

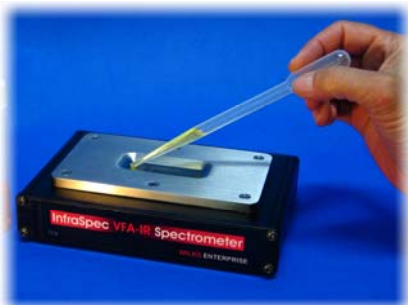
InfraSpec Variable Filter Array (VFA) IR Spectrometer *A New Concept in Infrared Instrumentation*



A rugged and portable filter based mid-infrared (mid-IR) spectrometer that provides mid-IR spectral—quantitative or qualitative—analysis on a wide variety of materials on site, in the production area or in the field. Ideal for repetitive process analysis applications and designed to be operated by personnel with little or no knowledge of infrared analytical techniques.

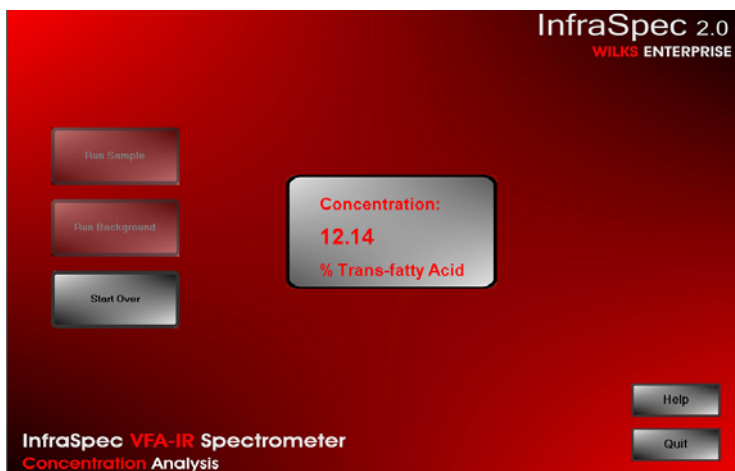
On-Site IR Analysis Now Easier and More Useful Than Ever Before

The InfraSpec Variable Filter Array (VFA) IR Spectrometer is a new concept instrument that enables the user to obtain infrared spectra on a variety of materials wherever they occur—in the production plant, in the field or in the lab. The new InfraSpec VFA-IR Spectrometer utilizes a patented design consisting of an ATR sample plate with a pulsable source on one end and a linear variable filter (LVF) mounted on a 128 pixel detector array on the other end. The net result is a very compact spectrometer with no moving parts, no optical path exposed to air and capable of producing mid-IR spectra on a variety of materials including liquids, slurries, semi-solids and films. A transmission variable filter array is also available for sealed cells, cuvettes, or card readers. The InfraSpec VFA-IR Spectrometer can be used like an FT-IR Spectrometer with much of the software program geared towards repetitive process analysis applications.



- **Spectral Range Analyzer**—2.5 -5.0 μm or 5.4-10.8 μm
- **Fast** — results in less one minute
- **Portable** — 6.0 x 6.5 x 2.75 inches (15.2 x 16.5 x 7 cm), can be battery operated
- **Affordable** — less costly than most other measurement techniques
- **Lightweight** — less than 4 lbs
- **Easy to use** — simplified PC interface
- **Direct readout** in desired units or pass/fail
- **Data Transfer** - USB or RS-232 connections

Application Versatility for Laboratory, Field or At/Near Line Use

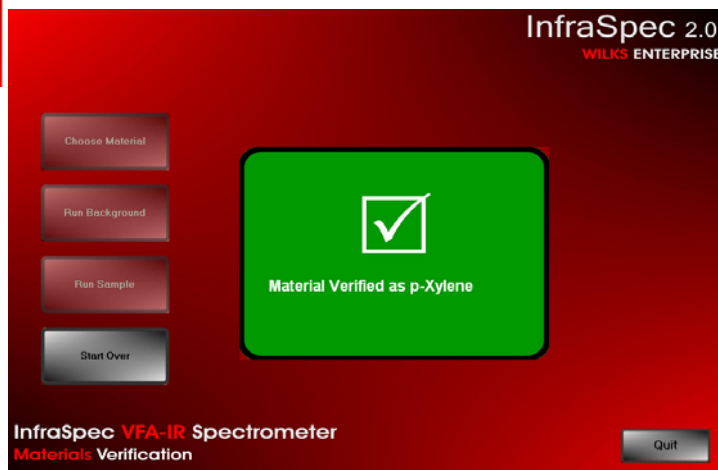


Quantitative Analysis

The mid-IR is the ideal spectral region for quantifying key components in a product. Examples include alcohol measurement in beverages, biodiesel in diesel, ethanol in gasoline, total glycerides during the biodiesel reaction process, free fatty acid and water analysis on biodiesel feedstock, and trans-fatty acid in vegetable oils.

Materials Verification

An important use of mid-IR spectral data has been to identify materials. The rugged and portable InfraSpec VFA-IR Spectrometer is well suited for this application because it can be placed at the receiving dock or in the production area. Materials can be verified in minutes by in-plant personnel with a simple pass/fail screen. Spectra of materials are stored in the InfraSpec software program for subsequent detailed analysis.



Typical InfraSpec VFA-IR Applications

Food Analysis

- % trans fatty acid
- Glucose in water
- Sugar in beverages
- Alcohol in beverages

Fuel Related Analysis

- Biodiesel in diesel
- Ethanol in gasoline
- Water in ethanol
- Total glycerides in biodiesel
- Free fatty acid and water in biodiesel feedstock
- Water in methanol

Energy Industry

- Water in D₂O
- D₂O in water

Polymer Industry

- Flexible film analysis
- Raw materials verification

Environmental Testing

- Solvents in water
- Oil in vertrel
- Isocyanates

Chemical Industry

- Materials verification
- Reaction monitoring
- Water in solvent

Pharmaceutical

- Process monitoring (PAT)
- Material verification

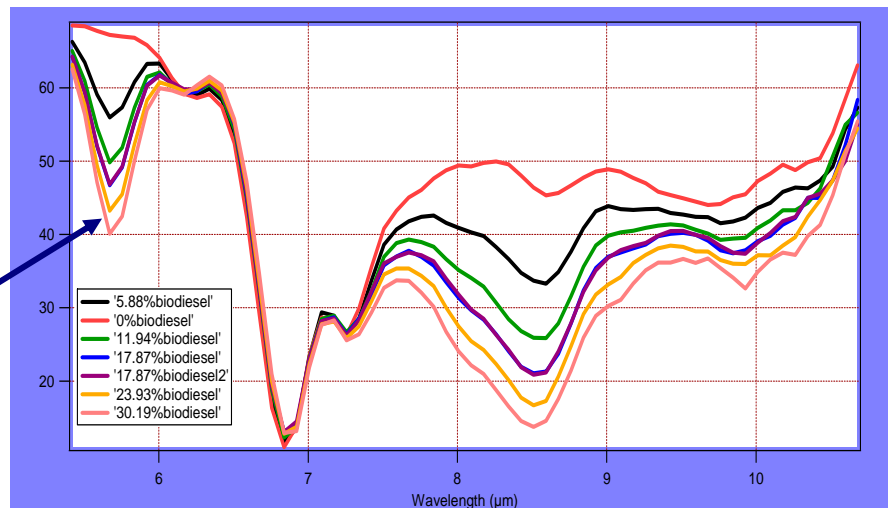
University Research

Other

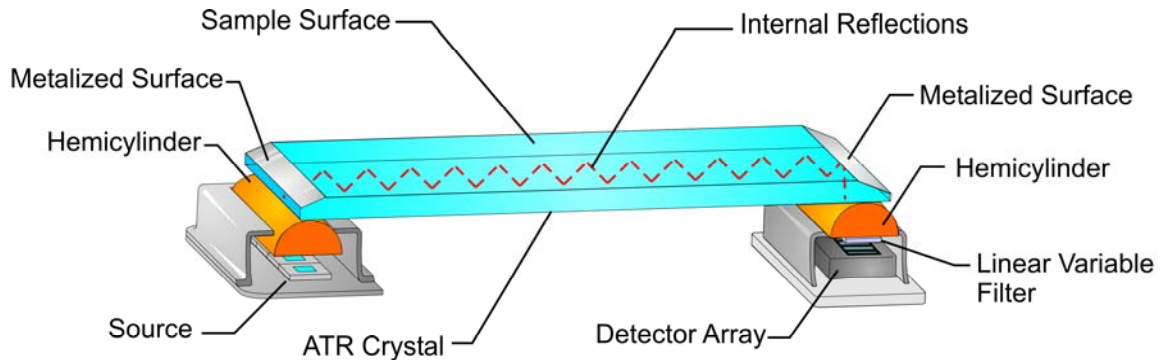
- Household products
- Soil analysis

Research Applications

For research laboratories or universities, the InfraSpec VFA-IR Spectrometer is a lower cost alternative to an FT-IR. With no exposed air path, it is relatively unaffected by environmental changes. Having no moving parts makes it less susceptible to damage. These features make it ideal for on-site analysis as a dedicated spectrometer for a research project.



Optical Schematic of the InfraSpec VFA-IR Spectrometer



Spectral performance varies with the ATR crystal material selected and the wavelength range of the LVF. An LVF can cover approximately an octave in terms of wavelength. Examples are 2.5 - 5.0 μm (the OH/CH region); 5.4 - 10.8 μm (the fingerprint region). Cubic zirconia crystals are used with the 2.5 - 5.0 μm LVF, ZnS or ZnSe with the 5.4 - 10.8 μm .

InfraSpec Specifications

Dimensions	6.50" x 6.5" x 2.75", 15.2 x 16.5 x 7 cm
Weight	3.5 lbs., 1.5 kg
P.C. Interface	RS 232 or USB
Power Requirements	12V DC, 2.0 amps
Power Supply	Universal AC/DC converter type (supplied as standard)
Suggested Temperature Operating Range	15°C - 60°C
Humidity	0 - 98% relative humidity (non-condensing)
Detector Array	128 Pixel linear pyroelectric array
Array Responsivity	5.4-10⁵ V/W
Standard Spectral Ranges	2.5-5 μm (2000-400 cm^{-1}), 5.4.10.8 μm (1850-925 cm^{-1})
Resolution	25 cm^{-1}
For InfraSpec VFA-IR Spectrometer ATR Sample Plate	
ATR Crystal Material	Cubic Zirconia, Zinc Selenide, or Zinc Sulfide
ATR Surface Size	50 x 16 mm
# of Reflections	10

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