
Getting Started

Congratulations on your purchase! The Thermo Scientific™ Nicolet™ iS™20 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.

NOTICE

Read the Site and Safety for your spectrometer before using the instrument. It contains important information to help you avoid personal safety risks and equipment damage.

A copy of the Site and Safety guide is available in the Knowledge Base at:

<https://knowledge1.thermofisher.com/>

CONTENTS

Getting Started	1
What's in the box?	2
What are the features?	3
What's on the rear panel?	8
 Measuring a spectrum	 9
How do I measure a spectrum?	9
 Taking the next steps	 18
What options are available?	18
How do I verify performance?	20
How do I maintain my spectrometer?	22
Where is the documentation?	22
What about the warranty?	23

What's in the box?

Your spectrometer will be unpacked and installed by one of our service representatives.

NOTICE

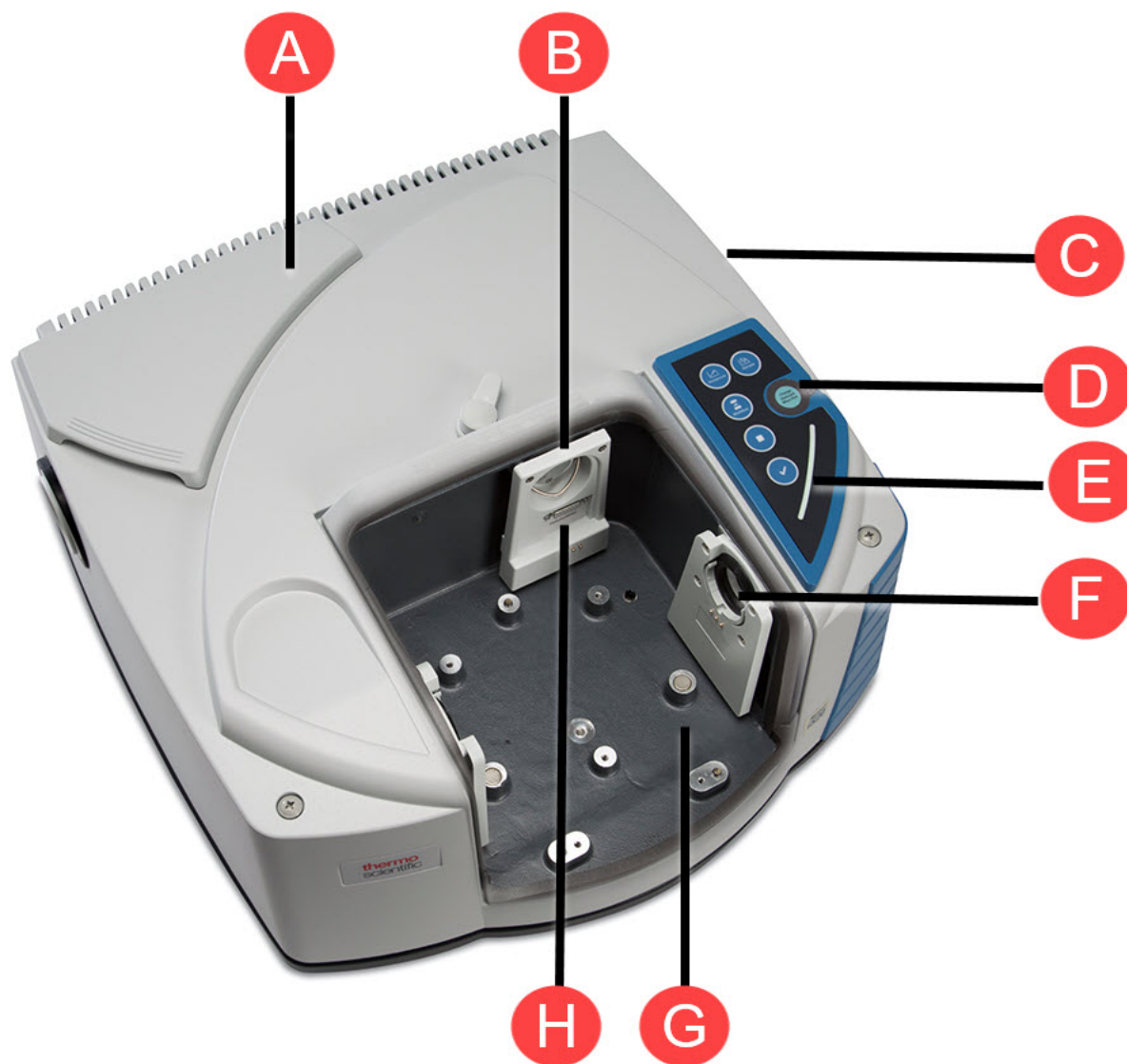
Your spectrometer is intended to be unpacked and installed by one of our service representatives, but if necessary, you can unpack the shipping box before the installation.

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.

What are the features?

The following image shows the main features of your spectrometer.

Figure 1-1: Spectrometer features



A	Desiccant canister cover
B	Source

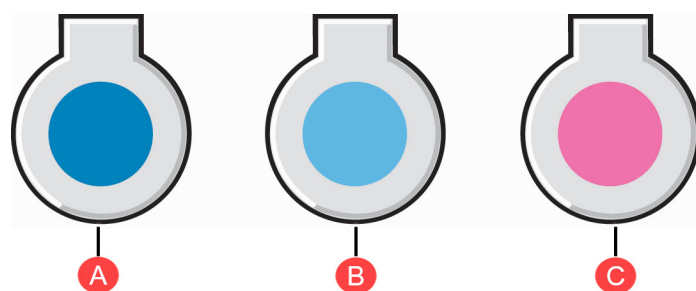
C	External beam port (right side)
D	Humidity indicator
E	Touch panel
F	Protective windows
G	Sample compartment
H	Auxiliary signals port

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, refer to the “Replacing the desiccant” and “Regenerating the desiccant” topics in the User Guide.

2. You can change the source in your instrument without removing the cover. Two sources are available: one for the mid-IR range and another for the near-IR range (tungsten-halogen).
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 humidity indicator monitors the level of humidity inside the spectrometer. The status is indicated by the color of the indicator:

Figure 1-2: Humidity indicator status colors



A	Blue (good)
B	Light blue (change desiccant)
C	Pink (call service)

5. The integrated touch panel has buttons and indicators that allow you to perform many operations without needing to use the computer. See [Measuring a spectrum](#) for further information.

The instrument scan bar provides visual feedback on run, idle, and alert modes, so you know what your next action should be.

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, see “Cleaning your spectrometer” in Spectrometer Help Topics (available through the OMNIC Help menu).

You can use the sample compartment with many different accessories, such as a:

The Smart OMNI-Transmission Accessory:

Figure 1-3: Smart OMNI-Transmission Accessory

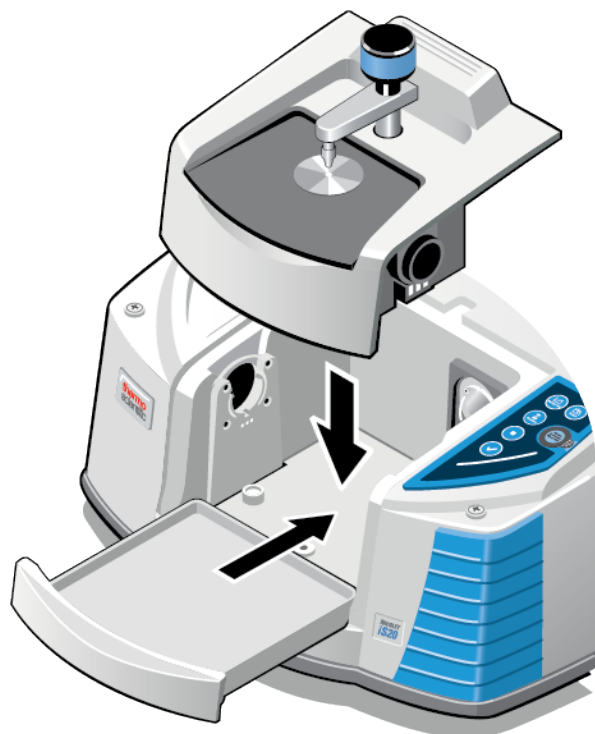


Use the transmission accessory to collect data from samples held in any of the typical transmission cells or holders, including:

- Standard liquid cells
- Film holders
- KBr pellet holders
- ST-IR cards
- Gas cells

Other Smart Accessories™:

Figure 1-4: 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:

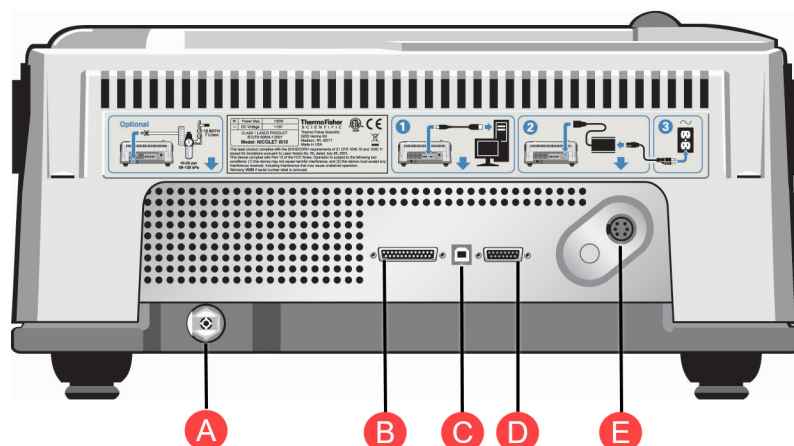
- Thermal Gravimetric Analysis (TGA) interface
- Multi-pass (long pathlength) gas cells
- Other accessories

The auxiliary signals port is used for accessories with detectors or power needs, such as the near-IR integrating sphere.

What's on the rear panel?

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

Figure 1-5: Rear panel



- A** Purge connector, where you connect a purge gas supply if you purchased the optional purge package
- B** Auxiliary connector, which allows you to start a data collection remotely and allows service personnel to check spectrometer function
- C** USB 2.0 port, where you connect the system computer (the instrument can interface with USB 2.0 and USB 3.0 devices)
- D** Accessory connector, used to connect the instrument to a Nicolet iZ10 module or other accessories
- E** Power supply port, where you connect the power supply for the instrument

Measuring a spectrum

To measure a sample spectrum, you must first measure a background spectrum that shows the response of the system when no sample is present. Once you have the background spectrum, you can measure 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 measure a spectrum?

The following procedure takes you through the data measurement process for the most commonly used techniques: attenuated total reflection (ATR), transmission, DRIFTS, and specular reflection.

NOTICE

For additional information about preparing the system and starting OMNIC Paradigm software, see the OMNIC Paradigm software Help menu or the knowledge base at: <https://knowledge1.thermofisher.com/>

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

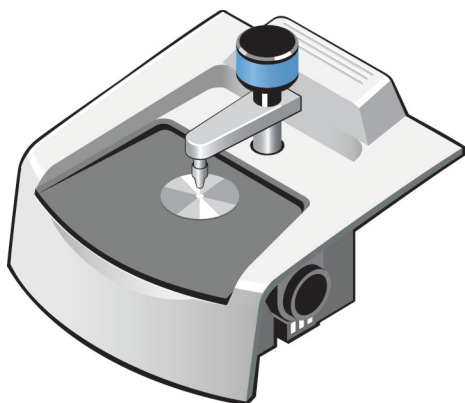
1. Start OMNIC Paradigm software.

Make sure the sampling accessory is properly installed in the sample compartment:

If you have...

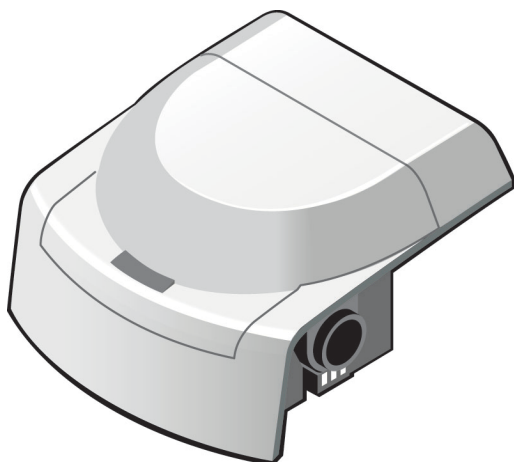
You should...

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. See the documentation for your ATR accessory and crystal type for details.

The Smart OMNI-Transmission accessory

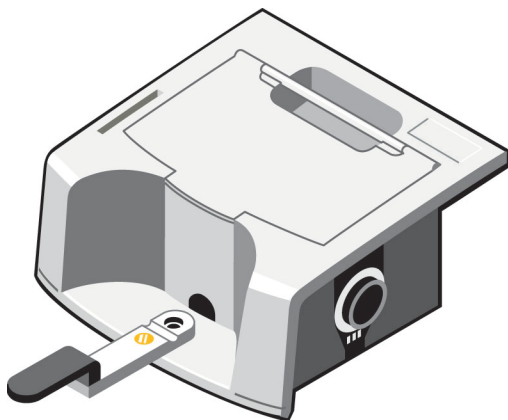


Make sure no samples that would block the infrared beam are installed in the accessory.

If you have...

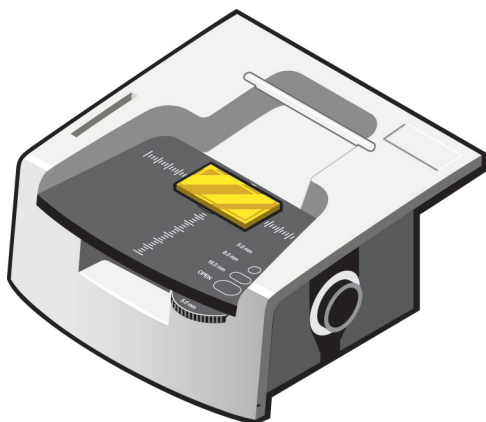
You should...

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



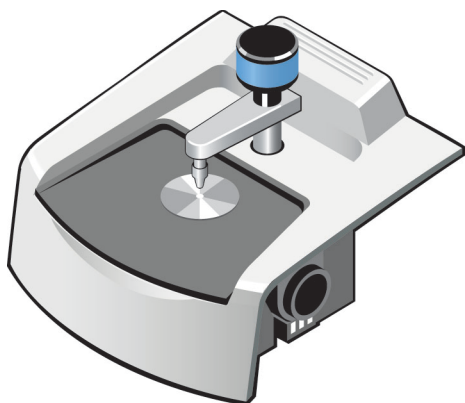
Place the gold mirror (provided with the accessory) face down on the accessory.

2. Press the OK/Enter button on the integrated touch panel to measure the spectrum. Alternatively:
Select **Preview and Measure Background** in OMNIC Paradigm software. This will create a spectra tab. Then, select **Start Background Measurement** and wait for the process to complete.
3. Next, install a sample:

If you have...

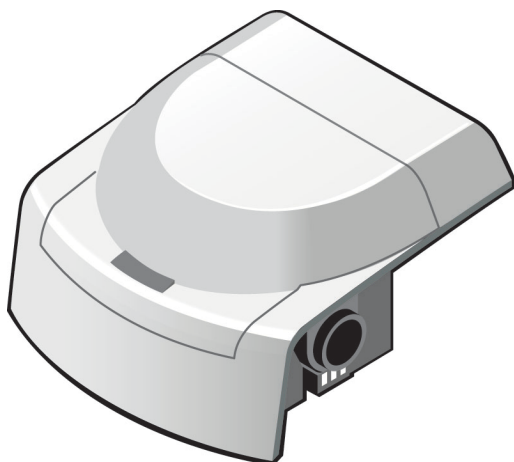
You should...

An ATR accessory

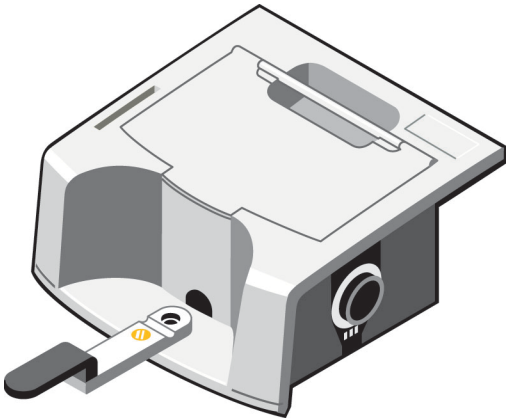
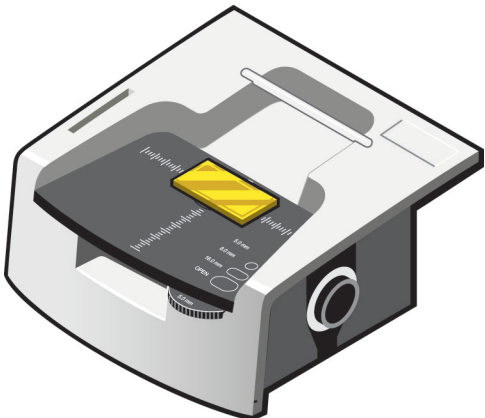


Place the sample on the crystal and apply pressure. A good first sample might be a credit card or a piece of plastic. For liquids, no pressure is needed.

The Smart OMNI-Transmission accessory



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

If you have...	You should...
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, then wipe the metal with a cloth so that a thin layer of oil remains.

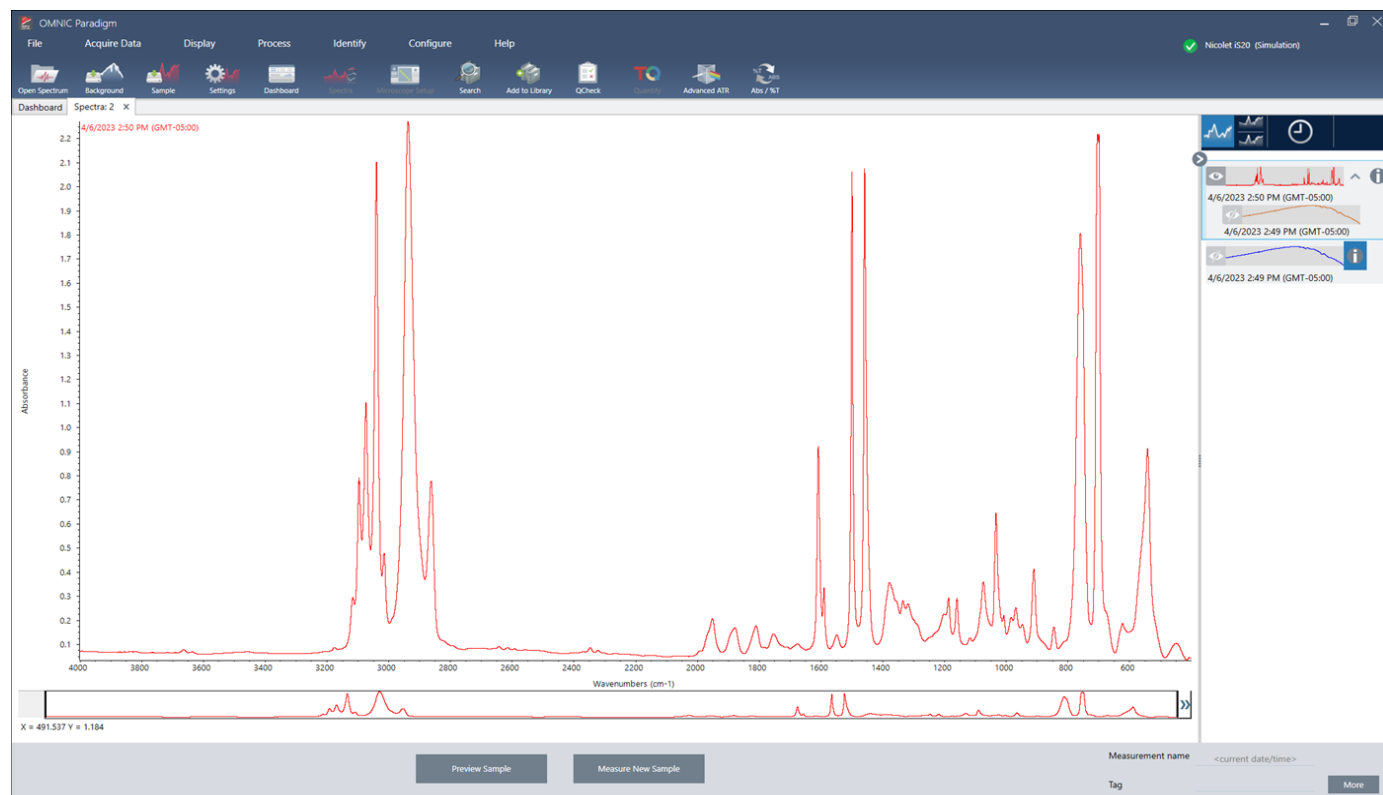
- Now, press the OK/Enter button on the integrated touch panel to measure a sample spectrum.
Alternatively:

In OMNIC Paradigm software, select **Start Sample Measurement** in the spectra tab and wait for the process to complete.

When the data measurement is complete, the sample spectrum will be displayed.

Note You can change your measurement name to whatever you desire. If you do not, the default name will simply be the date and time of measurement.

Figure 1-1: Example of a typical sample spectrum displayed in absorbance.



5. 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 Paradigm software QCheck tool under Identify > QCheck (you can also reach it by selecting the QCheck button in the toolbar). Then select the reference spectrum you want to compare. The result will display in the Results pane to the right

Figure 1-2: OMNIC Paradigm software QCheck tool

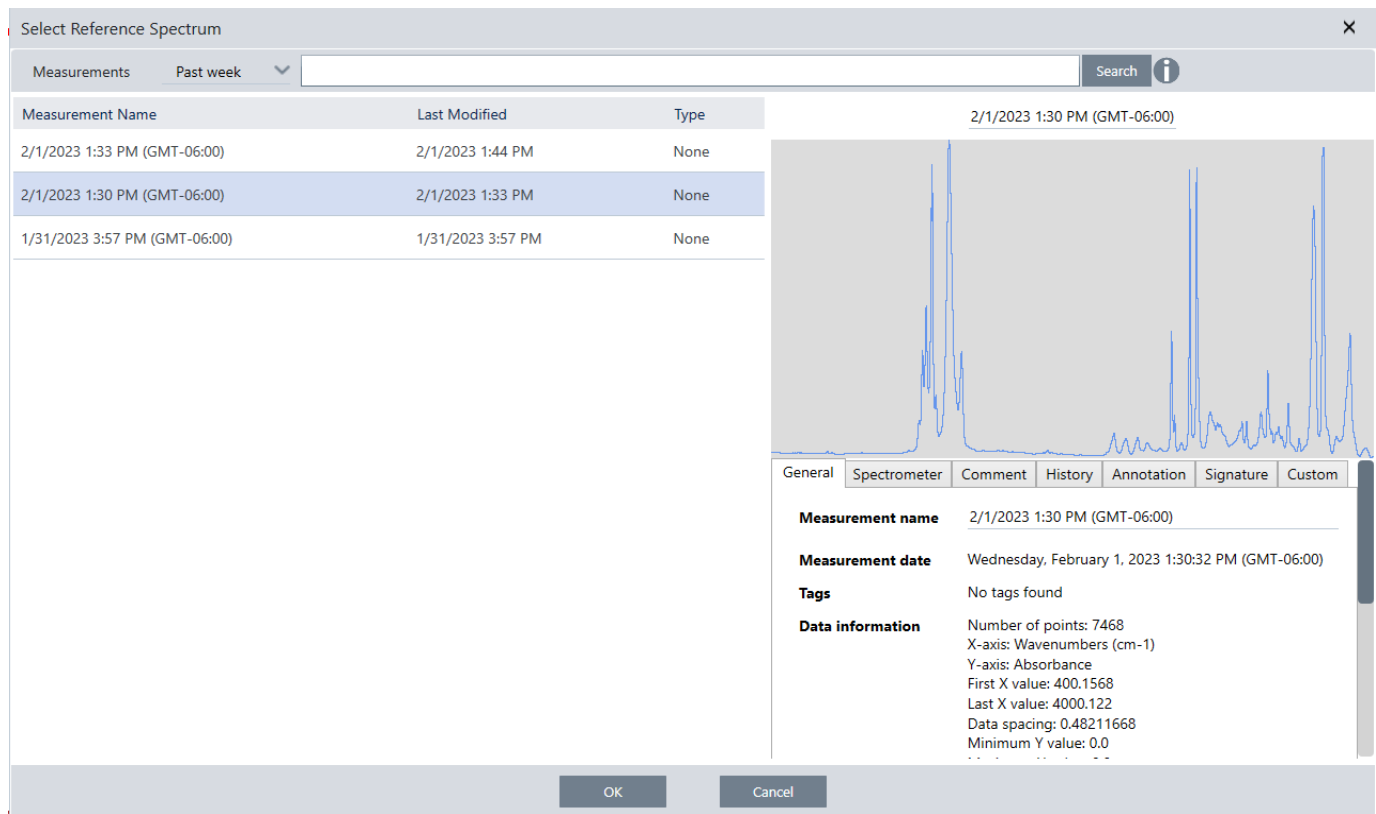
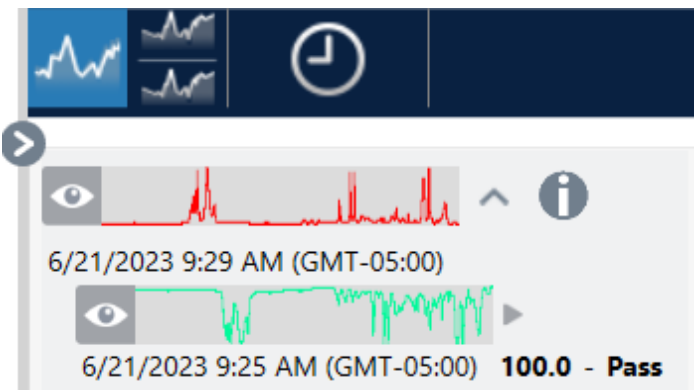
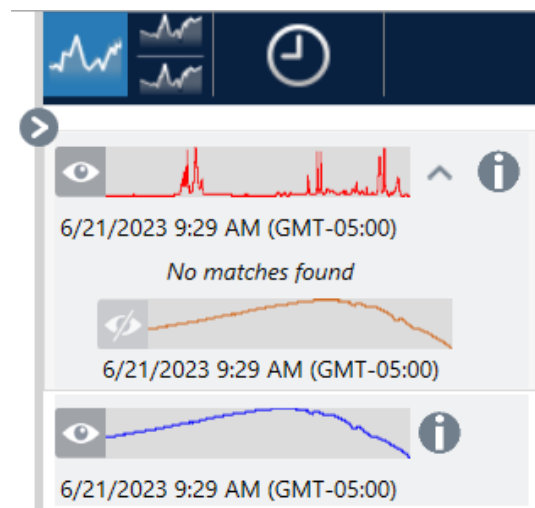


Figure 1-3: OMNIC Paradigm software QCheck results (sample)



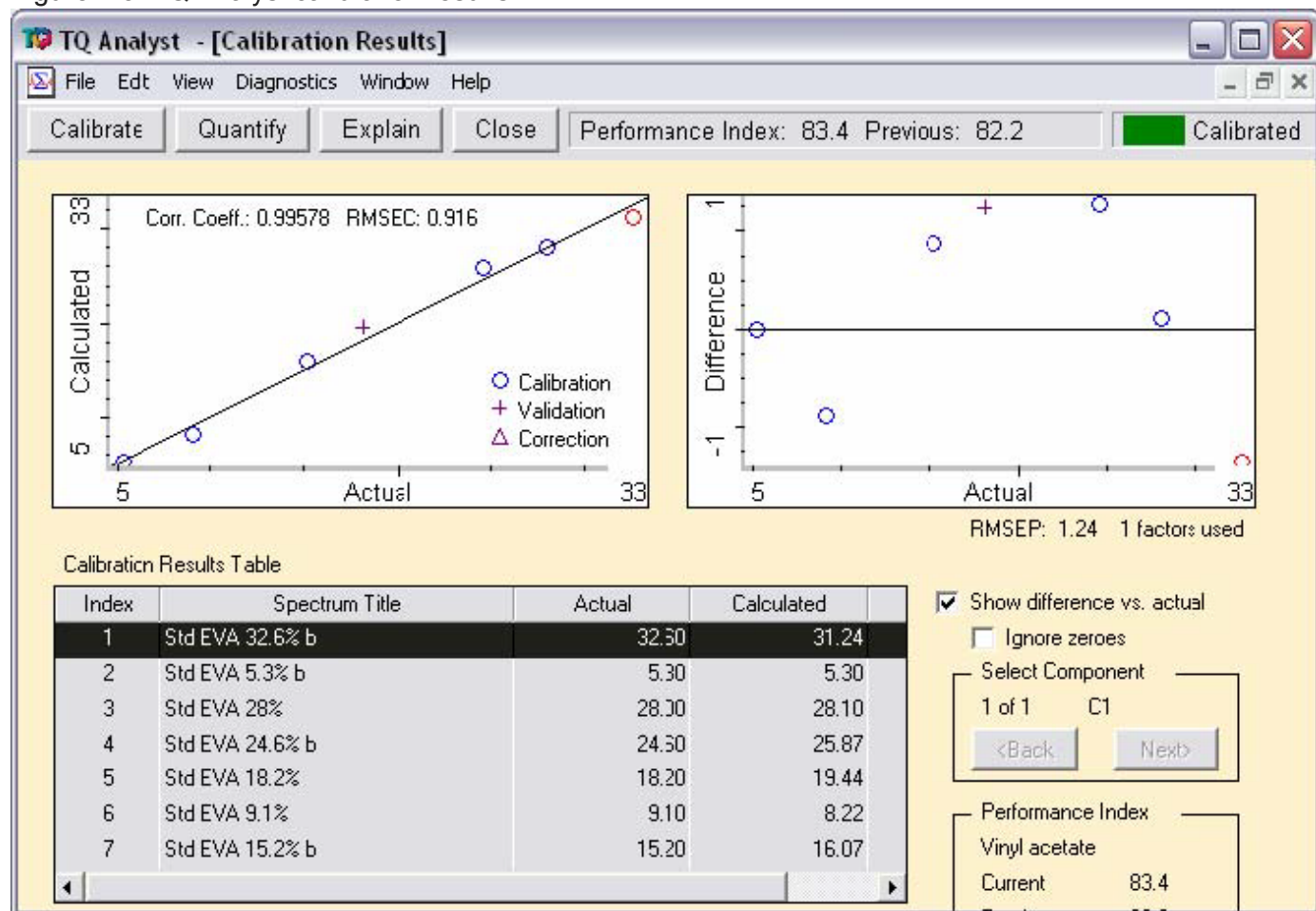
If you want to...	You can...
Identify an unknown material	Use the OMNIC Paradigm software Search feature. Go to Identify > Search > Correlation or Multi-Component . You can also select Search on the Dashboard. The results will appear in the Results pane on the right.

Figure 1-4: OMNIC Paradigm software Results pane



If you want to...	You can...
Quantify the amount of a component in your sample	Use the features in the TQ Analyst software to develop custom analytical methods as QNT files, then run them in OMNIC Paradigm software with a Quantify analysis type. Analysis type <u>Quantify</u> ▼

Figure 1-5: TQ Analyst calibration results



Taking the next steps

Now that you are familiar with your spectrometer and have collected a sample spectrum, you are 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 or for installation and usage of large, dedicated accessories like the TGA interface.

This accessory or instrument...	Does this...
An infrared microscope 	Allows you to identify particles as small as 10 micrometers and perform many operations, such as surface analyses and chemical mapping.
A near-IR integrating sphere 	Uses a built-in detector to quickly identify materials contained in vials or blister packs.

The following software is also available for your spectrometer:

- **OMNIC Anywhere** is cloud-based FT-IR software that allows you to analyze data away from the instrument, on any device, or share results with colleagues across the globe in a secure environment.
- **TQ Analyst** software provides an extensive suite of chemometrics features you can use to create methods to identify raw materials, perform quantitative analysis, and take spectral measurements.

How do I verify performance?

Ensure that your instrument is working well by running PV workflows and checking the system status.

Performance verification and qualification workflows

Check the performance of your instrument by running qualification or performance verification (PV) workflows. These workflows use an established standard sample to check instrument performance. Each test follows different regulatory standards.

Test	Description
Nicolet FTIR - Factory Qualification	Runs factory recommended tests and all qualification tests.
Nicolet FTIR - PV Test	Measures basic performance based on factory recommended tests.
Nicolet FTIR - CP Qualification	Executes the qualification tests as defined in the Chinese Pharmacopoeia.
Nicolet FTIR - JP Qualification	Executes the qualification tests as defined in the Japanese Pharmacopoeia.
Nicolet FTIR - PHEUR Qualification	Executes the qualification tests for as defined in the European Pharmacopoeia.
Nicolet FTIR - USP Qualification	Executes qualification tests as defined in the US Pharmacopoeia.

To run a qualification or PV workflow

1. Right-click the workflow and select Run.
2. Follow the on-screen prompts.

System status

The system status icon displays information about your instrument and software services.

Icon	Icon with Security Suite installed	Description
		The system is connected and all services are running correctly. You are ready to measure and save data. Click the system status icon to view details about the system.
		There may be a problem with the instrument, such as: • The detector is warm • The instrument is not scanning • The instrument is not connected Click the system status icon for more details about the problem. Also visually inspect the instrument and connection.
		There is a problem with one or more software services. Click the system status icon for details. If the service does not start automatically after a few minutes, restart the computer.

Note The instrument's SPV wheel contains NIST-traceable and NG-11 standards.

Figure 1-1: SPV wheel



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.

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, see “Cleaning your spectrometer” in Spectrometer Help Topics, available through the OMNIC Paradigm software Help menu.

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 following documents are available in our [knowledge base](#).

- Nicolet iS20 with OMNIC Paradigm software Getting Started Guide
- Nicolet iS20 Site and Safety Guide
- Nicolet iS20 with OMNIC Paradigm software User Guide
- 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

Note For more information about validation products that are available, contact us or our sales representative in your area.

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

- The OMNIC Paradigm software help system, which is available through the Help menu in OMNIC Paradigm software.
- The SPV help topics in the OMNIC Paradigm software help system. Choose OMNIC Paradigm software Help Topics from the OMNIC Paradigm software Help menu and find “System Performance Verification.”
- Other documentation or tutorials that came with your system.

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).

NOTICE

Your warranty does not cover damage to 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. To see the complete warranty or warranties for your spectrometer, see the documentation set for the system.

