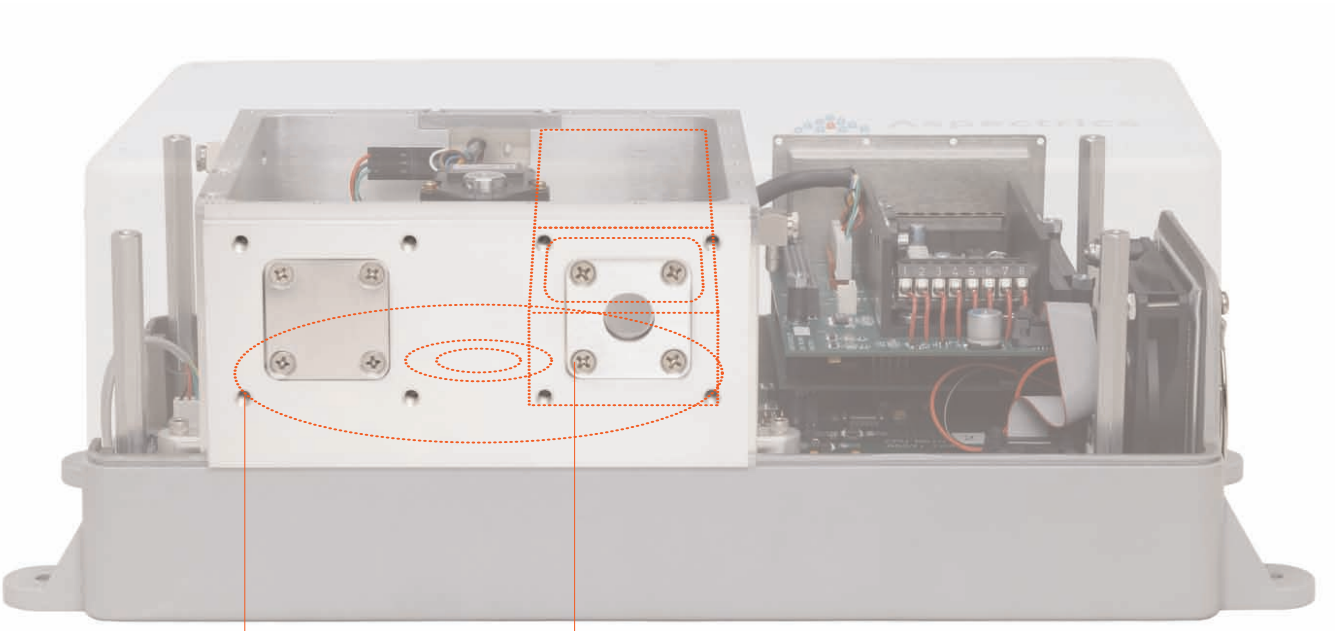
Chemical Analysis
In the Real World

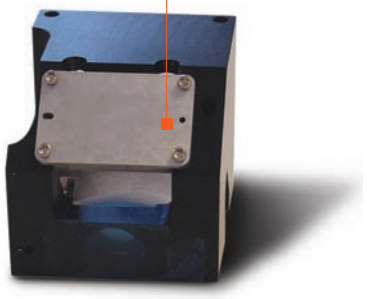


Most crucial chemical analysis and monitoring challenges occur outside of the analytical laboratory. Whether testing for trace toxins in a pharmaceutical manufacturing plant, measuring emissions in environmental applications or monitoring agricultural and food manufacturing processes , Aspectrics offers the most innovative technologies designed for real-world situations.

Built on the revolutionary Encoded Photometric Infrared (EP-IR) spectroscopy platform, the Aspectrics chemical analysis and monitoring engines are optimized for real-world applications with unprecedented stability to temperature, vibration and other environmental variables. What's more, the Aspectrics EP-IR monitoring engines simultaneously employ 256 photometric channels and complete 100 scans per second for fast, accurate measurements.

Encoded Photometric Infrared (EP-IR) Spectrometer





Encoding Disc (heart of EP-IR technology)
Up to 256 discrete wavelength channels encoded for analysis of complex mixtures

Up to 100 scans per second enables rapid data averaging for ppb sensitivity

Photolithographic disc manufacturing process ensures superior unit-to-unit reproducibility

Optional custom disc patterns further optimize application-specific analytical performance

Vibration insensitive

Rotating disc drive motor technology for long-term reliability

Compact (short path) Spectrograph
Efficient optical design for superior signal-to-noise performance

Dual spectrograph option enables redundant modules or multiple wavelength ranges in a single unit

Ultra-low drift performance for extended calibration intervals

NIR and mid-IR ranges available

TE-cooled high speed detectors matched to wavelength requirements

I / O
RS232 and Ethernet are standard

PC104 expansion slots accommodate custom I/O requirements, including displays, telemetry, external data and controls

4 channels DAC; 8 channels ADC

Embedded High-Speed Computer
Enables real-time Discrete Fourier Transforms (>100/second) for immediate data treatment and analysis.

Ease of integration through MyInstrument™ interface to any external data processing or chemometrics program (GRAMS™, Symbion™, SID, etc.)

Optional on-board chemometrics for stand-alone operation

Overall
Compact rugged design & packaging

Wide temperature operating range

Engineered for operation in harsh process environments

EP-IR SPECTROMETRY

Wavelength range - available in near-IR and mid-IR ranges

Speed - full spectrum information refreshed up to 100 times/second

Wavelength Accuracy - + / - 0.1 cm-1 precision at 2000 cm-1

Spectral Data - up to 256 data channels providing all relevant spectral information

High Sensitivity - Parts-per-billion level sensitivity in less than 60 seconds*

Stability - minimal drift over 24 hour periods

Rugged - vibration insensitive, wide temperature operational range

Low maintenance costs

EP-IR SPECTROMETRY APPLICATIONS

Simultaneous analysis of multiple components in a mixture, including spectrally interfering compounds

On-line process quantitative analysis of complex mixtures in real time

(Bio)chemical kinetics real-time monitoring

Optimized optical & mechanical design for ease of integration with gas, liquid and solids sampling accessories and sources.

EP-IR vs. NDIR (non-dispersive infrared):

Full spectral information - up to 256 data channels enables multi-variate analysis and advanced chemometrics

Complex mixtures - real-time process quantitative analysis of multiple chemical compounds (replaces multiple NDIR units)

High sensitivity - Parts-per-billion level sensitivity in less than 60 seconds*

Stability - minimal drift over 24 hour periods

EP-IR vs. FTIR (fourier transform infrared):

Speed - 100 scans/second with real-time Discrete Fourier Transform and co-addition

Comparable accuracy - inherent wavelength accuracy (lithographic reproduction techniques used for scanning disc manufacture)

High sensitivity - Parts-per-billion level sensitivity in less than 60 seconds*

Stability - minimal drift over 24 hour periods

Rugged - vibration insensitive, wide temperature operational range

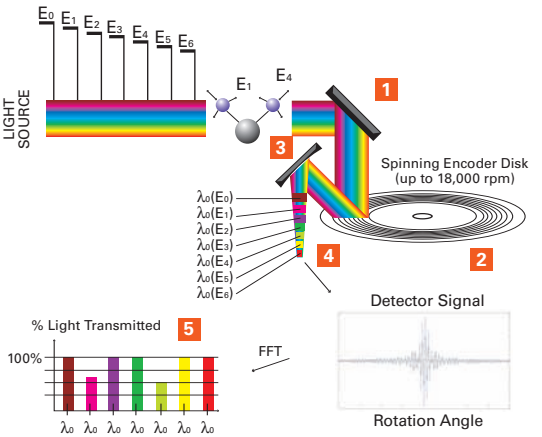
Small size - 14" X 7" X 5", < 15 lbs.

Cost effective for "lab to process" deployment

*in gas phase

What is EP-IR Spectrometry?

EP-IR spectrometry - Principles of operation



EP-IR Spectroscopy relies upon a photometrically simple, yet rugged and efficient design, where the incoming infrared beam from the sample is imaged on to a diffraction grating based spectrograph.

1 The dispersed radiation from the grating is imaged across an aperture above the surface of a rotating encoder disc.

2 The encoder disc has a series of reflective tracks, which are spatially located within the dispersed grating image to correspond to the wavelengths and wavelength regions used for the analysis.

3 Each track has a pattern that produces a reflected beam with a unique sinusoidal modulation for each individual wavelength.

4 The reflected beams are brought to an image on a single detector, which generates a signal that forms a discrete interferogram.

5 The intensity contribution for each wavelength component is obtained by applying a Fourier transform to the interferogram.

The EP-IR spectrometer is designed to encode the analytical information…but without the environmentally sensitive components of an interferometer.

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