

Accurate. Compact. Intuitive.

AGILENT 5500 SERIES FTIR SPECTROMETERS

The Measure of Confidence



**Agilent Technologies**

# accurate



## 5500 SERIES FTIR SPECTROMETERS

Agilent Technologies is your premier resource and partner for molecular spectroscopy. With the addition of compact, handheld and portable FTIR products, Agilent offers you a comprehensive range of molecular spectroscopy solutions.

### Quality answers — fast

The Agilent 5500 Series FTIR spectrometers are accurate, compact and intuitive, and provide superior qualitative and quantitative information for solid and liquid samples. With high performing optics, innovative sampling interfaces and intuitive software you can be sure the Agilent 5500 Series FTIR will give you fast, accurate, reliable results.

The Agilent 5500 Series FTIR is ideal for dedicated analyses in chemical, polymer and biotech QA/QC laboratories, and is an invaluable tool for proactive on-site maintenance of high-value machinery in the energy production, construction, mining and transportation industries.

Focussed on analyses in the mid-infrared, fingerprint region of the spectrum (4000–650  $\text{cm}^{-1}$ ), the Agilent 5500 Series FTIR comprises:

- 5500 DialPath for dedicated transmission measurements of liquid samples
- 5500t for specialized oil analysis applications
- 5500a for Attenuated Total Reflection (ATR) measurements of solid, semi-solid and liquid samples

The Agilent 5500 Series FTIR delivers:

- Reliability — proven, rugged optomechanical system provides answers you can trust.
- Easy analysis — no sample preparation is required, and sample introduction and cleanup are easy.
- Superior results — unique optical design gives you outstanding performance and reproducibility.
- More lab bench space — smallest and lightest available FTIR, takes up only 20 x 20 cm and weighs just 3.6 kg.
- Pictorial software with color-coded alerts provide answers at a glance, and warn when samples are out of specification.



## Molecular Spectroscopy Innovations

<b>1947</b> First commercial recording UV-Vis, the Cary 11	<b>1954</b> Cary 14 UV-Vis-NIR introduced	<b>1969</b> First rapid-scanning Fourier transform infrared spectrometer, the FTS-14	<b>1979</b> First use of a mercury cadmium telluride (MCT) detector in an FTIR	<b>1982</b> First FTIR microscope, the UMA 100	<b>1989</b> The acclaimed Cary 1 and 3 UV-Vis introduced	<b>1991</b> First infinity corrected infrared microscope
<b>1999</b> First 256 x 256 MCT focal plane array (FPA) for analytical spectroscopy	<b>2000</b> First ATR chemical imaging system	<b>2002</b> Research grade Cary 4000/5000/6000i Series UV-Vis-NIR introduced	<b>2007</b> Smallest, most rugged commercially available interferometer introduced	<b>2007</b> TumbIIR sample interface introduced — a revolution in FTIR liquid sampling	<b>2008</b> 600 Series FTIR spectrometers, microscopes and imaging systems introduced	<b>2008</b> First handheld FTIR, the ExoScan

# FOR YOUR APPLICATION

Agilent is committed to providing solutions for your application. We have the technology, platforms, and expert guidance you need to be successful.



### PETROCHEMICALS

- Monitor the health of lubricating fluids
- Determine the level of water in oil
- Analyze the degree of oxidation in lubricating fluids
- Measure the depletion of antioxidant additives
- Confirm the identity of incoming lubricating fluids
- Analyze petroleum and biofuels
- Analyze % biodiesel in diesel fuel via ASTM 7371-07 and EN 14078
- Measure the amount of biodiesel contamination of diesel fuel to as low as 250 ppm
- Measure key analytes in gasoline and diesel fuel, including gasoline contamination of diesel
- Measure ethanol and other oxygenates in gasoline and diesel fuel
- Measure contamination and aromatics in aviation fuel



### SPECIALTY CHEMICALS

- Confirm the identity of incoming raw materials
- Ensure the quality of compounds used in human food, health and cosmetic products
- Measure contaminant levels to ensure specifications are met
- Analyze and confirm the composition of finished products
- Analyze work-in-progress to ensure specification compliance
- Measure the concentration of additives in formulations
- Measure analytes in specialty solvents used in electronic component manufacturing
- Analyze individual flavor components in a final flavor formulation
- Analyze edible and cooking oils; measure trans-fat content
- Analyze paper for impurities, foreign particles, and composition



### MATERIALS TESTING

- Analyze failure causes in composites, paint coatings, and polymer films
- Track paint curing and composition
- Determine the concentration of UV stabilizers, antioxidants, or filler in plastics
- Measure oxidation in various co-polymers
- Determine the degree of cure and composition of rubber
- Analyze and measure thickness uniformity of wax or oil on polymer and metal surfaces

# compact



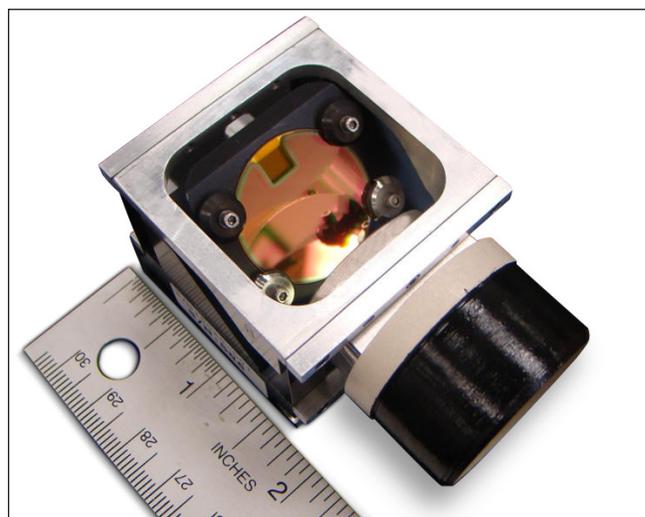
## SMALL SIZE, BIG PERFORMANCE

Maximize your lab bench or fume hood space, and achieve the utmost in performance and ruggedness, without downtime.

### Innovative design, unique technology

The compact, lightweight Agilent 5500 Series FTIR is big on performance and reliability. This is achieved through an innovative design, coupled with a unique interferometer and optical system:

- 25 mm optical aperture and very short internal optical path in the interferometer achieve performance levels associated with far larger lab systems.
- Same rugged, compact interferometer and optical system as that in Agilent's handheld and portable FTIR.
- The interferometer's moving mirror uses the unique Flexure system for long-lasting, proven reliability.
- Solid state laser provides long life, reliable operation and precision, and eliminates the need for large, traditional HeNe lasers.
- Dedicated ATR, TumbIIR, or DialPath sampling technology is fully integrated into the optical system, for optimized performance and zero user alignment.
- Optics are completely sealed, require no alignment, and use non-hygroscopic ZnSe. No purge is required and humidity will not affect performance.
- The only required external utility is power.



### Innovative interferometer technology

Measuring just 8 × 8 × 13 cm, the Agilent modular interferometer is the smallest and most rugged commercially available high performance system

# SIMPLICITY THROUGH INNOVATION

The Agilent 5500 Series FTIR has a sampling interface to suit your application and user requirements.

The 5500 DialPath and 5500t are ideal for laboratories performing quantitative analysis of liquid samples. The 5500a is suitable for measuring a range of concentrated liquids, powders, pastes and gels.

## **5500 DialPath FTIR — DialPath interface**

- Unique DialPath technology facilitates long pathlength FTIR transmission measurement of liquids, without the inconvenience of cumbersome infrared transmission cells.
- As easy to use as ATR.
- Dedicated analyzer for high quality qualitative and quantitative analysis of samples of various concentrations.
- Select three factory-calibrated, fixed pathlengths between 30 and 250 microns.
- For lower concentration samples, select a longer pathlength window set. For more concentrated samples, use a shorter pathlength combination.

## **5500t FTIR — Tumbler interface**

- Single window set, 100 micron version of DialPath for specialized oil analysis applications.
- Simply place a single drop of liquid on a stationary infrared-transparent window, then rotate a second window to encompass the sample. A highly reproducible, fixed sample pathlength is created between the two windows.
- Quickly clean up by merely wiping the windows to prepare for the next sample.

## **5500a FTIR — ATR interface**

- Universal sampling interface readily handles solids, concentrated liquids, pastes, and gels with ease.
- Ideal for busy QA/QC and material science labs.
- Diamond ATR is impervious to scratching and virtually all corrosive materials.
- Choose a one, three or five reflection diamond ATR. Single reflection diamond ATR is available for solids and liquids identification. Multi-reflection ZnSe ATR is available for liquid analysis.
- Precisely controlled powder press ensures reproducible measurements of solids.

# dedicated



## PETROLEUM AND PETROCHEMICAL APPLICATIONS

The Agilent 5500 Series FTIR has the capabilities of much larger, laboratory FTIR oil and fuel analysis systems, without the complexity, maintenance requirements or cost.

### Answers in minutes with the 5500t FTIR

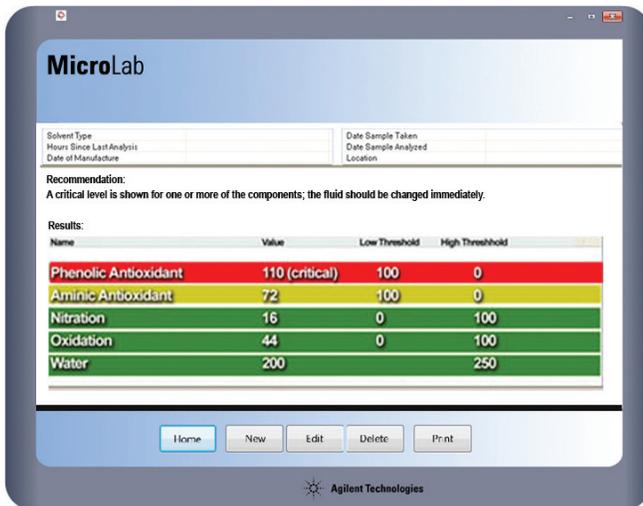
- The special 100 micron pathlength TumbIR transmission interface is ideal for viscous oils, fuels and lubricants.
- Simply click a button to obtain valuable information about the condition of a lubricating fluid, or get a detailed fuel sample analysis.
- No sample preparation is required, and only minimal sample is used for the rapid quantitation of minor components in a liquid.
- Perform analyses in less than 2 minutes, and clean up in seconds.
- Intuitive software means no technical training is required to use the system.
- Screen prompts assist you in performing an analysis, and results are presented in an easy-to-understand format.

### Lubrication analysis

With just a single drop, analyze turbine oil, hydraulic fluid, gear oil, crankcase oil and greases. Use the 5500t to determine:

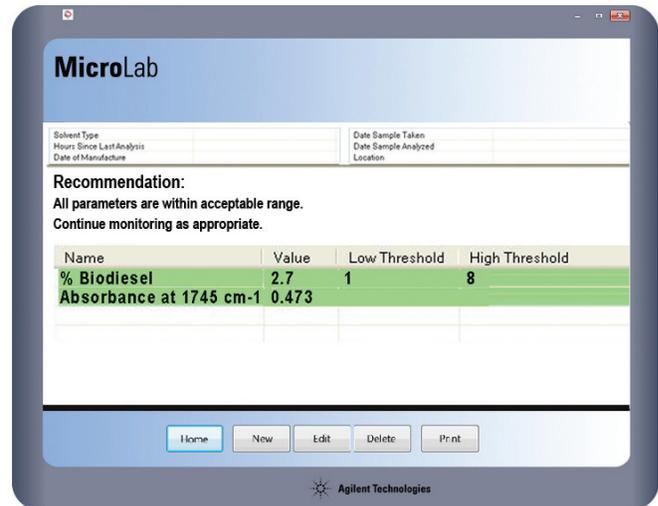
- Water in oil — monitor levels as low as 50 ppm.
- Degree of oxidation — measure oxidation and nitration by-product formation.
- Additive depletion — accurately determine critical additive levels such as antioxidant, anti-wear and extreme pressure additives.
- Contamination/lube identity — ensure the proper lubrication has been provided and that it is fit for service.





### Easy-to-read results

Screen prompts assist with performing analyses. Results are presented in an easy-to-understand format, with color-coded recommendations.



### Biodiesel analysis recommendation

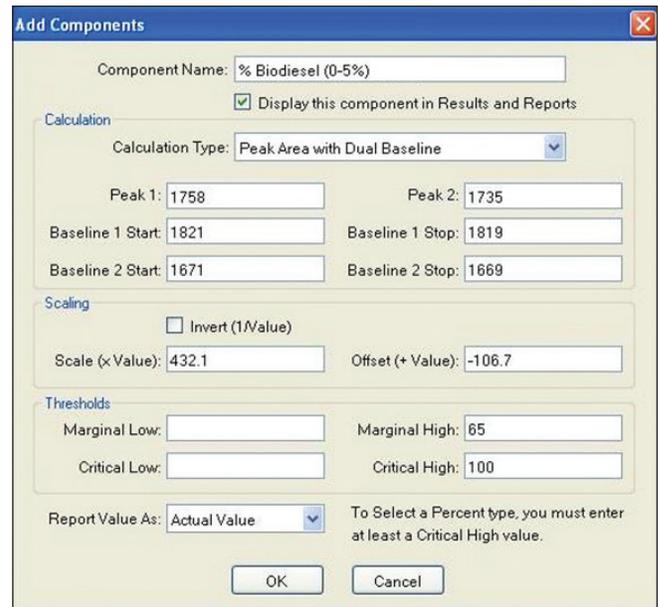
MicroLab FTIR software results screen for a 3.0% sample of biodiesel in diesel.

# FUEL AND BIODIESEL APPLICATIONS

## Measure trace amounts

For diesel fuel analysis, you can:

- Quickly and accurately determine the amount of biodiesel present in blended diesel fuel. Use the 5500t if you need to comply with EN 14078, or the 5500a for ASTM 7371-07.
- Accurately measure biodiesel from the lowest concentrations up to 100% biodiesel.
- Rapidly and easily measure biodiesel in stored diesel fuel to as low as 0.025% (250 ppm); critical in applications such as nuclear power generation plants and aviation fuel, where biodiesel degrades fuel quality.
- Select and execute a specific method with a single command.
- View quantitative results, which are color-coded to alert you if a sample is out of specification.



### Simple method creation

Easily set method sample parameters so that the software informs you when samples are out of specification

# reproducible



## SPECIALITY CHEMICAL APPLICATIONS

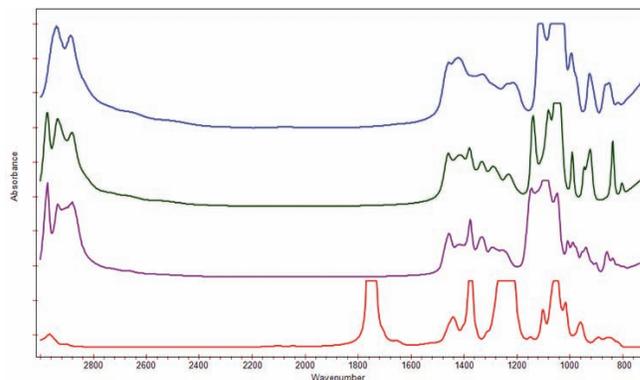
The 5500 DialPath FTIR changes everything you know about liquids analysis by FTIR.

### Identify and measure

DialPath technology has revolutionized the analysis of specialty and fine chemical liquids, which are formulated into products used in the human health, food and cosmetics industries.

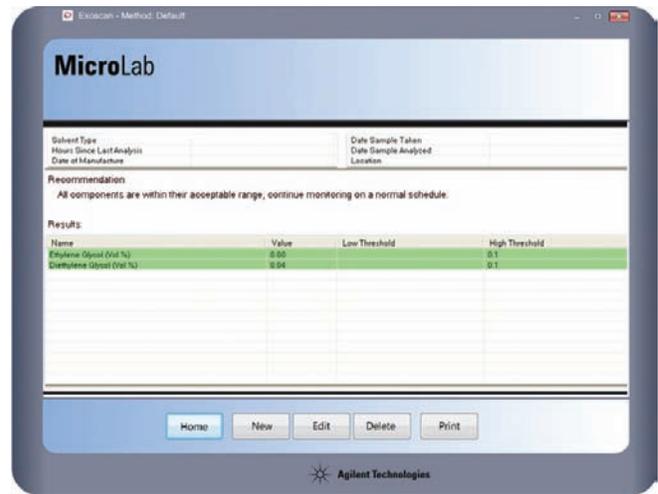
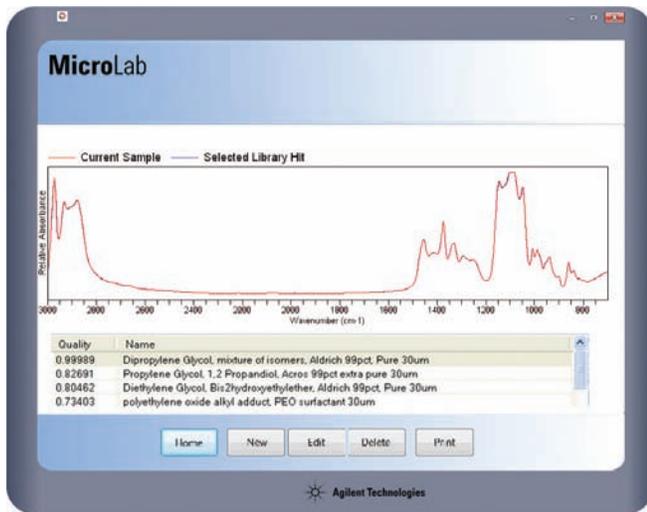
With the 5500 DialPath FTIR you can:

- Use the 30 micron DialPath window set to identify concentrated liquids. Simply place a drop of the liquid between the two windows and analyze.
- Easily analyze trans fat in edible oils and identify food adulterants.
- Quickly authenticate solvents, surfactants, specialty amines, or industrial organic chemicals using spectral libraries.
- Accurately measure levels of known additives to ensure manufacturer's specifications are met.
- Ensure blends and mixtures of fine chemicals are properly formulated.



### DialPath spectra

Spectra of additives recorded using the DialPath 30 micron pathlength: blue = glycerol, green = propylene glycol, purple = dipropylene glycol, red = triacetin.



### High quality matches

Rapidly compare your results to onboard spectral libraries. Analyze individual compounds to display high quality matches to reference spectra and confirm the identity of your sample.

### Ensure sample is within specification

The green color bands indicate that the level of impurities in triacetin are within the user set specifications.

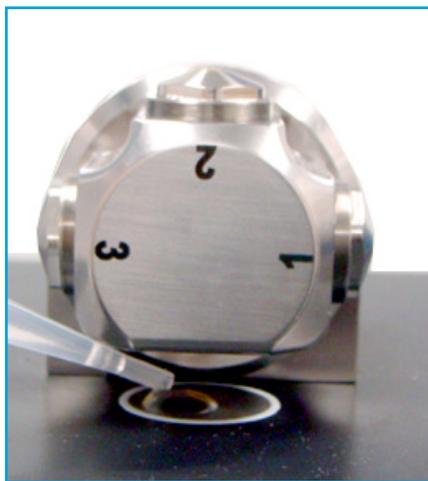
# THE DIALPATH ADVANTAGE

## Revolutionary technology

- Instantly select one of three pathlengths, as needed.
- No need to disassemble to change pathlengths.
- Spacers are not required, so there is no cell leakage.
- Eliminate fringing and bubbles.
- Autosamplers or syringes are not required for sample introduction.
- Effectively handle liquids of varying viscosity and volatility.



**1** Ensure the crystal is clean



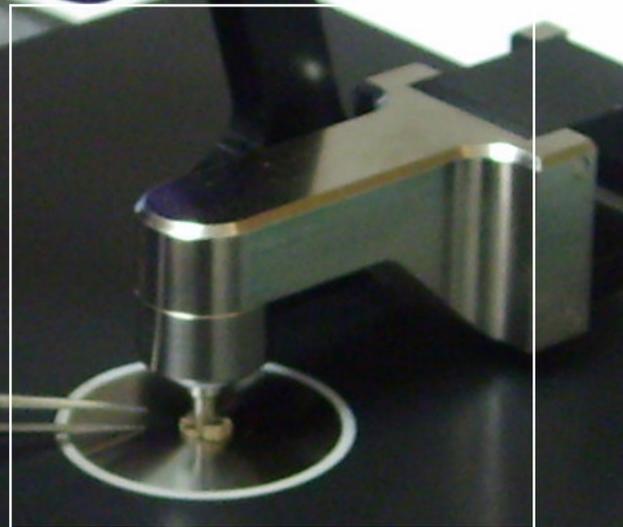
**2** Place your sample on the window



**3** Turn the DialPath to your required pathlength



intuitive



## MATERIALS TESTING APPLICATIONS

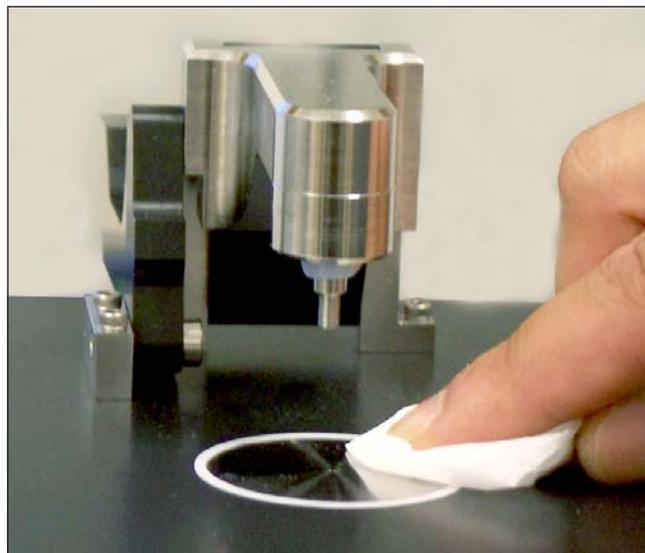
The 5500 Series FTIR is perfect for routine use in QA/QC labs and other multi-user, high traffic environments. Individuals with varying levels of experience can use the system with ease.

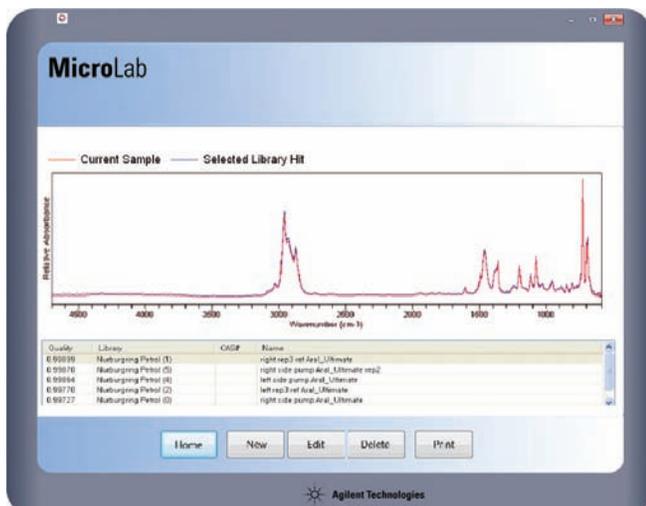
### Confidence in your results

Every aspect of the 5500 Series FTIR was designed with simplicity in mind, from the no-alignment optics, to the software that provides visual assistance with running the sample, to the all-important sampling interfaces.

For the routine analysis of materials in the chemical and polymer industries, you can:

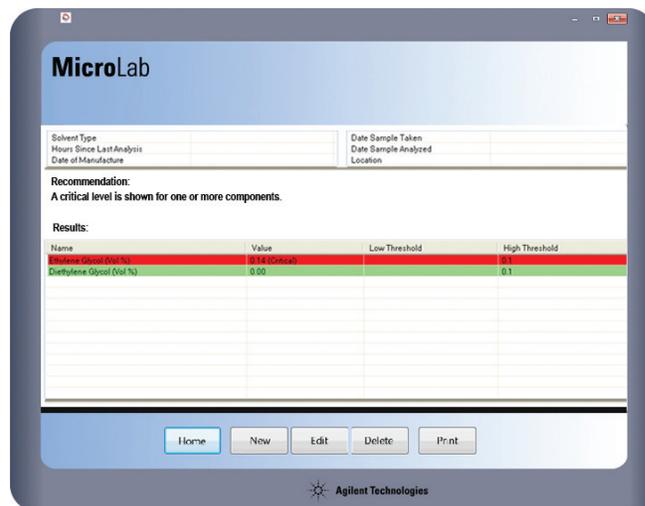
- Identify and confirm plastics, elastomers, and adhesive materials by comparing spectra with the onboard library.
- Verify the composition and quality of coatings and thin films.
- Obtain quantitative information about co-polymers using pre-loaded calibrated methods.
- Analyze contaminants during semiconductor processing and solar cell manufacturing.
- Confirm that products being formulated and finished products comply with defined specifications.





### Quality Library Match

Use the MicroLab PC software to search onboard libraries to obtain quality and library hit matches.



### Method-driven

Use method-driven software to set specification parameters based on sample type. If the sample does not meet the specifications, the software will alert you with color-coded results.

# DISTINCTLY BETTER SOFTWARE

The powerful, intuitive MicroLab FTIR software ensures you get the answers you need quickly and easily.

### Analysis made easy

With the innovative MicroLab FTIR software, you can:

- Be guided through sample introduction, analysis and cleanup by an intuitive, pictorial interface.
- Ensure data quality by seeing the spectrum before a full data collection, using real-time analysis mode.
- Perform straightforward diagnostics for optimal instrument performance and data quality.
- Easily create qualitative and quantitative methods using the supplied development package.
- Simply click a button to use pre-loaded and pre-calibrated methods.
- Identify unknown compounds by searching a library or database.
- Use color-coding to quickly identify whether analytes are above a critical threshold (red), approaching threshold (yellow) or within specification (green).
- For lubricants, click a highlighted color bar to see a comparison of a used sample and a fresh sample spectrum.
- Edit action thresholds for specific equipment or formulations.
- Transfer data files to advanced chemometric packages for further development and workup.

## Trust Agilent to keep your lab running — at peak productivity

Agilent's Advantage Service protects your investment in Agilent instruments and connects you with our global network of experienced professionals who can help you get the highest performance from every system in your lab. Count on us for the services you need at every stage of your instrument's lifecycle — from installation and upgrade to operation, maintenance and repair.

For customers who require full system validation, Agilent offers complete qualification services (Installation and Operational Qualification) for the Agilent 5500 Series FTIR.

And if ever your Agilent instrument requires service while covered by an Agilent service agreement, we guarantee repair or we will replace your instrument for free. No other manufacturer or service provider offers this level of commitment.



### Further information

For full details of the Agilent range of molecular spectroscopy products, ask for a brochure or visit our website at [www.agilent.com/ftir/](http://www.agilent.com/ftir/)



Cary 600 Series FTIR Spectrometers  
Publication number 5990-7783EN

Cary 610/620 FTIR Microscopes  
Publication number 5990-7784EN

4100 ExoScan FTIR Spectrometer  
Publication number 5990-8097EN



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