
Nicolet Apex with OMNIC Getting Started Guide

Congratulations on your purchase! The Thermo Scientific™ Nicolet™ Apex spectrometer is designed with integrated validation features, a powerful software suite, and many other features that make it easy for you to measure 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 the [Nicolet Apex Knowledge Base page](#).

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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: Apex spectrometer features



A Desiccant canister cover

B External beam port (right side)

C Integrated touch panel (w/ power indicator, humidity indicator, blue button)

D Source

E **Auxiliary signals beam port**

F **Protective windows**

G **Sample compartment area**

1. Your spectrometer is protected from excessive humidity by two desiccant canisters located in a compartment below the desiccant canisters cover.

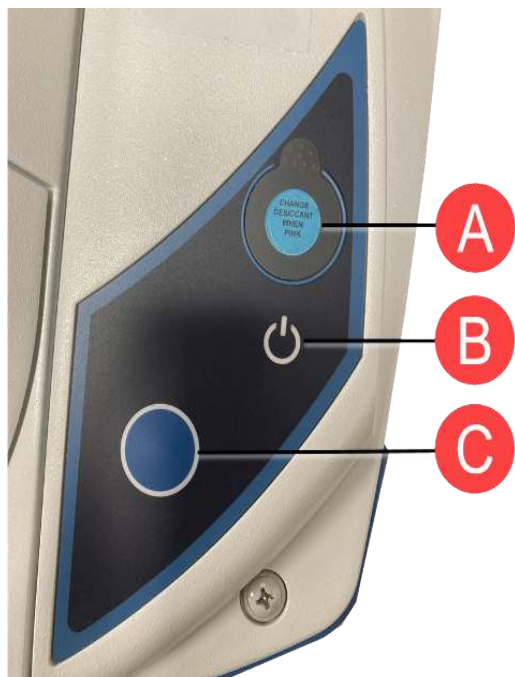
For information about regenerating and replacing these canisters, refer to the “Replacing the desiccant” and “Regenerating the desiccant” topics in the User Guide. You can also visit the topics in Spectrometer Help Topics.

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). The latter option is only available for the XT-KBr configuration Apex spectrometer.
3. The external beam port on the right side of the spectrometer allows the spectrometer to be connected to an applicable .
4. The humidity indicator shows the level of relative humidity inside the bench. The indicator is only provided for use when the bench is left unpowered and disconnected from a computer.

Normally, the indicator is blue (indicating that the humidity is lower than 60% RH). If the indicator is pink or white, humidity conditions are too high. At this point, you must replace the desiccant and consider storing the instrument in a lower humidity environment.

5. The integrated touch panel has buttons and indicators that allow you to perform many operations without needing to use the computer. You can use the blue Touch Point button to streamline your data analysis and get answers quickly. See [Collecting a spectrum](#) for further information.

Figure 1-2: Integrated touch panel



-
- | | |
|---|--------------------|
| A | Humidity indicator |
|---|--------------------|
-
- | | |
|---|-----------------|
| B | Power indicator |
|---|-----------------|
-
- | | |
|---|--------------------|
| C | Touch Point button |
|---|--------------------|

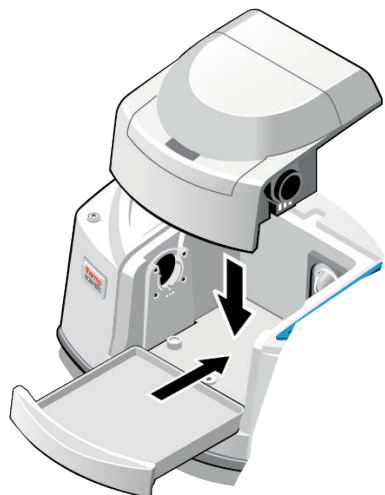
6. Your spectrometer is protected from environmental humidity and other chemical vapors by two windows. These windows isolate the optics in the spectrometer and are coated to improve their resistance to water vapor. You still, however, need to be careful when cleaning your spectrometer to avoid damaging the optics or the windows.

For more information, see "Cleaning your instrument" in the Nicolet Apex User Guide.

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

The Smart OMNI-Transmission Accessory:

Figure 1-3: Smart OMNI-Transmission Accessory

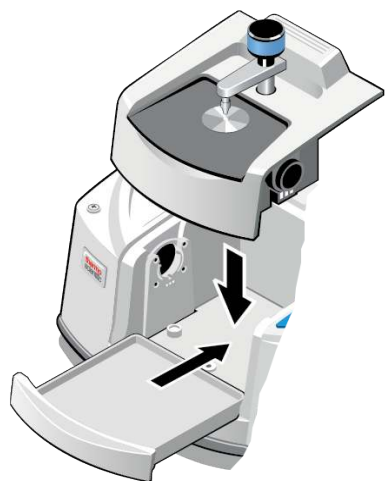


Use the transmission accessory to measure data from samples held in any of the typical transmission cells or holders, including:

- 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:

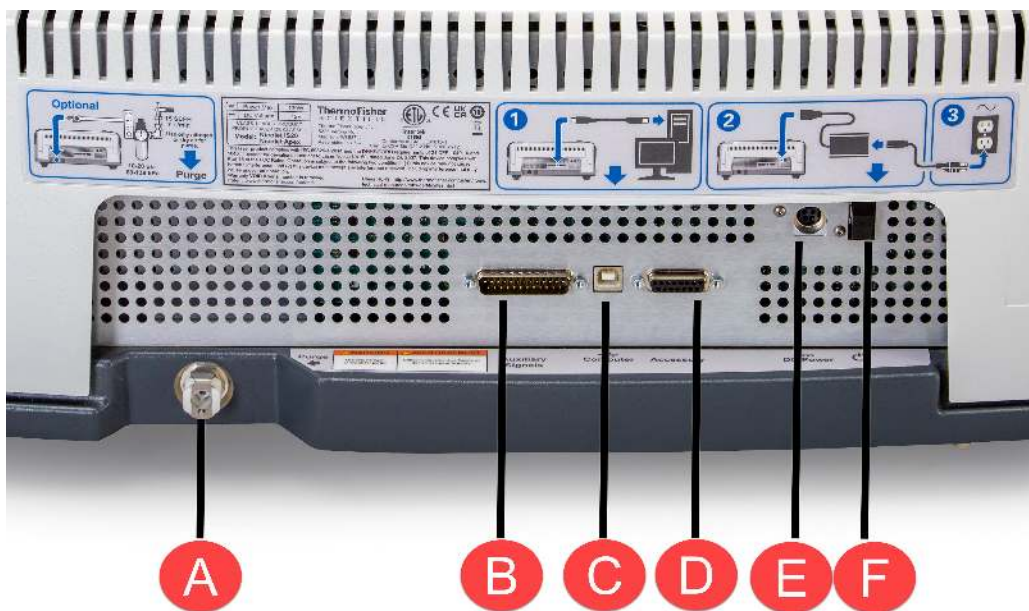
- Thermal Gravimetric Analysis (TGA) interface
- Multi-pass (long pathlength) gas cells
- Other accessories

8. 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: Nicolet Apex 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 accessories
- E** Power supply port, where you connect the power supply for the instrument
- F** Power switch, used to turn the instrument on or off

Collecting a spectrum

To collect a sample spectrum, you must first collect a 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: attenuated total reflection (ATR), transmission, DRIFTS, and specular reflection.

NOTICE

For additional information about preparing the system and starting OMNIC software, see our online [Knowledge Base](#).

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

1. Start OMNIC 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. Generally, it is recommended to use isopropanol. If your sample requires a harsher solvent to clean it, please check the chemical compatibility sheet for your ATR accessory.

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 blue Touch Point button  on the integrated touch panel to measure a background spectrum.
Alternatively:
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



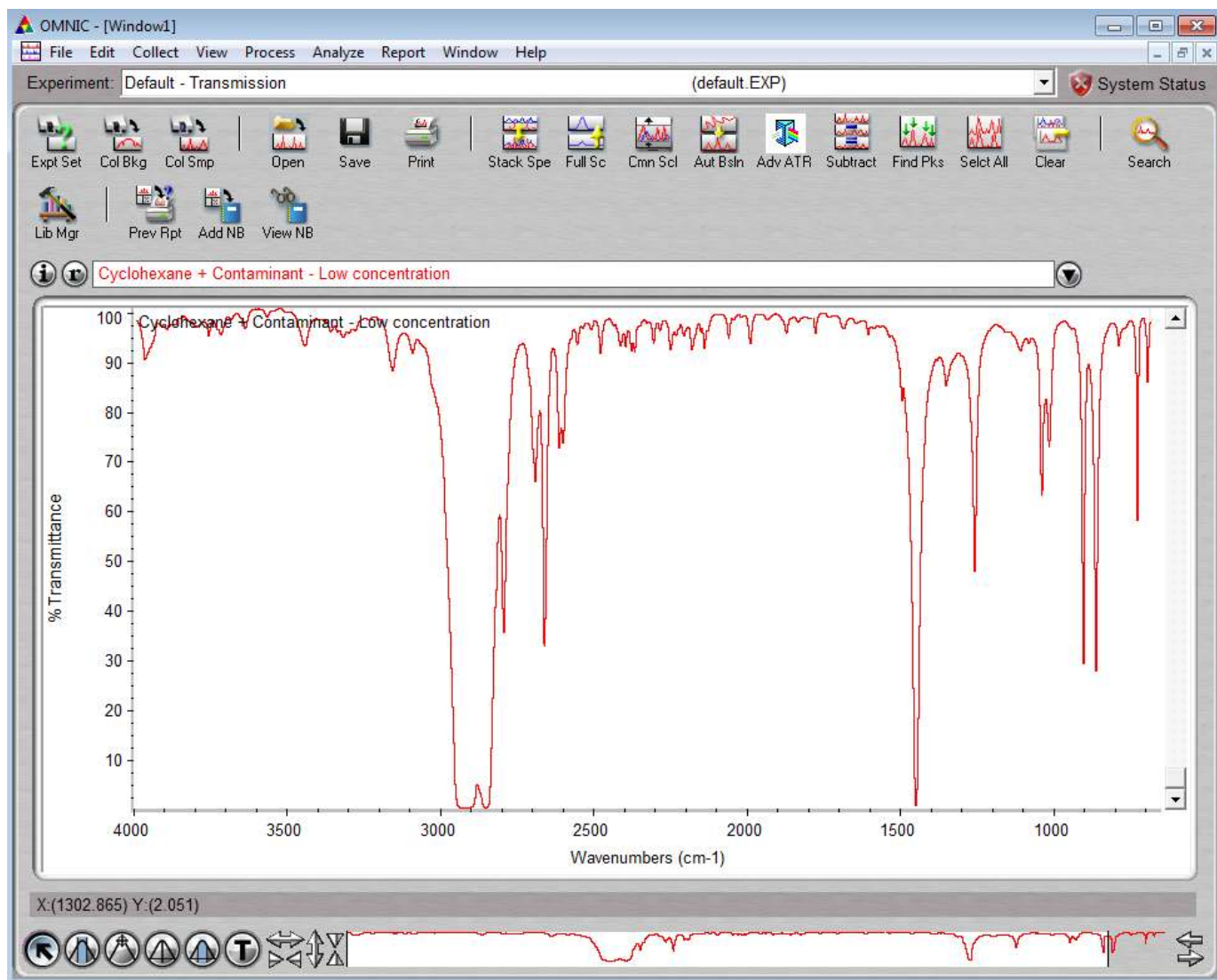
Place the sample upside down on the accessory. A good first sample is a piece of shiny metal, like aluminum, with a thin coating of vegetable oil. Add a drop of oil, then wipe the metal with a cloth so that a thin layer of oil remains.

4. Now, press the blue Touch Point button  on the integrated touch panel to measure a sample spectrum.

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.

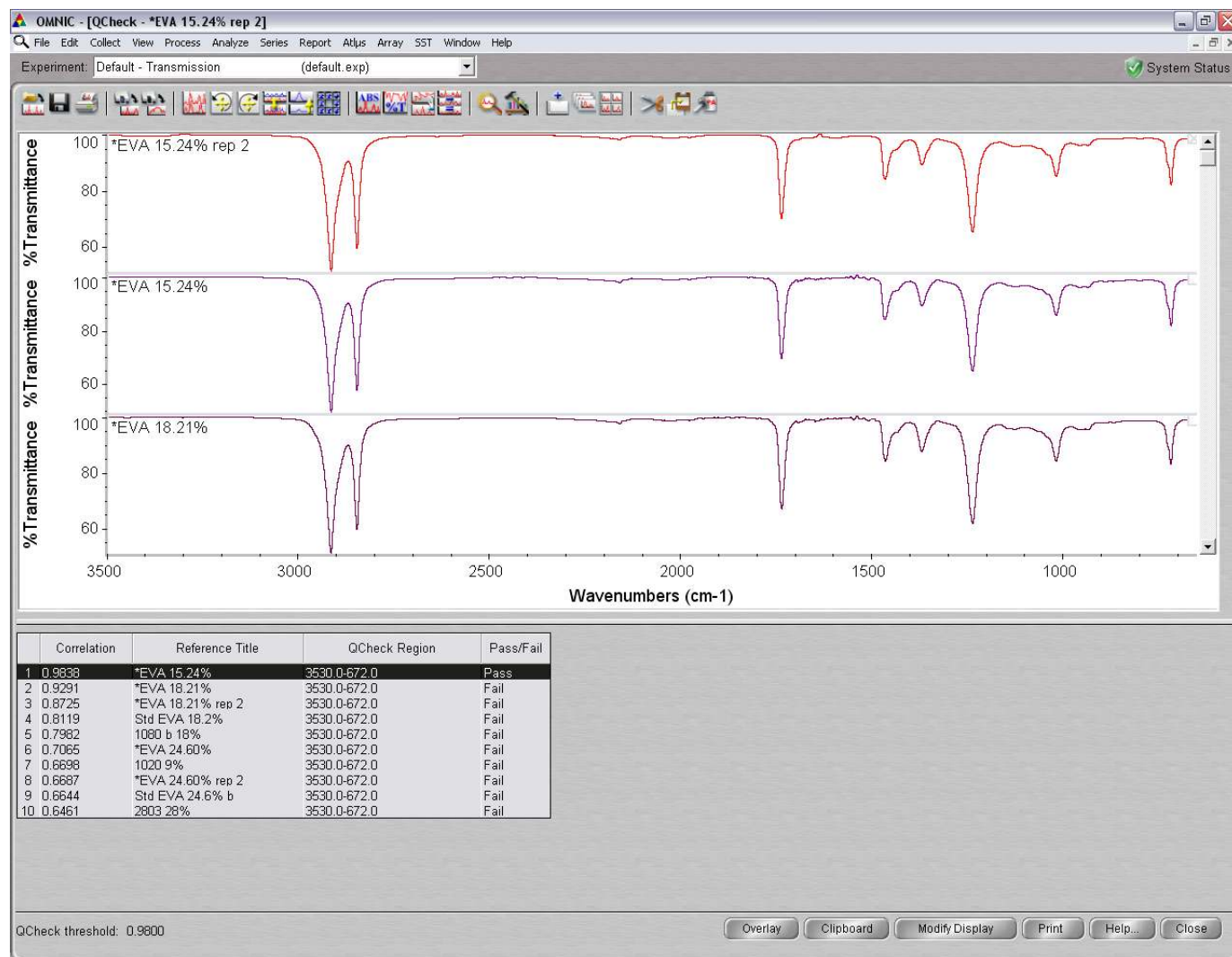
Figure 1-1: Example of a typical sample spectrum



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 QCheck tool.

Figure 1-2: QCheck tool



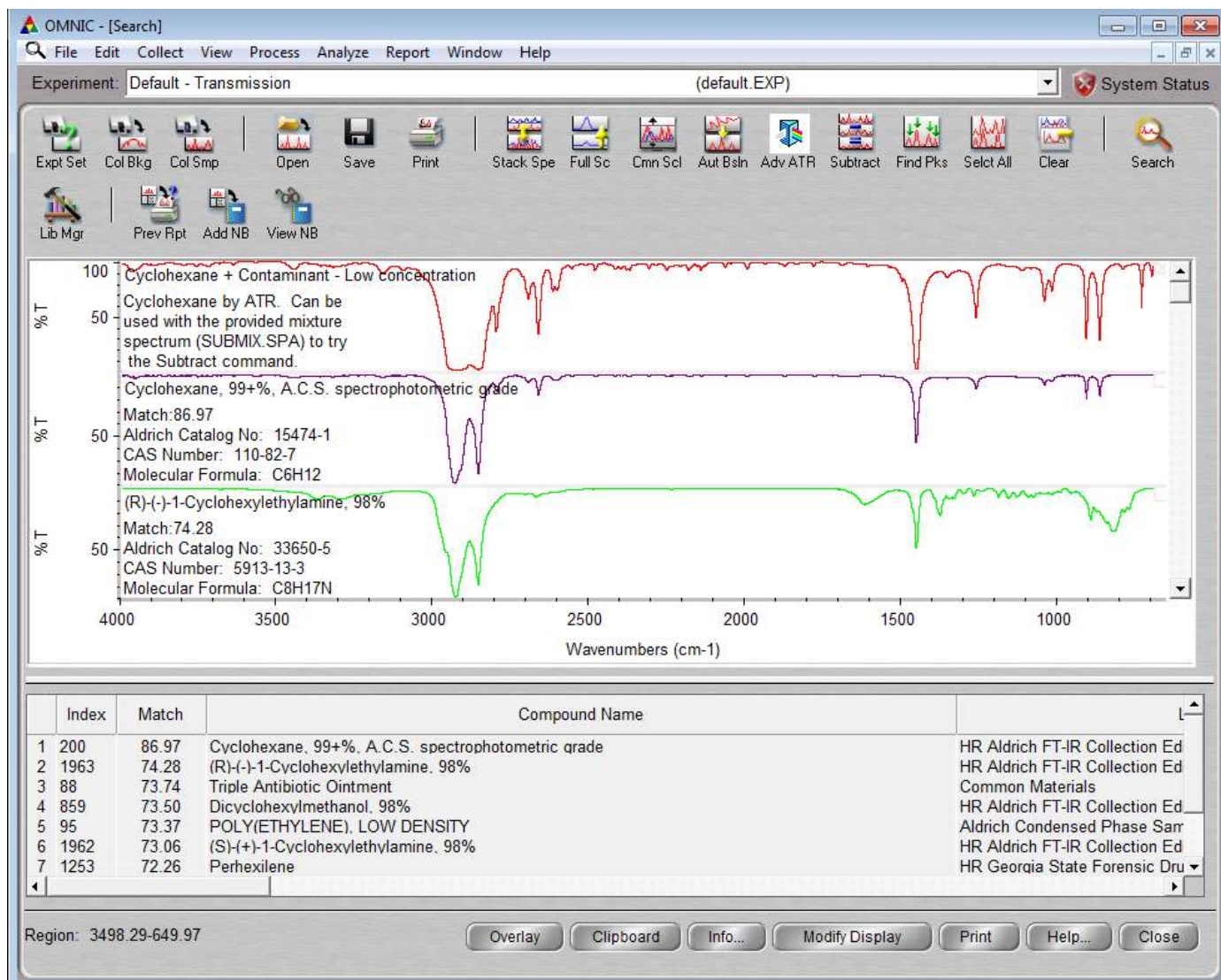
If you want to...

Identify an unknown material

You can...

Use the OMNIC Search feature or the Spectra software features.

Figure 1-3: OMNIC Search



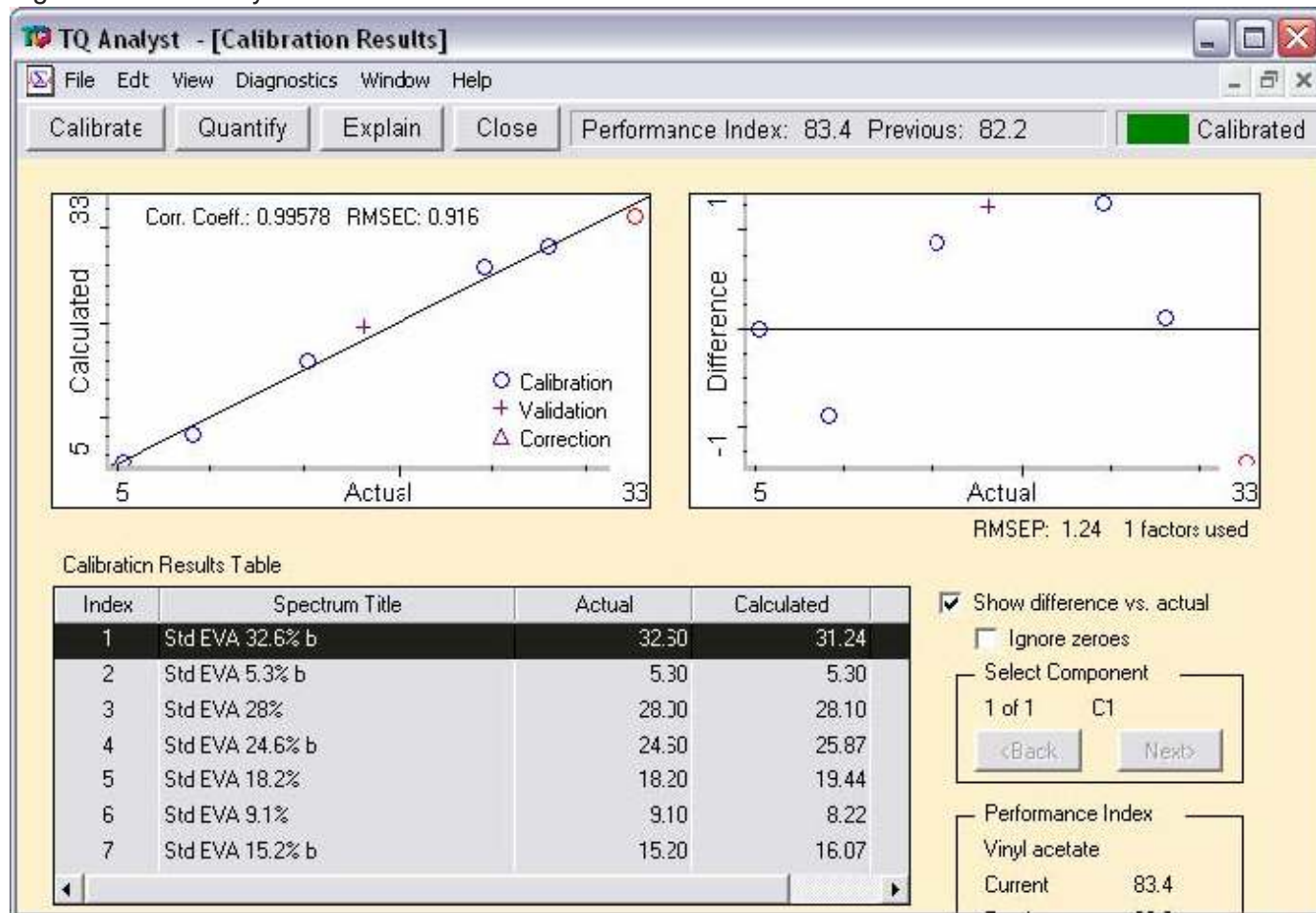
If you want to...

You can...

Quantify the amount of a component in your sample

Use the features in the TQ Analyst software.

Figure 1-4: 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...
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...

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.

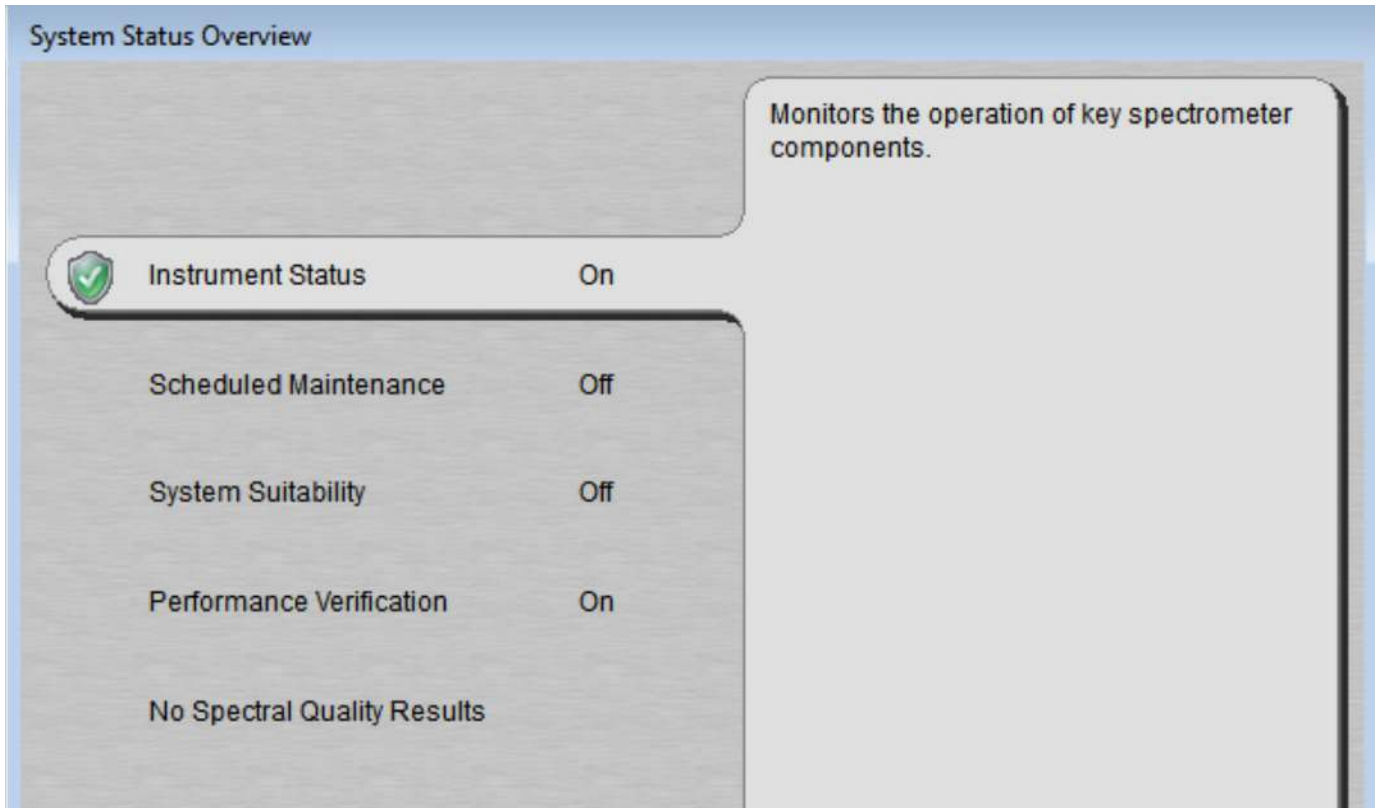
How do I verify performance?

The performance of your spectrometer is continuously monitored by the System Performance Verification (SPV) features in OMNIC software. SPV allows you to:

- Perform ASTM tests to verify your spectrometer's performance
- Define system suitability tests specific to your application
- Monitor data collection

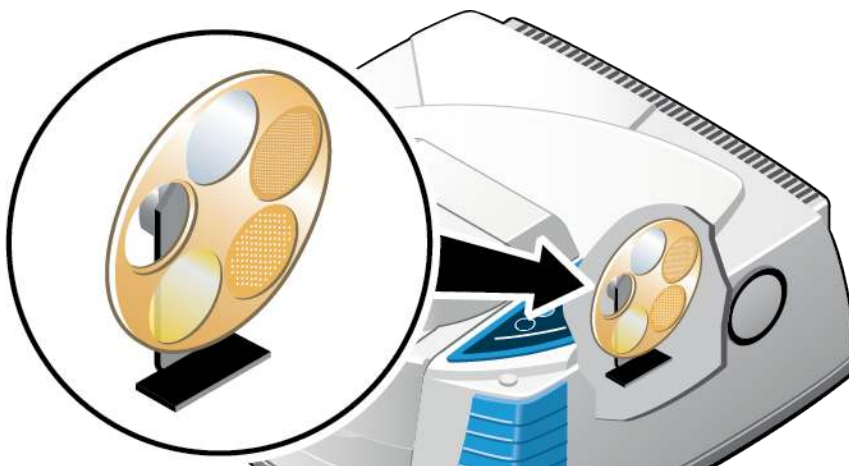
- Notify users when a test is out of date
- Implement complete, automated validation with the optional ValPro Qualification software.

Figure 1-1: Example of the System Status Overview message box, which gives you access to SPV features



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

Figure 1-2: 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 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 Apex for OMNIC Getting Started Guide
- Nicolet Apex Site and Safety Guide
- Nicolet Apex for OMNIC 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 software help system, which is available through the Help menu in OMNIC software.
- The SPV help topics in the OMNIC help system. Choose OMNIC Help Topics from the OMNIC software Help menu and find “System Performance Verification.”
- Other documentation or tutorials included 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.

Warranty information

- **Complete system:** 1 year
- **Interferometer:** 10 years
- **Laser:** 10 years
- **IR source:** 10 years
- **Smart iTX diamond ATR:** 5 years