Agilent

Trusted Answers

Agilent 4300 handheld FTIR spectrometer

At-Site. Immediate Results. True Nondestructive Analysis.

The measure of confidence

Bring the power of FTIR spectroscopy out of the lab...and to the sample

From enhancing composite bonding and performance-testing of coatings, to verifying polymer identity and authenticity, and measuring metal surface contamination, success depends on generating actionable, immediate results.

Perform accurate, nondestructive material testing with the Agilent 4300 handheld FTIR spectrometer

The versatile, ergonomic 4300 handheld FTIR spectrometer is ideally suited to at-site, mid-IR measurement of objects constructed from high-value materials. Its optimized design lets you quickly scan large surfaces or areas, and knowledgeably assess factors such as identity, quality, authenticity, and wear. In addition, the 4300 handheld FTIR enables you to analyze objects directly – without removing a sample – so you can reduce your dependence on overworked or off-site labs. In short, the 4300 handheld FTIR represents a new generation of FTIR innovation for material analysis brought to you by Agilent.

Superior analytical performance under realworld conditions:

The Agilent 4300 handheld FTIR spectrometer eliminates the need to take samples to the instrument, so you can nondestructively measure objects of any size or form factor.

Nondestructive testing, right on the spot

The 4300 handheld FTIR enables you to take measurements wherever they are needed – regardless of the physical size or location of the object. It delivers immediate, real-time results to help you make informed decisions about factors such as quality control, surface contamination, and which samples require further testing. You can nondestructively identify, verify, classify, authenticate, and detect counterfeits in a broad range of materials. We call this positive material identification. With handheld FTIR, you can perform in-service measurements to test materials during their lifetime and determine the effect of use and environment on wear characteristics. In addition, the 4300 handheld FTIR improves productivity by allowing you to quickly scan a large surface area and locate the most important measurement points.

Remarkable comfort and superior data

Weighing under 5 lbs (2.2 kg), the ergonomic 4300 FTIR is ideal for mobile measurements. But do not let its size fool you. The 4300 is also engineered with optimized electronics and an ultrashort internal optical path, so you can count on exceptional results for your most demanding applications. Even better, the 4300 handheld FTIR enables anyone to achieve reliable results with custom, easy-switch sample interfaces, zero alignment optics, and intuitive software.

Generate actionable data for these and other applications

Aerospace, automotive, paints, and coatings

- Composites: Assess thermal, chemical, and environmental damage, test for curing, verify composition, and analyze surface plasma treatment,
- Polymers: Verify composition and authenticity, detect contaminants, and test for curing,
- Rubber and elastomers: Measure the composition of carbon-filled materials, such as tires,
- Coatings: Confirm composition, thickness and uniformity, measure degradation, and ensure proper surface preparation

Food

- Measure soil composition and chemistry
- Analyze fruit and vegetable ripeness

Art and historical object conservation

- Confirm authenticity
- Analyze paints, pigments, fillers, and lacquers
- Determine paper and textile composition

Energy and chemicals

- Identify engineering components (such as gaskets, seals, and O-rings) by composition
- Monitor UV degradation of polymers used in solar panel arrays
- Identify and qualify films and coatings for critical applications in oil and gas exploration and handling
- Measure thermal damage and coating wear on composite wind turbine blades

Mining and geology

- Measure soil composition
- Analyze rocks, minerals, and ores

Metals

- Ensure that surfaces are prepared for coating
- Measure surface contamination
- Monitor surface cleaning processes

Enhanced material analysis from the people who developed the original handheld FTIR

More reproducible results:

At 5 pounds (2.2 Kg), the 4300 is comfortable to hold and use. It also has a perfect weight distribution with its batteries located in the base to balance the optical head. Optimized ergonomics means better quality results, especially for analyses that require longer measurement times, numerous measurement points, or are on objects that are physically constrained.

Superior perfomance:

A proven interferometer design, ultrashort internal optical path, optically matched sample interfaces, and low-noise electronics yield better spectral data utilizing a DGTS detection system.

Rapid scanning:

The Agilent 4300 handheld FTIR is ideal for rapidly and conveniently mapping the surface of materials. The analysis of numerous locations on a surface is made fast and easy due to high sensitivity of the spectrometer and the handheld ergonomic design.

Real-time measurements:

Agilent MicroLab software was created and enhanced for our portable and handheld spectrometers. Its real-time spectral display complements the rapid scanning capability of the 4300 handheld FTIR spectrometer.

Longer periods of continuous operation:

The lithium ion batteries that power the 4300 can easily be swapped while the system is running.

Flexibility for every method:

Interchangeable, snap-on interfaces do not require alignment, and, and are custom engineered to match optics and electronics. These interfaces are RFID equipped to ensure they are correctly matched to the specific method required for an analysis.

Control at your fingertips:

An integrated touch screen operates all system and data acquisition functions and tilts for easy viewing in ambient light.

Fast execution:

Run methods and commands with a simple trigger click

Meet the next generation of FTIR mobility

Touchscreen user interface runs the MicroLab software

Flexibility for every method. Interchangeable, snap-on interfaces require no alignment, are custom engineered to match system optics, and are equipped with RFID sensors to ensure the correct match between sample interface and analytical method

Easy trigger initiates method commands

4-hour Li ion batteries: "hot" swappable for extended system use

Advanced optomechanical and low-noise electronics with no alignment needed

Lightweight: 4.8 lbs (2.2 kg)

Balanced for easier, and better, measurements

Wrist strap improves comfort and security

Optically matched sample interfaces afford the highest quality data for the broadest range of samples

Diamond ATR

Just right for solids, liquids, pastes, and gels, this interface consists of a diamond ATR sensor, which is impervious to corrosion and scratching. After samples come into contact with the diamond window, the top 2-3 surface microns are analyzed.

Diffuse reflectance

Diffuse reflectance is best for samples that reflect little light, such as artwork, soils, rocks and minerals, composites, rough plastics, fabrics, and metal corrosion. Optically matched sample interfaces afford the highest quality data for the broadest range of samples.

External reflectance

External reflectance, with its 45° angle of incidence, is suitable for smooth, opaque samples that reflect infrared light. It also enables the analysis of thin films and coatings on reflective metal surfaces, such as aluminum and steel.

Grazing angle

Ideal for submicron films, the grazing angle interface also works well for measuring trace contamination on reflective metal surfaces. Its 82° angle of incidence improves sample interaction with the infrared energy by increasing sample path length.

Germanium ATR

With germanium ATR, only the top 0.5 to 2 micrometers of an object are measured, making this interface a good match for strongly absorbing solids and liquids (such as carbon-filled elastomers and rubbers).

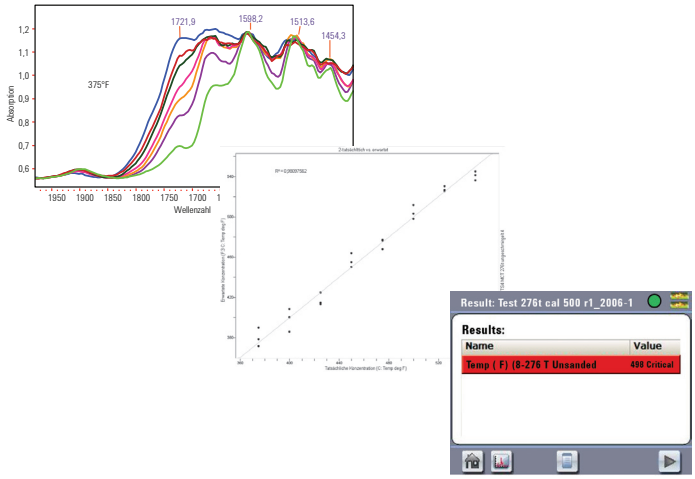
Measure smarter, measure faster for your key applications

The Agilent 4300 handheld FTIR nondestructively handles field measurements across diverse industries

Composites

The 4300 handheld FTIR is proven to deliver outstanding results in applications such as:

- Detecting damage caused by excess exposure to heat
- Mapping thermal damage on surfaces
- Guiding sanding, scarfing, and patching repairs
- Measuring oxidative damage from UV light and other environmental factors
- Confirming the effectiveness of plasma treatment in preparing composite surfaces for bonding
- Detecting hydrocarbon and silicone oil contamination
- Assessing moisture levels
- Determining the extent of pre-preg curing
- Identifying and verifying composition

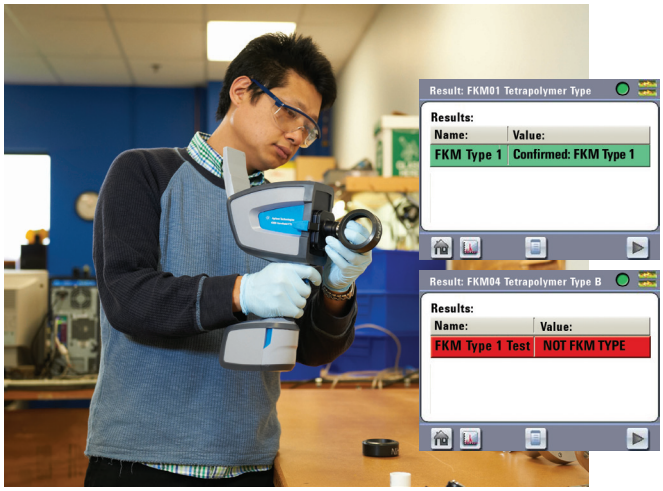


Composite thermal damage is represented in the MicroLab software. Behind the simple-to-use results screen, powerful calibrations embedded in the software provide a method specific to the analysis parameters. The result is color-coded in red to show that the sample exceeds the critical threshold, indicating thermal damage.

Polymers

With its versatile sampling capability, the 4300 FTIR enables you to:

- Identify, verify, and authenticate polymer components
- Measure the degree of cross-linking and cure
- Determine the composition of copolymers
- Analyze rubber and other elastomers – even those containing carbon particles
- Quantify phthalate plasticizer in polymeric materials used in consumer products
- Verify composition and authenticity of seals, gaskets, and O-rings
- Establish the identity and composition of carbon-filled polymers recycled from electronics



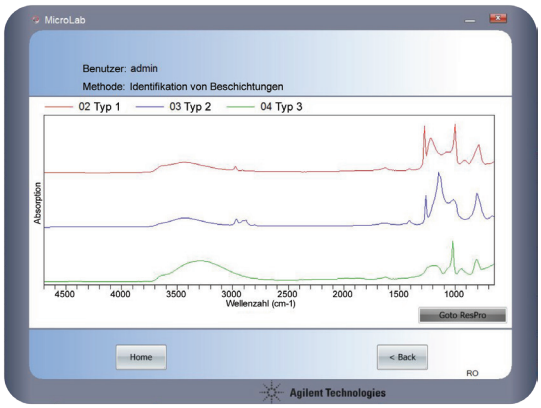
In the MicroLab method chosen for the pictured O-ring analysis, a threshold was set such that samples within the target group are shown in green while those outside the target group are shown in red. Furthermore, the conditional reporting feature can be used to display a customized alert message such as, “Confirmed FKM Type 1” for samples within the target group and the message “NOT FKM TYPE 1” for samples outside the target group.

Coatings

From paints to polymers to adhesives, the 4300 handheld FTIR lets you confidently:

- Confirm that underlying metal surfaces are clean and contaminant free
- Track the cleaning of contaminants from inorganic and organic surfaces
- Ensure the correct coating has been applied to the finished product
- Test whether primers and coatings are properly cured
- Measure thickness and uniformity on metal surfaces
- Evaluate monolayer coatings for coverage and uniformity
- Monitor paint aging and weathering
- Identify lacquers, paints, and pigments used in art conservation and restoration
- Determine presence of residual solvent following coating cure

A



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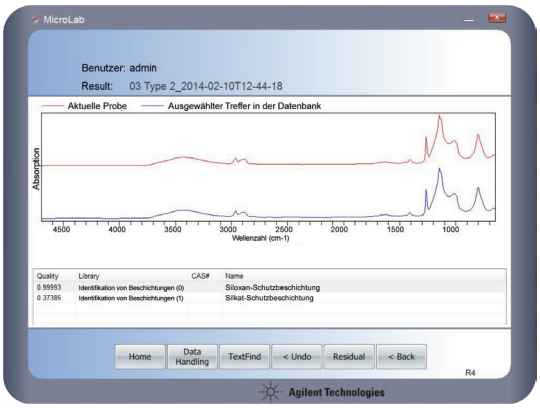


Coating identification:

Protective coatings are a key component of highly polished metal substrates used in lighting and other industrial applications. The 4300 handheld FTIR can easily identify coatings in support of quality control or incoming inspection objectives. Measurement of three commonly used protective coatings on polished surfaces (**A**) demonstrates that these materials are clearly distinguished by their mid IR spectrum. A library search (**B**) identifies one of the compounds as a silicone protective coating.

Agilent MicroLab software

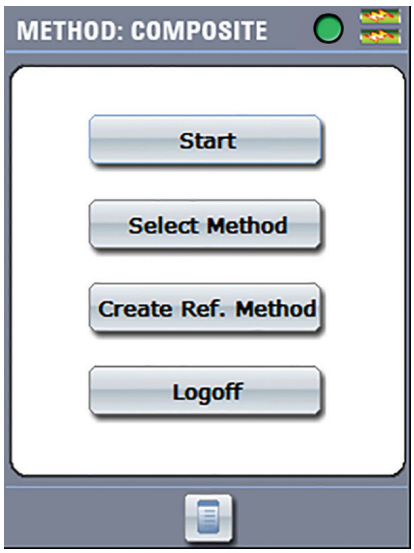
For any application… Agilent MicroLab software is the perfect complement for the 4300 handheld FTIR for any application

Powerful analytical capability, combined with an intuitive user interface, allows users of all levels to obtain great data in the field.

- Pictoral interface simplifies sample measurement
- RFID-enabled device optimizes system acquisition parameters, and confirms that your sample interface and selected method are a match
- Real-time analysis mode and rapid scan rate make it easy to analyze the surface of an object, determine areas for more in-depth measurements, and develop a “molecular map” of the object’s surface
- Single-click trigger lets you execute methods quickly – including previously developed calibrations
- Full library search capability allows rapid identification, verification, and authentication
- Color-coded, visual alerts warn you when samples or objects are not within specification
- Automated diagnostics maximize your uptime
- Integrates easily with MicroLab PC software for easy data, methods, and libraries transference
- GLP/GMP compliant

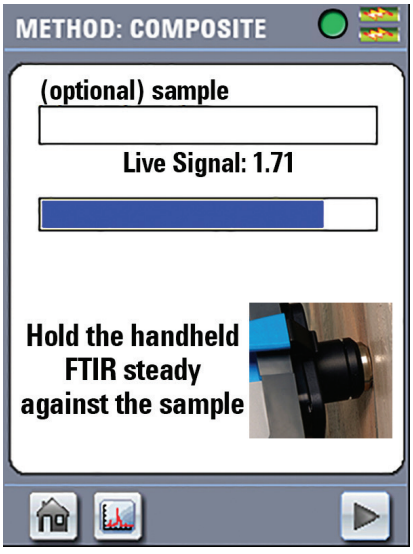
Visual, intuitive user interface and software enable rapid system implementation

The MicroLab software guides the user through the measurement, and the RFID-equipped sample interfaces ensure that the method and measurement parameters are correctly matched. These innovations mean the 4300 will rapidly become an important part of your company's workflow.

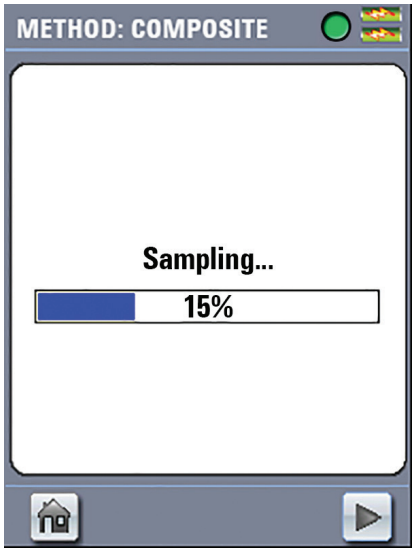


From the home screen you can quickly launch analysis, choose a method, and create a new reference method.

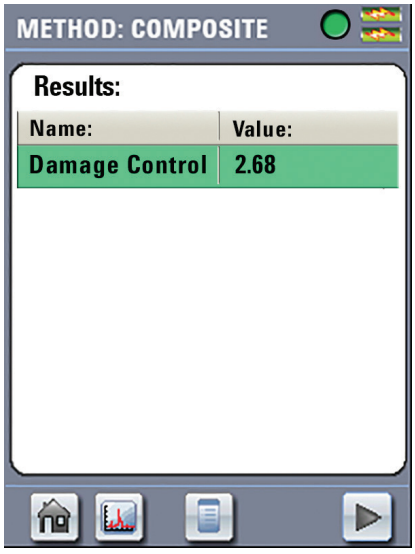
Agilent MicroLab software will instruct when to position the spectrometer's sample interface on the object to be analyzed.



During sampling, the progress bar shows the advancement of the data collection.



When the progress bar reaches 100%, the prompt will change to Transferring Data. You can then remove the instrument from the sample.



Results screen: The results screen will display the calculated component values relative to their critical limits. Components within the acceptable range are shown in green.

Whether you specialize in materials science, industrial R&D, quality control, academic research, life sciences, or pharmaceuticals, Agilent molecular spectroscopy instruments can help you discover, characterize, and test your most diverse and challenging materials.

Agilent service guarantee

If 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 to keeping your lab running at maximum productivity.

Agilent value promise

We guarantee you at least 10 years of instrument use from your date of purchase, or we will credit you with the residual value of the system toward an upgraded model.

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