

NICOLET™ iS10

Getting Started

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For Technical Support, please contact:

Thermo Fisher Scientific

5225 Verona Road

Madison, WI 53711-4495 U.S.A.

Telephone: 1 800 532 4752

E-mail: us.techsupport.analyze@thermofisher.com

World Wide Web: <http://www.thermo.com/spectroscopy>

For International Support, please contact:

Thermo Fisher Scientific

Telephone: +1 608 273 5017

E-mail: support.madison@thermofisher.com

World Wide Web: <http://www.thermo.com/spectroscopy>

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Getting Started

Congratulations on your purchase! The Thermo Scientific Nicolet™ iS™ 10 spectrometer is designed with integrated validation features, a powerful software suite, and many other features that make it easy for you to collect data and get the answers you need.

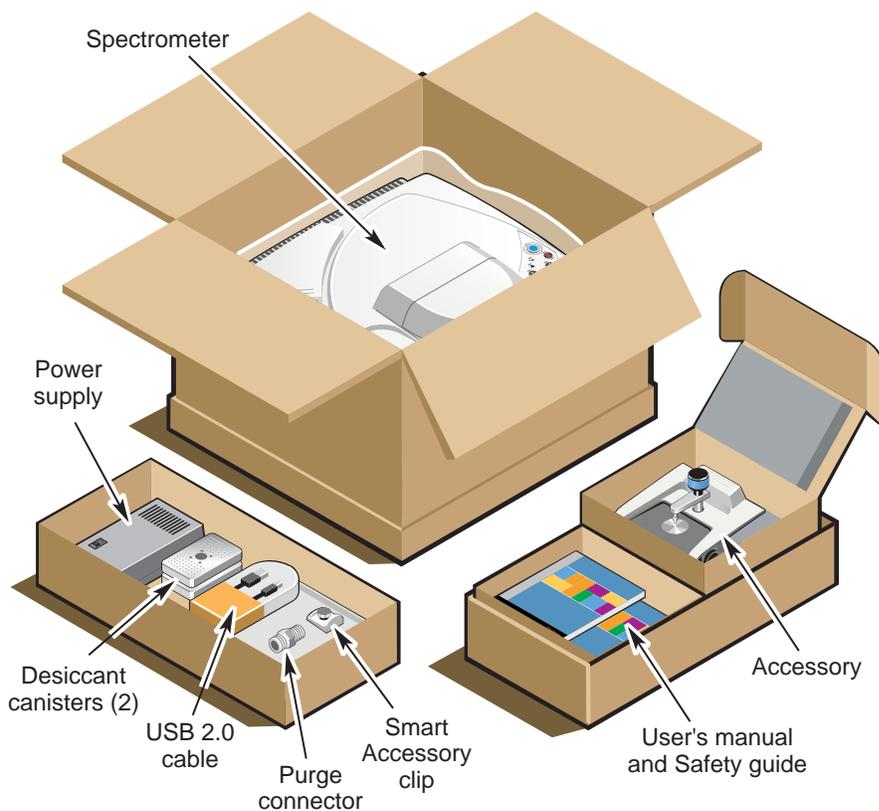
This manual explains the features of your spectrometer and takes you through a basic sample collection. The topics that are covered include:

- The contents of the shipping box.
- An introduction to the instrument.
- The procedure for collecting a spectrum.
- System options.
- Maintenance and performance checks.
- Important documents.
- Contact information.
- The instrument warranty.

What's in the box?

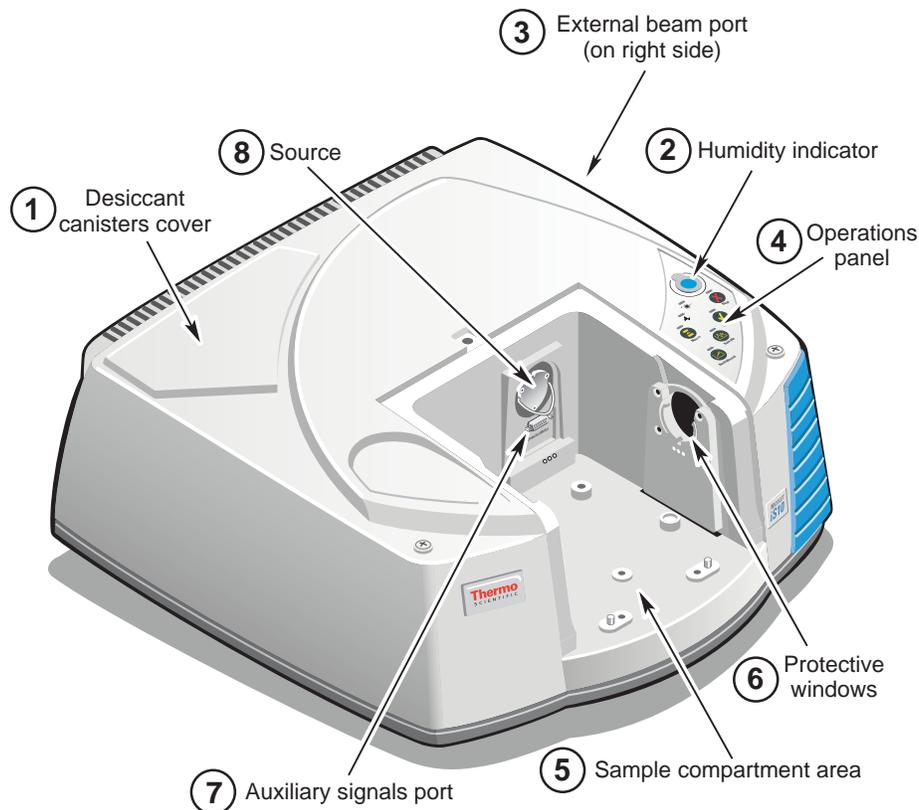
Your spectrometer will be unpacked and installed by one of our service representatives, but if necessary, you can unpack the shipping box before the installation. The following drawing shows the typical contents of the box.

Notice To avoid permanent damage to the optical components in your spectrometer, do not open anything, especially the plastic bag that protects the spectrometer, until the entire shipping box has come to room temperature. Please see “What about the warranty?” in the “Taking the Next Steps” chapter for more information. ▲



What are the features?

The following drawing shows the main features of your spectrometer. After the drawing, you will find descriptions of these features. For additional information, please see the spectrometer help available through the Help menu in the OMNIC™ software.

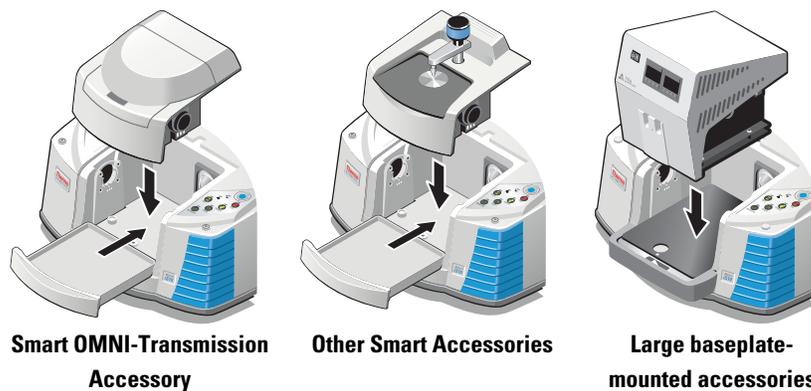


- ① Your spectrometer is protected from excessive humidity by two desiccant canisters located in a compartment below the desiccant canisters cover. For information about regenerating and replacing these canisters, choose the spectrometer help from the Help menu in OMNIC, and then refer to the “Replacing the desiccant” and “Regenerating the desiccant” topics.

- ② The humidity indicator monitors the level of humidity inside the spectrometer. The status is indicated by the color of the indicator:



- ③ The external beam port on the right side of the spectrometer allows the spectrometer to be connected to an FT-IR microscope or a Nicolet iZ10 module.
- ④ The operations panel has buttons and indicators that allow you to perform many operations without needing to use the computer. For information about advanced operations using the Macro button, please see OMNIC software help (available through the Help menu in OMNIC). The other buttons are explained in the “How Do I Collect a Spectrum” chapter and in the spectrometer help system available through the Help menu in OMNIC.
- ⑤ You can use the sample compartment with many different accessories, such as a:



➤ **The Smart OMNI-Transmission Accessory:**

Use the transmission accessory to collect data from samples held in any of the typical transmission cells or holders, including:

- Standard liquid cells
- Film holders
- KBr pellet holders
- ST-IR cards
- Mineral oil mulls
- Gas cells up to 10 cm

➤ **Other Smart Accessories™:**

A wide range of Smart Accessories can be used, including:

- Attenuated total reflectance (ATR)
- Diffuse reflectance (DRIFTS)
- Specular reflectance
- Temperature controlled accessories
- Near-Infrared Integrating Sphere

Note The included tray provides storage below the accessory and protects the cover of the instrument. ▲

➤ **Large baseplate-mounted accessories:**

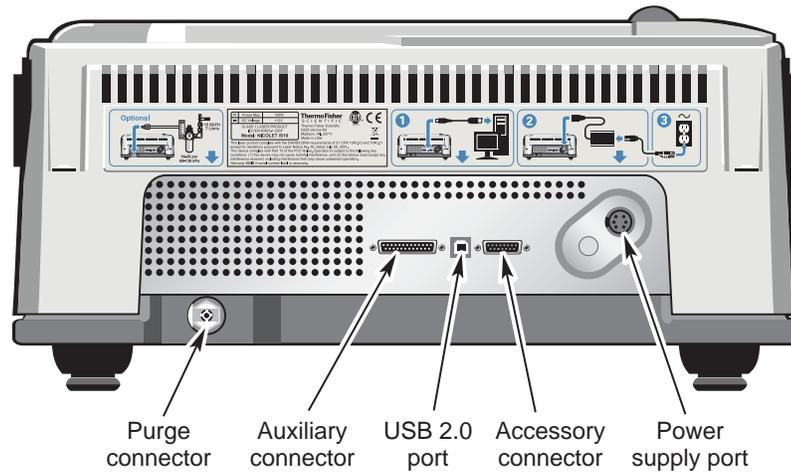
An optional sample compartment extension allows you to install specialized accessories, including:

- Thermal gravimetric analysis (TGA) interface
- Micro-Well Plate accessory (reflection or transmission)
- Multi-pass (long pathlength) gas cells
- Other accessories

- ⑥ Your spectrometer is protected from environmental humidity and other chemical vapors by two windows. These windows isolate the optics in the spectrometer and are coated to improve their resistance to water vapor. You still, however, need to be careful when cleaning your spectrometer to avoid damaging the optics or the windows. For more information, please refer to the “Cleaning your spectrometer” topic in the spectrometer help (available through the Help menu in OMNIC).
- ⑦ The auxiliary signals port is used for accessories with detectors or power needs, such as the Micro Well Plate accessory and the near-IR integrating sphere.
- ⑧ You can replace the source in your instrument without removing the cover. Two sources are available: one for the mid-IR range (EverGlo™) and another for the near-IR range (tungsten-halogen). (For information about installing a new source, open the spectrometer help from the Help menu in OMNIC. Choose the “Source” topic from the “Replacing existing hardware” book in the “Service” book of the spectrometer help system.)

What's on the rear panel?

The following drawing shows the connectors that are on the rear panel of your spectrometer:



- The USB 2.0 port is where you connect the system computer.
- The power supply port is where you connect the power supply for the instrument.
- The Accessory connector is used to connect the instrument to a Nicolet iZ10 module or other accessories.
- The Auxiliary connector allows you to start a data collection remotely and also allows service personnel to check the function of the spectrometer.
- The Purge connector is where you connect a purge gas supply.

Collecting a Spectrum

To collect a sample spectrum, you must first collect a reference (or background) spectrum that shows the response of the system when no sample is present. Once you have the background spectrum, you can collect data with a sample in place. The sample data is then ratioed with the background data, which leaves only the signals from the sample.

How do I collect a spectrum?

The following procedure takes you through the data collection process for the most commonly used techniques: horizontal attenuated total reflection (ATR), transmission, DRIFTS, and specular reflection. (For more information, please refer to the other printed and electronic documentation that came with your spectrometer.)

Note For additional information about preparing the system and starting OMNIC, please see the spectrometer help and the OMNIC help (available through the Help menu in OMNIC) or the printed documentation that came with your system. ▲

Note The software may display various prompts during collection. If any prompts appear, follow the instructions shown on the screen. ▲

Begin by starting OMNIC:

You can double-click the OMNIC shortcut on the Windows® desktop or you can use the Start button on the Windows taskbar.

Next, make sure the sampling accessory is properly installed in the sample compartment:

If you have...

You should...

An ATR accessory



Make sure the pressure device, if included, is not in contact with the crystal. Clean the crystal with a soft cloth and, if needed, an appropriate solvent.

The Smart OMNI-Transmission Accessory



Make sure no samples that would block the beam are installed in the accessory.

A DRIFTS accessory



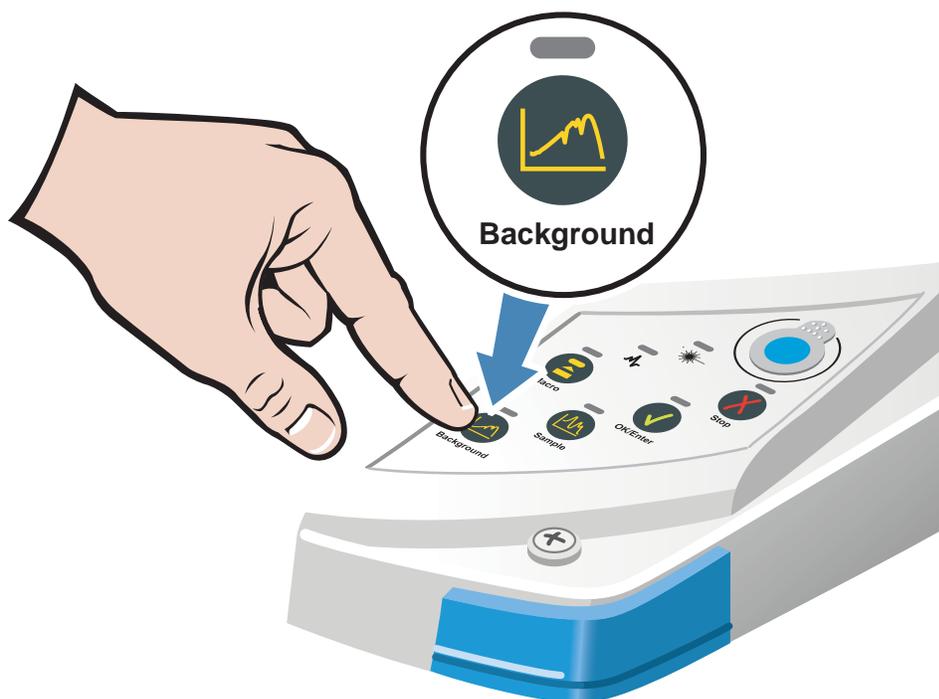
Make sure the slider is pushed in to the second cup (the one closer to the handle). This positions the gold disk in the beam.

A specular reflection accessory



Place a gold mirror face down on the accessory.

Now, press the Background button on the operations panel to collect a background spectrum:



Next, install a sample:

If you have...

You should...

An ATR accessory



Place the sample on the crystal and apply pressure. A good first sample might be a credit card, an old CD, or a piece of plastic. For liquids, no pressure is needed.

The Smart OMNI-Transmission Accessory



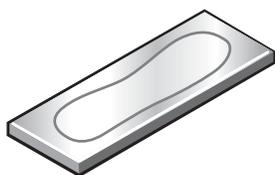
Slide a sample into place. A good first sample is a plastic bag or any polymer film.

A DRIFTS accessory



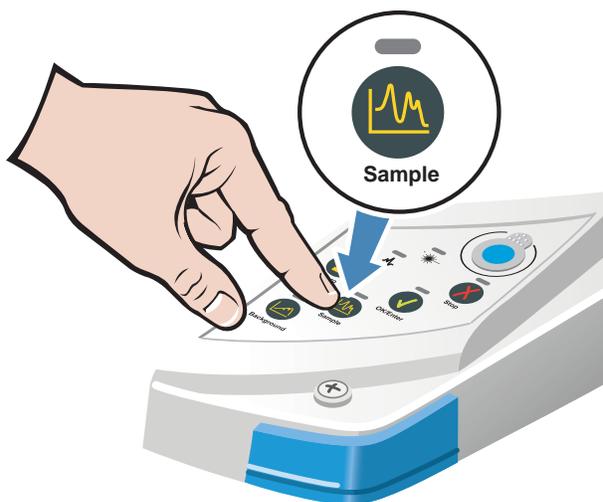
Fill the cup with a sample. A good first sample is a ground aspirin tablet diluted to 3-5% in KBr powder. You do not need to overfill the cup.

A specular reflection accessory

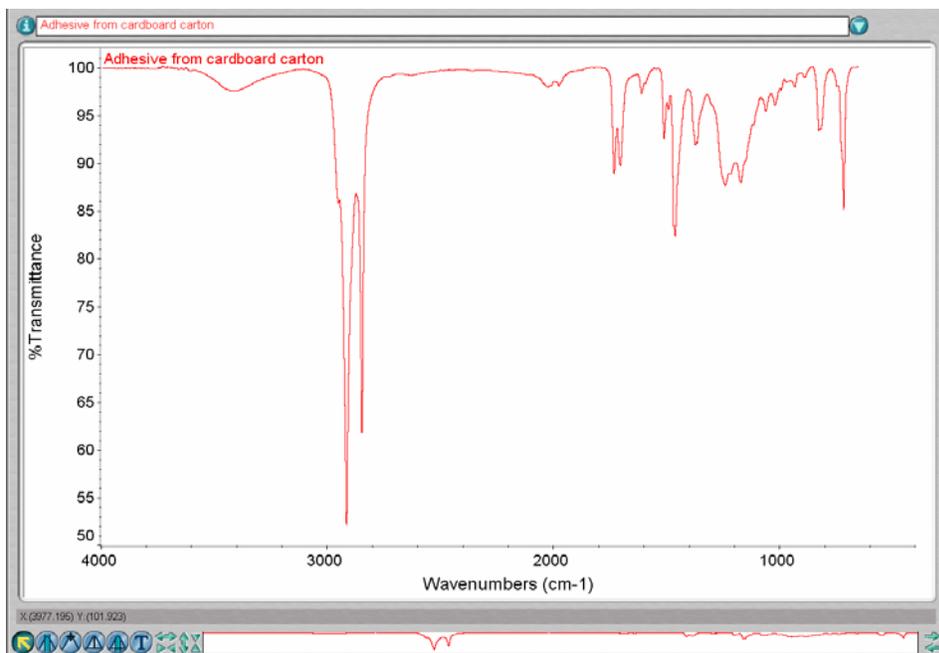


Place the sample upside down on the accessory. A good first sample is a piece of shiny metal, like aluminum, with a thin coating of vegetable oil. Add a drop of oil, and then wipe the metal with a cloth so that a thin layer of oil remains.

Now, press the Sample button on the operations panel to collect a sample spectrum.



When the data collection is complete, the sample spectrum will be displayed. The following is an example of a typical sample spectrum.



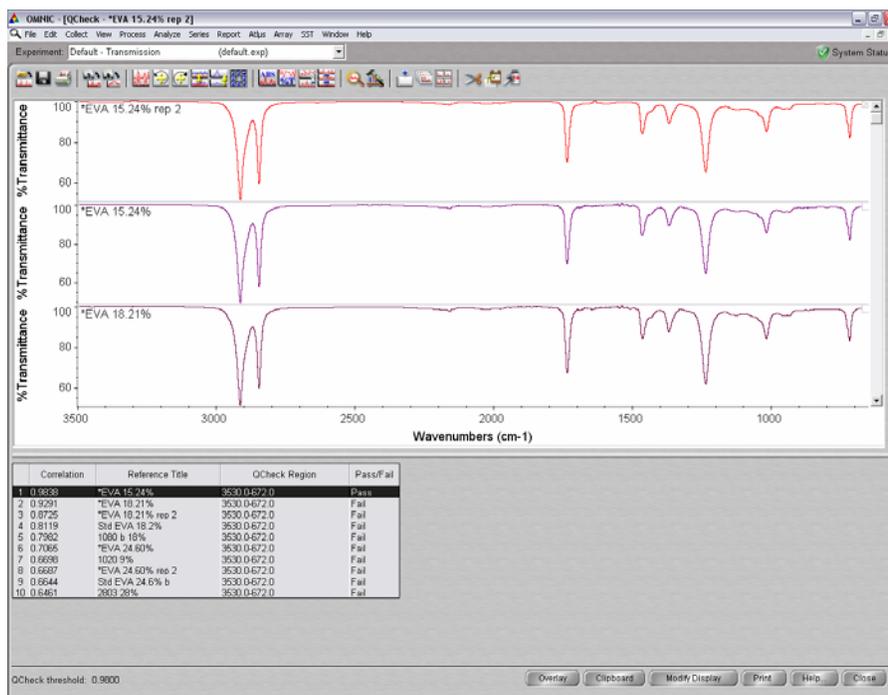
Finally, you can verify, identify, and quantify your data:

If you want to...

You can...

Verify the purity or quality
of your sample.

Use the OMNIC QCheck tool.

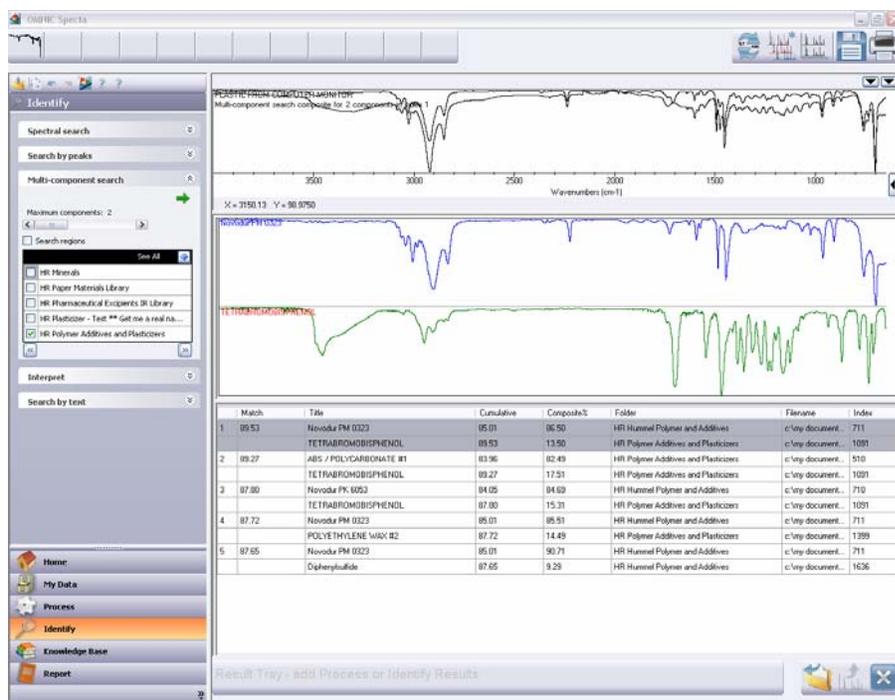


If you want to...

You can...

Identify an unknown material.

Use the OMNIC Search feature or the Spectra software features.

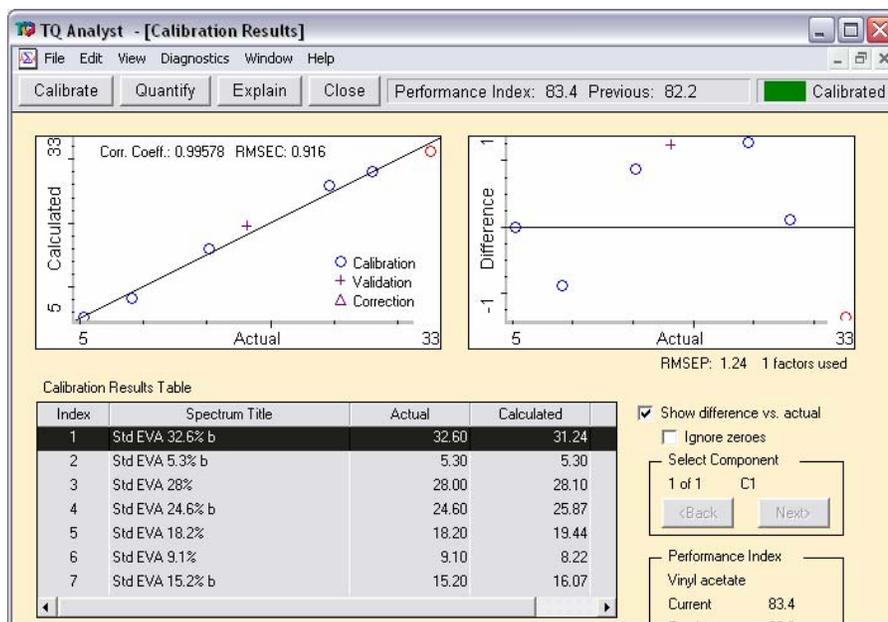


If you want to...

You can...

Quantify the amount of a component in your sample.

Use the features in the TQ Analyst™ software.



Taking the Next Steps

Now that you are familiar with your spectrometer and have collected a sample spectrum, you're ready to explore other options and learn where you can find additional information.

What options are available?

Several accessories, or instruments, that expand what you can do with your spectrometer are available. The following is a list of some of these accessories. (For information about additional accessories, contact our sales representative in your area.)

This accessory or instrument...

Does this...

A Nicolet iZ10



Provides a second sampling area for routine analysis with an accessory and for installing and using large, dedicated accessories like the TGA interface.

An infrared microscope



Allows you to identify particles as small as 10 micrometers, and perform many operations such as surface analyses and chemical mapping.

This accessory or instrument...

Does this...

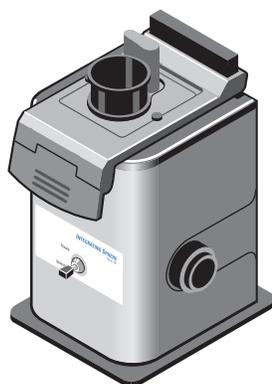
The Micro Well Plate accessory

Allows higher throughput screening applications in either transmission or reflection modes.



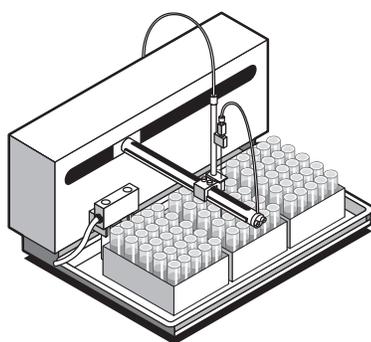
A Near-IR Integrating Sphere

Uses a built-in detector to quickly identify materials contained in vials or blister packs.



A liquid autosampler

Allows you to set up automated processes to analyze fluid samples.



This accessory or instrument...

Does this...

A bar code reader



Allows SOP implementation, error free data entry and no-touch data collection. (A macro that supports this accessory is provided with your spectrometer.) You can use any reader that is ASCII-compatible.

The following software is also available for your spectrometer:

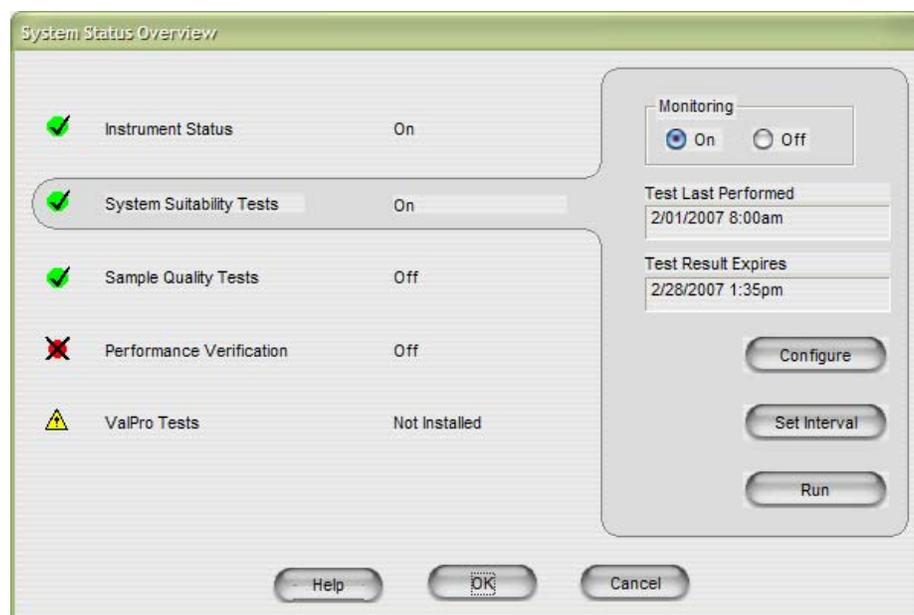
- *OMNIC Spectra™* enhances the features and procedures you can use to analyze unknowns. This software includes a 9,000 compound spectral database and features for using your computer's hard drive as a library. OMNIC Spectra also offers a unique multi-component search feature that makes it easy to identify the spectra of mixtures and TGA/IR vapor phase samples.
- *TQ Analyst* provides an extensive suite of chemometrics features you can use to identify raw materials, perform quantitative analysis, and take spectral measurements. (The basic quantitative analysis tools of TQ Analyst are included on your OMNIC software CD.)

How do I check performance?

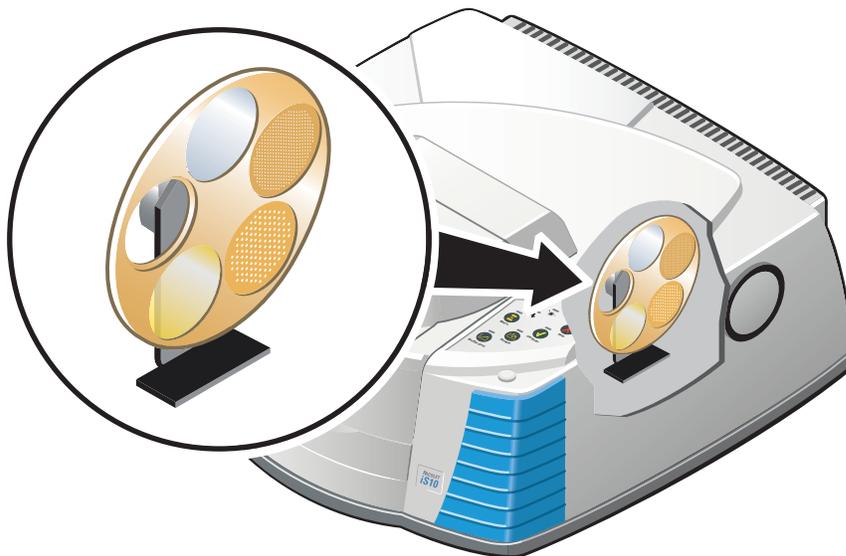
The performance of your spectrometer is continuously monitored by the System Performance Verification (SPV) features in OMNIC. For detailed information about using SPV, open OMNIC Help Topics from the Help menu in OMNIC. Find “System Performance Verification” in the index of the help system, and then go to the “System Performance Verification” topic. To summarize, SPV allows you to:

- Perform ASTM tests to verify your spectrometer’s performance.
- Define system suitability tests that are specific to your application.
- Monitor data collection.
- Notify users when a test is out of date.
- Implement complete, automated validation with the ValPro™ Qualification software.

The following is an example of the System Status Overview dialog box, which gives you access to SPV features.



Note The standard wheel that SPV uses is shown below. This wheel contains NIST traceable and NG-11 standards. ▲



How do I maintain my spectrometer?

To keep your spectrometer in good working order, check the desiccant indicator frequently and replace the desiccant canisters as soon as they become saturated. (For more information, see item 1 in “What are the features?” in the “Getting Started” chapter.)

If you want to clean your spectrometer, you can wipe off the exterior of the main cover, but do not allow any moisture to come into contact with the windows. For more information, refer to the “Cleaning your spectrometer” topic in the spectrometer help (available through the Help menu in OMNIC.)

Where is the documentation?

Audit requirements and good practices often make it necessary for you to keep track of important documentation for your instruments. The documents listed below are for your spectrometer and are available in either print or PDF format.

The following documents are located in your spectrometer documentation binder:

- Getting started manual
- ISO 9001 certificate
- Declaration of conformity
- Statement of traceability for the 1.5 mil polystyrene transmission standard
- Statement of traceability for the NG-11 glass transmission standard
- Declaration of system qualification
- NIST traceability certificate (if you have the ValPro Qualification software)

Note For more information about validation products that are available, contact our sales or service representative in your area or use the information at the beginning of this document to contact us. ▲

Other resources for learning more about your spectrometer, the software, and accessories include:

- The OMNIC help system, which is available through the Help menu in OMNIC.
- The SPV help topics, which are available through the OMNIC help system. (Choose OMNIC Help Topics from the Help menu in OMNIC. When the help system opens, find “System Performance Verification” in the Index, and then go to the “System Performance Verification” topic.)
- The printed safety guide, which came with your system.
- Other printed documentation or tutorials that came with your system.

What if I have a question?

In case of emergency, follow the procedures established by your facility. If you have questions or concerns about safety or need assistance with operation, repairs, or replacement parts, you can contact our sales or service representative in your area or use the information at the beginning of this document to contact us.

Notice Be sure to read the safety guide that came with your spectrometer! The safety guide contains important information to help you avoid personal safety risks and equipment damage. Please read the safety guide before using your instrument. If you need a replacement guide, contact us. ▲

What about the warranty?

Your spectrometer is designed to work reliably for many years, and our software features allow you to keep careful track of its performance. We stand behind our instruments by providing a warranty for the entire system for 12 months (14 months from shipment date).

Note The warranty does not cover damage to the hygroscopic parts (the purge windows and the beamsplitter) if the spectrometer is exposed to excessive moisture or if the cover is removed for an extended time by someone other than one of our representatives. ▲

Notice Your spectrometer is intended to be unpacked and installed by one of our service representatives, but if necessary, you can unpack the shipping box before the installation. To avoid permanent damage to the optical components in your spectrometer, do not open anything, especially the plastic bag that protects the spectrometer, until the entire shipping box has come to room temperature. **Damage due to unpacking the spectrometer before it has come to room temperature is not covered by the warranty.** ▲

Note To see the complete warranty for your spectrometer, choose the spectrometer help from the Help menu in OMNIC. When the spectrometer help system opens, refer to the “Warranty” topic in the “Introduction” book. ▲