Thermo Scientific Nicolet iS10
FT-IR Spectrometer

Complete infrared spectroscopy system

for routine analytical needs

Thermo
SCIENTIFIC

Your process, our answer

Load

Measure

Ensure

Verify

Comply

Identify

Textiles   Chemicals   Pharmaceuticals   Lubricants   Rubbers/Polymers

The first FT-IR spectrometer designed for you

Owning a Thermo Scientific™ Nicolet™ iS™10 FT-IR spectrometer means you are up and ready as soon as your instrument is turned on. You do not need to be a spectroscopy expert to get good data from your Nicolet iS10 spectrometer – the expertise is already built into the instrument.

Materials verification

Validation, data integrity and push-button operation are important requirements, but no longer sufficient in today's fast-paced, continuous-improvement business environment. Your job requires you to manage cost of ownership of your equipment, enhance productivity, save time, and ensure that human errors are at a minimum. You demand unambiguous answers. The Nicolet iS10, with award-winning Thermo Scientific™ OMNIC™ software, creates the most effective tool to achieve all your objectives without compromise.

Materials identification

Your challenges walk through your lab door every day. Handling last-minute demands from manufacturing, quality control and product development – troubleshooting is your daily "routine." Your answers determine not only your customers' satisfaction but also your company's image and profitability. Performance, ease-of-use, and reliability are of paramount importance. The Nicolet iS10 spectrometer goes the distance with you – risk free.

These are only a few of the materials that can be monitored for consistent quality using the Nicolet iS10 FT-IR spectrometer.
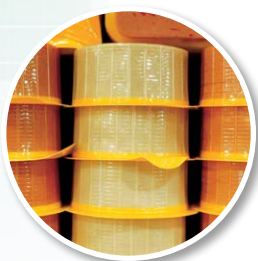
| Biofuels/Fuels | Packaging | Inks/Pigments/Paints | Cement | Cosmetics |

QC analysis – *sample in...*

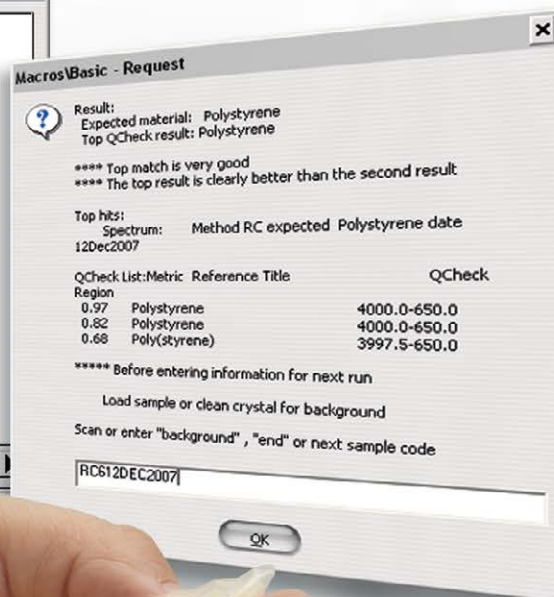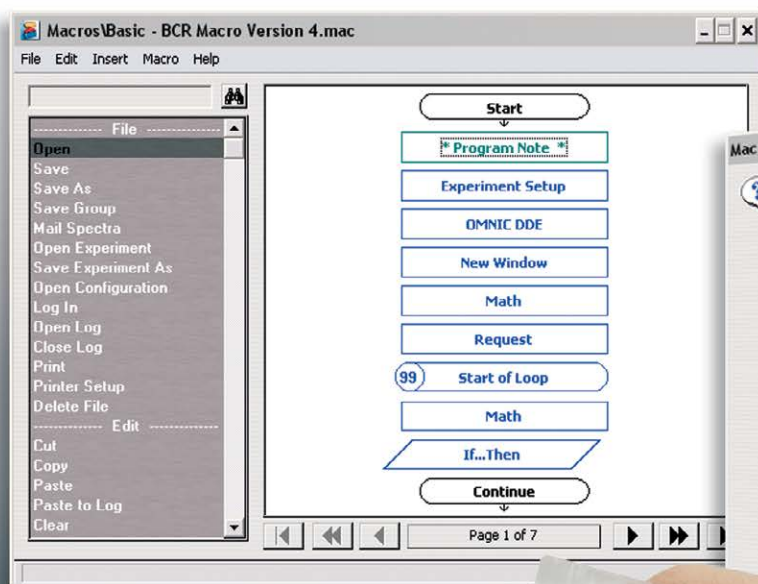Qualify System ➤ Input Sample Info ➤ Prepare Sample ➤ Select Method

System is always qualified

- Save valuable time and optimize laboratory throughput by running system performance qualification overnight, every night with System Performance Verification (SPV)
- Qualify the spectrometer and the accessory
- System suitability testing complements performance verification
- Constant system monitoring

Sample information loading and preparation

- Minimize user interaction by loading sample information through bar codes
- Standardize sample preparation and quality of results by using the Thermo Scientific™ Smart iTX™ ATR sampling accessory
- Even method selection can be automated, for error-free operation

Macros\Basic - BCR Macro Version 4.mac

File Edit Insert Macro Help

---- File ----
Open
Save
Save As
Save Group
Mail Spectra
Open Experiment
Save Experiment As
Open Configuration
Log In
Open Log
Close Log
Print
Printer Setup
Delete File
---- Edit ----
Cut
Copy
Paste
Paste to Log
Clear

Start
* Program Note *
Experiment Setup
OMNIC DDE
New Window
Math
Request
(99) Start of Loop
Math
If...Then
Continue

Page 1 of 7

Macros\Basic - Request

Result:
Expected material: Polystyrene
Top QCheck result: Polystyrene

**** Top match is very good
**** The top result is clearly better than the second result

Top hits:
Spectrum: Method RC expected Polystyrene date 12Dec2007

QCheck List:Metric Reference Title   QCheck
Region
0.97   Polystyrene   4000.0-650.0
0.82   Polystyrene   4000.0-650.0
0.68   Poly(styrene)   3997.5-650.0

***** Before entering information for next run

Load sample or clean crystal for background

Scan or enter "background" , "end" or next sample code

RC612DEC2007

OK

HC826AUG07

Running the Nicolet iS10 FT-IR spectrometer means no typing sample numbers, no printing SOPs, and no manual selection of methods. You don't even need to touch the computer.

What you get is:

- **Speed**
- **Security**
- **Consistency**
- **Confidence**

QC analysis – *answers out*

Verify Sample → Pass / Fail → Report Out

Sample verification

- Verify raw materials, intermediates and finished products for consistency, purity and concentration
- Regardless of your sample – be absolutely confident in your pass/fail results, thanks to the new and unique compare tools in the Thermo Scientific™ QCheck™ feature
- Quantify your compounds with classic and chemometric tools in Thermo Scientific™ TQ Analyst™ software

Comprehensive reports, quick and easy

- System validation status and date
- Sampling accessory validation status and date
- Method verification (suitability) status and date
- Sample verification status (pass or fail)
- User ID and digital signature (where applicable)
- Generated and digitally stored for convenient review throughout your organization

Standard on every Nicolet iS10 spectrometer is an integrated scan button pad that incorporates LED status and humidity indicator.

Clear and simple answers for smooth quality control and assurance
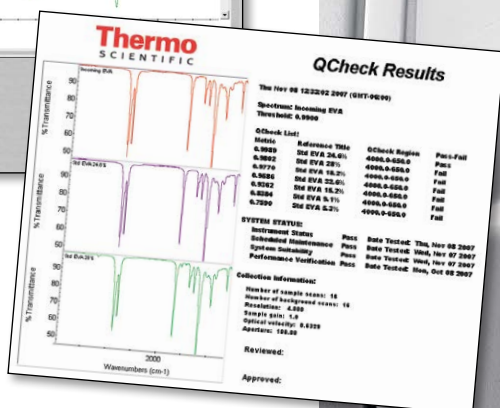
Universal sampling – *reality*

Attenuated Total Reflectance (ATR) is a powerful sampling technique that virtually eliminates sample preparation. The Thermo Scientific Smart iTX ATR sampling accessory for the Nicolet iS10 spectrometer offers outstanding performance and universal sampling.

- Multiple crystal options make it possible to sample virtually any liquid or solid
- Automatic recognition, collection parameters, spectral quality check
- Factory-calibrated pressure tower ensures spectral uniformity
- Easy to clean and quickly load your next sample
- Maximum durability; withstands hard and harsh samples with diamond ATR
- OMNIC ATR correction allows spectral search without dedicated ATR libraries
- Qualification available for diamond crystals

Smart iTX Universal ATR Sampling Accessory Reference Chart

MATERIAL TO BE SAMPLED	CRYSTAL TYPE		
	Diamond	ZnSe	Germanium
Soft solids, powders	Best	Best	Good
Rigid samples	Best	Weak	Weak
Harsh chemicals	Best	Weak	Good
Coatings on metal	Good	Weak	Weak
Liquid samples, gels	Best	Good	Good
Carbon black filled samples	Weak	Medium	Best

More than 60% of FT-IR users get their results by using a single reflection HATR. The popular Smart iTX sampling accessory delivers exceptional energy throughput which allows you to acquire high-quality spectra in seconds. The interchangeable crystals answer your needs for flexibility, ease of cleaning and reproducibility of data.

Carbon black filled samples can be effectively characterized with the Smart iTX universal sampling module by using the germanium crystal.
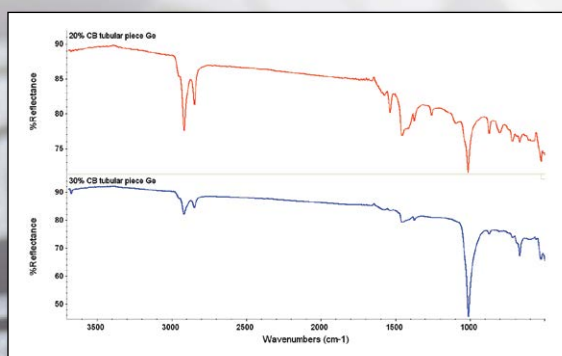
Productivity *and efficiency*

Double your lab's throughput without doubling your budget. The Thermo Scientific™ Nicolet™ iZ™10 adds a second sampling module while sharing your Nicolet iS10 spectrometer's analytical engine.

Maximize productivity

- Configure the spectrometer for routine daily use with the main sample compartment
- Eliminate accessory changeover delays and complete sample analysis faster

Ensure quality results

- Optimized performance of dedicated accessories with the flexibility to meet changing needs quickly

Easily comply

- Independently validate each module with our Thermo Scientific™ ValPro™ system qualification package

Simplify Sampling

The Thermo Scientific Near-IR Integrating Sphere samples directly through glass, allowing you to rapidly analyze materials for both qualitative and quantitative assessment.

Use the Near-IR Integrating Sphere to:

- Eliminate sample preparation
- Speed up analysis
- Analyze bulk samples
- Get pass/fail or quantitative results

The Nicolet iZ10 module doubles your sampling capabilities with one spectrometer.

Analytical support –
problem in, answer out

When defects occur in your manufacturing process, when suspected counterfeit goods threaten your brand, or when your quality control laboratory rejects a product – your analytical services day has begun.

Tough questions...

Q *Why was the material rejected?*

Q *Why did the failure occur?*

Q *Is the customer correct, or did they not use the product properly?*

Q *What is the root cause?*

Q *What possible actions can we take?*

Getting to the core of these questions requires an investment in spectral libraries, ability to identify mixtures and a justification of your results – just a good quality infrared spectrum is not enough!

Meet Thermo Scientific™ OMNIC™ Specta™ software, a unique combination of spectral identification tools, interpretation algorithms, and a knowledge-base of scientific documentation that guides you in identifying and certifying assumptions. Combined with a standard collection of several thousand spectra, you now have the capability for:

- Automated qualitative and semi-quantitative analysis of pure compounds and mixtures
- Comprehensive search and interpretation tools
- Expert knowledge base
- An all encompassing database that includes every spectrum on your computer

...Require definitive answers

A *OMNIC Specta improves your lab's problem-solving skills – minimizing the cost of external contract lab services.*

A *OMNIC Specta protects and improves your customer satisfaction.*

A *OMNIC Specta reduces inconsistent product quality and product recalls.*

A *Ideal for the analytical services lab, OMNIC Specta also empowers QC laboratories wanting to minimize costs of external contract lab-services.*

Get the highest confidence from infrared spectroscopy materials identification.

OMNIC Specta provides innovative identification and interpretation tools and a unique expert knowledge base. It converts all of the spectral data on your hard disk into an always-ready database and includes a standard collection of thousands of spectra enabling you to efficiently and effectively identify pure materials and mixtures.

OMNIC Specta can identify multiple compounds in mixtures, simultaneously with a click of the mouse. This example shows a polymer material made of ABS, and a brominated flame retardant as the second component.
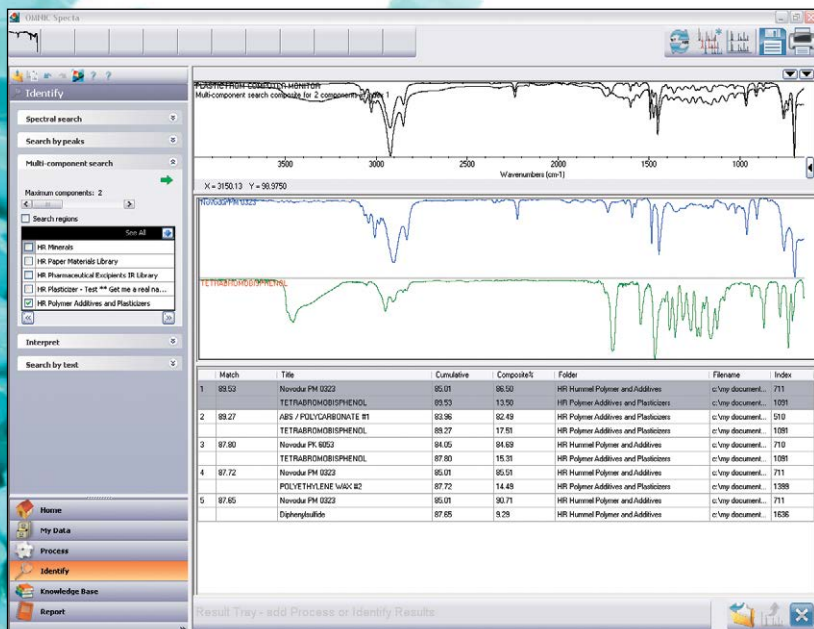
Analytical support – *see, study, report*

Quantitative method development

- Provide better tools to QC laboratories to monitor finished products quality
- Measure the concentration of your ingredients after mixing or before product shipment
- Verify product specifications for quality assurance

OMNIC software includes TQ Analyst quantitative analysis for multiple compounds in simple mixtures. For more complex mixtures and diluted ingredients, chemometric tools such as PLS, PCA and PCR are optionally available.
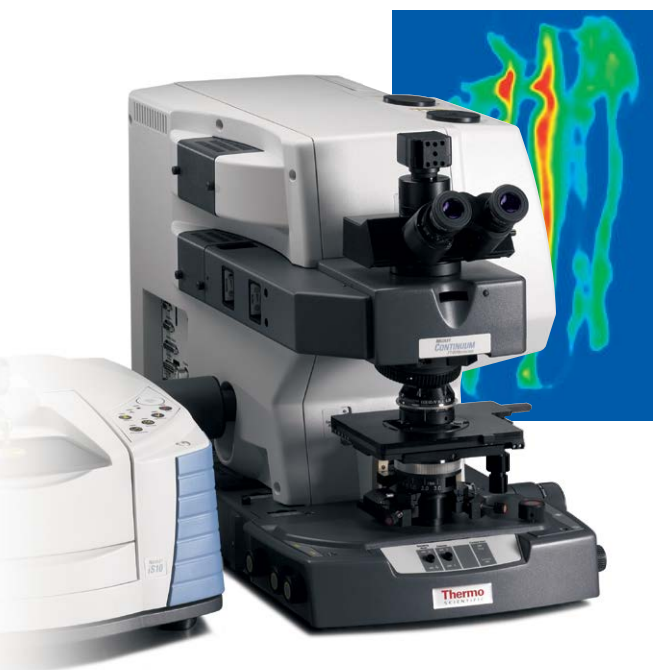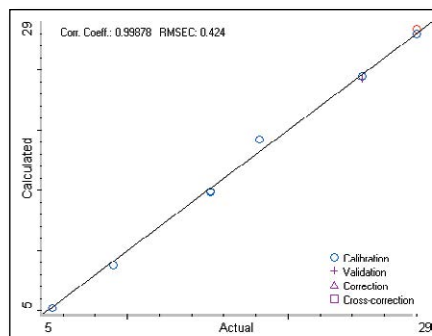
## Contamination and failure analysis by infrared microscopy

- Measure particles, filtrates and contaminants down to a few microns
- Identify composition of small particles by OMNIC Specta
- Find the possible cause/source of the failure

The Nicolet iS10 is compatible with the award-winning Thermo Scientific Nicolet Continuμm microscope. The Nicolet iS10 spectrometer is also the ideal companion to the fully-integrated Nicolet iN™10 Infrared microscope, another innovative solution from Thermo Scientific.

Ensure the quality of your products and identify microscopic contaminants.

Materials analysis by TGA-IR

- Learn more about materials by linking infrared to thermal analysis
- Identify species evolved during thermal decomposition
- Elucidate composition of mixtures, copolymers and blends
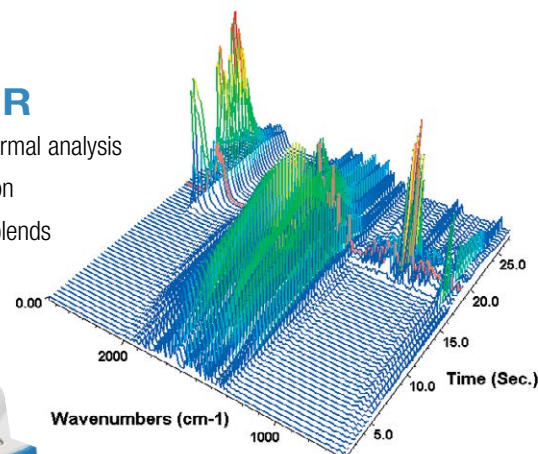
OMNIC Series software, with unique Mercury TGA routine and 3-D displays, allows you to quickly and efficiently extract useful information from TGA-IR and other time-based experiments.

Auditing made easy

Quality-driven businesses, pharmaceutical manufacturers, and other regulated laboratories must have absolute confidence in the answers they provide – with supporting documentation. The Nicolet iS10 FT-IR spectrometer is the perfect partner for any regulated and quality driven environment. The standard qualification package includes software, hardware and documentation based on industry-standard validation methods, traceable standards, and automated overnight qualification.

System Performance Verification *(standard)*

- Fully automated ASTM E-1421 method for FT-IR spectrometer testing, includes report printout for reference purposes
- Fully automated validation wheel with 1.5-MIL (38-micron) serialized NIST traceable polystyrene film, and NG-11 Schott glass
- SPV software for spectrometer, sampling accessory, method performance verification and system suitability testing
- Overnight system verification, user programmable

ValPro System Qualification *(optional)*

- Fully automated ASTM methods for FT-IR spectrometers testing, includes printed copy for reference purposes
- European and Japanese pharmacopoeia methods
- ASTM, EP and JP sampling accessory validation
- Fully automated validation wheel with 1.5-MIL (38-micron) serialized NIST traceable polystyrene film, and NG-11 Schott glass
- ValPro software for spectrometer, sampling module and method performance verification
- Design Qualification documentation (DQ)
- OQ, PQ protocols and documentation
- Installation Qualification (IQ) also available

Digital signature and electronic data security *(optional)*

- Complete 21 CFR Part 11 compliance tools
- Digital signatures for the most secure data
- Audit trails for data and system use
- Server-based security administrator

Every Nicolet iS10 includes software and tools for ASTM method FT-IR validation protocol with capability for comprehensive overnight fully-automated testing, NIST traceable and serialized standard testing, and NIST traceable standard mounted on serialized wheel. ValPro advanced validation package is optionally available for more demanding regulated environments and pharmaceutical industry.
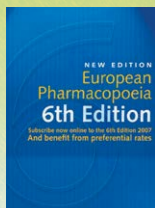
Don't take risks.
Empower your laboratory with a reliable, high-performing and warranty protected FT-IR.

Quality, performance and support

Built to last and backed by the Thermo Scientific global customer service network, the Nicolet iS10 spectrometer is designed to be the workhorse of your laboratory.

Sealed and desiccated optics lowers maintenance costs

Standard KBr/BaF$_2$ anti-hygroscopic coating, protective windows

- User rechargeable desiccant canister and humidity inspection window
- High-sealing gaskets to protect system from chemical vapors
- Standard integrated multi-level positive pressure purge circuit
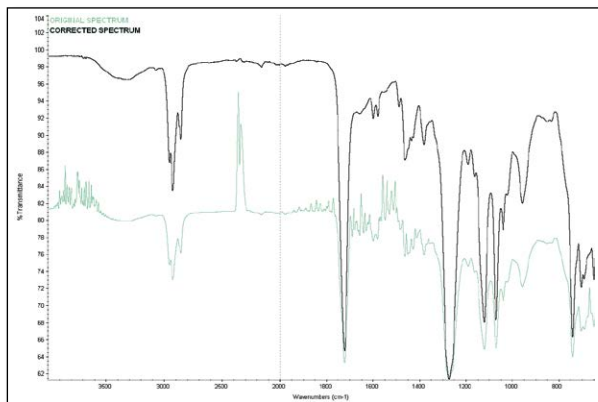
Automatic atmospheric suppression removes water and carbon dioxide from spectra, with no need to select a reference spectrum.

Proven technology for low cost, state-of-the-art operation

- Diamond-turned mirrors and pinned-in-place optics provide excellent wavelength accuracy with no need for spectral correction by software
- Dynamic alignment provides superior performance and scan velocities
- IR and halogen sources accessible from the sample compartment are replaceable and interchangeable by the user further extending your capabilities and lowering maintenance costs
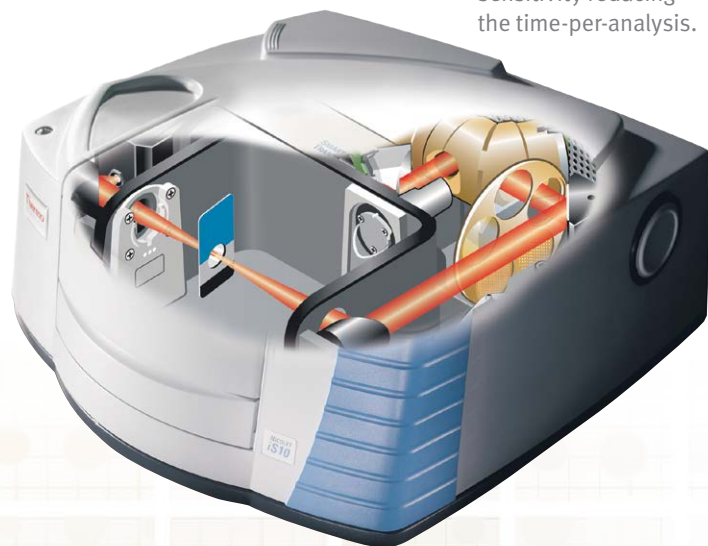
The simple optical layout of the Nicolet iS10 spectrometer delivers exceptional sensitivity reducing the time-per-analysis.

Speed and sensitivity: increase your laboratory throughput

- High spectral resolution standard
- Exceptional band-shape and sensitivity
- Exceptional signal to noise ratio
- High scan rate for kinetic studies

Comprehensive Support for Your Needs

- On-site visits from factory-trained field service engineers
- Technical phone support
- Internet-based technical support
- Performance maintenance programs
- Classroom and on-site training programs
- Contract method and application development programs

Worldwide Service and Support

Thermo Scientific FT-IR spectrometers are backed up by the support staff of the largest analytical instrumentation company in the world. Service and support are available almost everywhere. We have more FTIR-trained field service engineers and applications people to support you than any other company. Meeting all of your support needs is our highest priority.

Nicolet iS10 FT-IR spectrometer

Beyond one-click operation, performance and ease-of-use

- Highest confidence when identifying impurities and mixtures
- Continuous performance verification
- Error-free sample information loading
- Highest confidence in QC pass/fail results
- Full set of tools for passing audits
- Consistent sample preparation
- Universal sampling tools
- Electronic SOP authoring

You are responsible for providing answers. You require the highest confidence in your results, efficient laboratory operation and low cost of ownership. The Thermo Scientific Nicolet iS10 FT-IR spectrometer has been designed for you. Discover how the Nicolet iS10 system provides the performance, reliability, and simplicity you require. Then discover the added value you may not expect from FT-IR.

Africa +43 1 333 50 34 0	**Denmark** +45 70 23 62 60	**India** +91 22 6742 9494	**New Zealand** +64 9 980 6700
Australia +61 3 9757 4300	**Europe-Other** +43 1 333 50 34 0	**Italy** +39 02 950 591	**Russia/CIS** +43 1 333 50 34 0
Austria +43 810 282 206	**Finland/Norway/Sweden**	**Japan** +81 45 453 9100	**Spain** +34 914 845 965
Belgium +32 53 73 42 41	+46 8 556 468 00	**Latin America** +1 561 688 8700	**Switzerland** +41 61 716 77 00
Canada +1 800 530 8447	**France** +33 1 60 92 48 00	**Middle East** +43 1 333 50 34 0	**UK** +44 1442 233555
China +86 21 6865 4588	**Germany** +49 6103 408 1014	**Netherlands** +31 76 579 55 55	**USA** +1 800 532 4752

BR51502_E 12/14M

Thermo SCIENTIFIC

A Thermo Fisher Scientific Brand

Designed for laboratories with quality control, analytical services or forensic duties, the Nicolet iS10 FT-IR spectrometer delivers the highest confidence in the verification and identification of materials. The Nicolet iS10 spectrometer is designed for maximum assurance in its ability to sample and solve challenging problems with a minimal investment in time.

Product Specifications

Nicolet iS10
FT-IR Spectrometer

Infrared spectroscopy with confidence
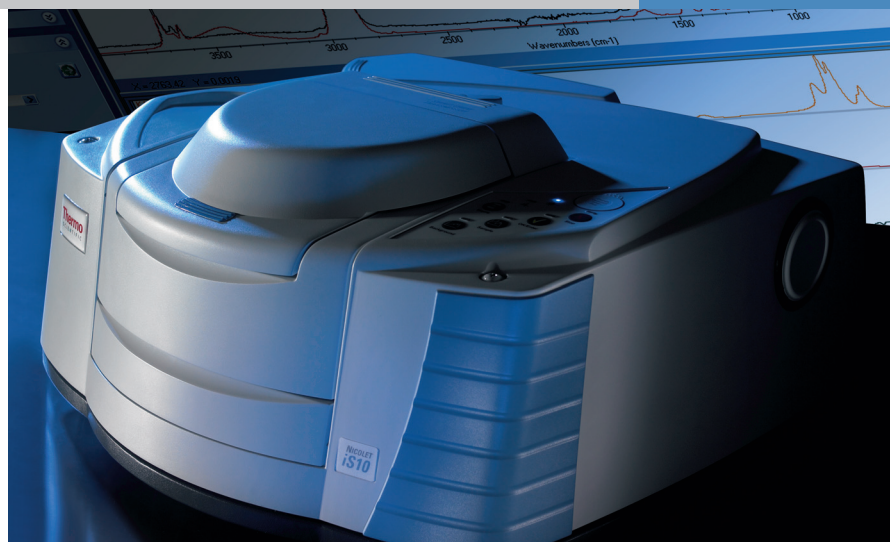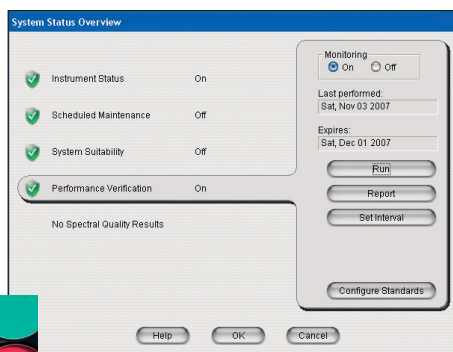
The Thermo Scientific Nicolet™ iS™10 FT-IR spectrometer includes features that validate the instrumental performance, verify the quality of materials, create SOPs and suitability tests, identify unknowns or mixtures, and quantify mixture ingredients. The Nicolet iS10 has been developed especially for the material characterization process, from loading sample information to final report. The Nicolet iS10 is designed for use by any skill level, with many tasks capable of being completed in one click.

Designed for Instrument Qualification

System Performance Verification (SPV) is a powerful tool to ensure that the spectrometer is performing as expected, day after day. SPV includes hardware and software to test the instrument against the ASTM E1421 method by using Shott NG-11 and NIST traceable standards, contained in a built-in motorized wheel. The Nicolet iS10 system verification is programmable and can be set for:

- Daily performance verification
- System suitability
- Validation standards expiration date
- Scheduling preventative maintenance visits

Qualify System → Input Sample Info → Prepare Sample → Select Method → Verify Sample → Pass / Fail → Report Out

Thermo
SCIENTIFIC

Designed for Ease of Use

The Nicolet iS10 FT-IR spectrometer has been designed for the ease of use and reliability required by laboratories with heavy workloads.

- Easy to access, rechargeable desiccants and built-in humidity indicator
- Integrated scan button and SOP builder, for simple user interface, consistency and productivity
- Nicolet Smart Accessory™ technology for simple accessory exchange and experimental conditions setup
- Material verification package with standard and high sensitivity correlation algorithm, to fit variability of tested materials
- Innovative multi-component analysis allows identification of principal ingredients of mixtures, enabling every laboratory to troubleshoot contamination problems with confidence

The Nicolet iS10 enables anyone to conduct material testing and identification, consistently and reliably.

Optical System

The sealed and desiccated optical unit protects the instrument from humidity and solvent vapors. A self-compensating, dynamically aligned interferometer removes any tilt and shear scanning error, automatically tunes the instrument for best throughput and provides analysis speed for real time survey or screening. Diamond turned, pinned-in-place alignment-free optics guarantee long life system performance with minimum maintenance.

Detectors

- Fast recovery deuterated triglycine sulfate (DTGS) detector
- Liquid-nitrogen-cooled mercury cadmium telluride (MCT) detector

Source

- Mid-infrared Ever-Glo; user replaceable from sample compartment
- Tungsten/halogen user replaceable from sample compartment

Beamsplitter

- KBr/Ge mid infrared optimized
- XT-KBr/Ge extended range mid infrared

Humidity and Vapor Protection

- Sealed and desiccated optical bench with protective coating on KBr windows
- Rechargeable desiccant cartridges
- Humidity indicator
- Multi-zone pressure system for optional purge

Frequency Calibration

- HeNe laser tube
- Does not require software optimization or calibration

## Spectrometer Performance Validation

- Integrated validation wheel with NG-11 and NIST traceable polystyrene film standards, serialized
- System Performance Verification (SPV) software and programmable tasks interface

External Beam Options

- Optional external beam for infrared microscopes or external Thermo Scientific Nicolet iZ™10 FT-IR module
- The Nicolet iZ10 FT-IR module can be used with the NIR integrating sphere (InGaAs detector), TGA interface or any other mid-infrared accessories, and can be equipped with a DTGS or MCT detector

Quality and Low Cost of Ownership — Guaranteed

- Fully protected optics, to ensure maximum resistance from chemical vapors and humidity
- Five-year warranty on diamond HATR crystal of the Thermo Scientific Smart iTR™ ATR accessory, optimized for the Nicolet iS10 spectrometer
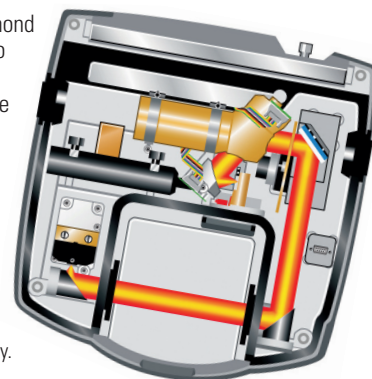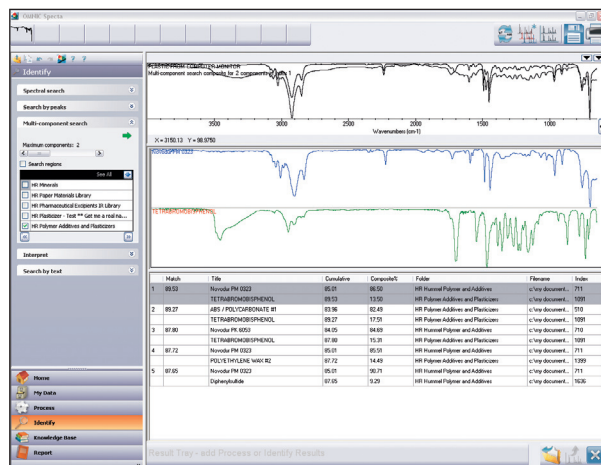

The optical efficiency, diamond turned mirrors and dynamically aligned interferometer of the Nicolet iS10 provide speed, sensitivity, precision and accuracy.

Optional tungsten halogen source and desiccant compartment are easily accessible.


The Nicolet iS10 source is mounted in the sample compartment allowing quick and easy optimization of data collection in the mid-near or infrared region.
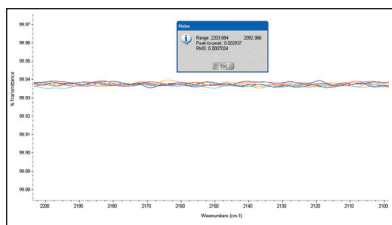

The Nicolet iS10 provides efficient tools to identify pure compounds and mixtures with confidence and ease of use. OMNIC™ Specta™ includes innovative ways to manage your results and provide answers with the confidence you need.

Speed and Consistency of Data by Performance

Collect spectra of exceptional quality in only a few seconds, saving your time for other tasks. Take advantage of the ease of use of the Smart iTR accessory – the simplest and most efficient way to measure solids, pastes and liquids. Assure the quality of your materials with consistency in your laboratory through our exclusive SOP builder and with system suitability tests.
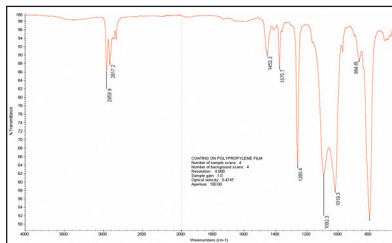
5-second collection time spectrum of a silicone-based oil on a polypropylene film.
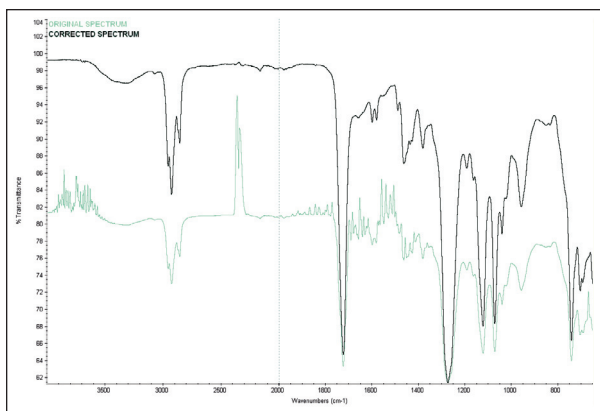
Enhanced Analytical Power and Productivity

- Measure samples directly through vials, with the integrating sphere conveniently mounted in the Nicolet iZ10 FT-IR module
- Characterize materials quickly and easily by switching to TGA/IR interface installed in the Nicolet iZ10 FT-IR module
- Achieve high throughput screening by powder and liquid auto samplers
- Identify unknowns with the power of OMNIC Specta, which includes a 9,000 spectra database and innovative multi-component search routines

The Nicolet iS10 delivers exceptional signal to noise in just a few seconds, up to 10,000:1 (or better) peak to peak in 5 seconds. With the Smart iTR ATR accessory most material characterization data collection can be accomplished in just five seconds.

Nicolet iS10 FT-IR spectrometer equipped with Smart iTR ATR accessory and integrating sphere mounted in the Nicolet iZ10 external module

Electronics

- 24-bit analog to digital converter; digital signal processor for spectrometer monitoring and software integrated controls
- Integrated scan button panel including LED control status for source, laser and interferometer
- USB 2.0 high-speed bidirectional communication
- Smart accessory automatic recognition, parameter setting and spectral quality monitoring
- Enhanced synchronization protocol continuously monitors power supply, laser, source and detector

Software Options

- **OMNIC Specta** – a revolutionary spectral identification package for pure compounds and mixtures, backed with over 9,000 spectra
- **TQ Analyst™ Professional edition** – adds PLS, PCR and discriminant analysis calibration to prediction capabilities
- **OMNIC Series** – for kinetic studies, TGA-IR and rapid scan
- **Array Automation** – Perfect match for micro well-plate sampling, ideal for cluster analysis and high throughput screening

Nicolet iS10 FT-IR Spectrometer OMNIC Software Suite

- Windows® XP and Windows Vista® compatible
- Collect, set-up parameters and spectral preview, customizable toolbar and menu options
- Display capabilities: Zoom, roll, stack, overlay, offset and interactive display mode tools
- Data processing: Baseline correction (automatic and manual), smooth, blank and straight line, first and second derivative, curve fitting, spectral math, subtract (manual and automatic)
- Data conversion and corrections: Kubelka Munk, Kramers Kronig, Photoacoustic, ATR correction including settings for crystal material, reflections, angle and sample refractive index
- Spectral Search: High-resolution library generation, customizable information fields, single or multi-region search, library management, standard libraries (1400 spectra)
- Spectral peak picking, audit trails history log, multi-format converters for J-camp DX other vendors' spectral files and user libraries
- Spectral groups statistical analysis: Variance, average, and range
- Peak analysis tools: Peak area, peak height, cursor, peak text annotation
- Automatic atmospheric suppression (no standards needed) to remove H_2O and CO_2 interferences
- SOP builder (task-driven compiler) to execute through Integrated Scan Button panel (OMNIC Macros\Basic™ compiler and reader)
- QCheck for spectrum-to-spectrum or spectrum-to-multiple spectra QC/QA verification; includes correlation, high sensitivity compare, customizable pass/fail threshold
- Quantitative and discriminant analysis package including:
  – Beer-Lambert calibration and prediction (peak height or area integration)
  – Classical Least Squares calibration and prediction
  – Discriminant analysis, Partial Least Squares (PLS) and Principal Component Analysis (PCR) prediction
- Infrared spectral interpretation tool and online guide

5-second collection time polymer film spectra with and without automatic atmospheric suppression (expanded region)

Smart Accessory Compatibility

The Nicolet iS10 is compatible with our extensive line of Smart Accessories specialized for quantitative analysis, reaction studies, surface and thin film measurements.

- Simple accessory exchange and experiment setup
- Maintain proper experimental conditions and pre-set parameters
- Automatic performance verification

Performance Specifications

- 7800-350 cm^{-1} optimized, mid-infrared KBr beamsplitter
- 11000-375 cm^{-1} XT KBr extended range mid-infrared optics
- Signal-to-noise:
  - 10000:1 peak to peak in five seconds
  - 35000:1 peak to peak in one minute
- Room temperature, KBr optics, DTGS detector, 4 cm^{-1} spectral resolution
- Wavelength precision: better than 0.01 cm^{-1} at 2000 cm^{-1}
- Collection speed: variable from 0.16 cm/sec to 2.5 cm/sec; suitable to slow responsivity (PAS) and high-sensitivity (MCT) detectors
- Maximum speed: 40 spectra per second at 16 cm^{-1} resolution, individually collected and stored
- Spectral resolution: better than 0.4 cm^{-1}, non-apodized
- Ordinate linearity (ASTM E1421): <0.1%T deviation from 0.0%T, measured at 4 cm^{-1} resolution

Validation Options for FDA, EP or JP Regulated Industries

- ValPro™ System Qualification specifically addresses DQ/IQ/OQ (Design, Installation, and Operational Qualification). Provides "objective evidence" to regulators and ISO auditors, showing that their Thermo Scientific system has been properly selected, implemented, and verified for use in their process.
- Digital and electronic signature, 21 CFR Part 11 compliance package

Other Specifications

Size: 550 mm x 570 mm x 250 mm (W x D x H)

Weight: 39 Kg

Regulatory Approvals: CE, ETL

Warranty: 1 year on complete system; 5 years on Smart iTR (optional) diamond HATR crystal

Thermo Electron Scientific Instruments LLC, Madison, WI USA is ISO Certified.

PS51503_E 01/08M

Africa +43 1 333 5034 127	**Denmark** +45 70 23 62 60	**Japan** +81 45 453 9100	**Sweden/Norway/Finland** +46 8 556 468 00
Australia +61 2 8844 9500	**Europe-Other** +43 1 333 5034 127	**Latin America** +1 608 276 5659	
Austria +43 1 333 50340	**France** +33 1 60 92 48 00	**Middle East** +43 1 333 5034 127	**Switzerland** +41 61 48784 00
Belgium +32 2 482 30 30	**Germany** +49 6103 408 1014	**Netherlands** +31 76 579 55 55	**UK** +44 1442 233555
Canada +1 800 530 8447	**India** +91 22 6742 9434	**South Africa** +27 11 570 1840	**USA** +1 800 532 4752
China +86 10 5850 3588	**Italy** +39 02 950 591	**Spain** +34 914 845 965	**www.thermo.com**

Thermo
SCIENTIFIC

PRODUCT SPECIFICATIONS

Thermo Scientific Nicolet iS10 FTIR spectrometer

## Infrared spectroscopy with confidence

Designed for laboratories with quality control, analytical services or forensic duties, the Thermo Scientific™ Nicolet™ iS™10 FTIR spectrometer delivers the highest confidence in the verification and identification of materials. The Nicolet iS10 spectrometer provides maximum assurance in its ability to sample and solve challenging problems with a minimal investment in time.

The Nicolet iS10 FTIR spectrometer includes features that validate the instrumental performance, verify the quality of materials, create SOPs and suitability tests, identify unknowns or mixtures, and quantify mixture ingredients. The Nicolet iS10 spectrometer has been developed especially for the material characterization process, from loading sample information to final report. Users of any skill level can operate the system, with many tasks completed with one click.

Specifications you can trust

The Nicolet iS10 FTIR spectrometer is built to inspire a high level of customer confidence. All instrument specifications are factory verified to ensure each unit meets our rigorous quality standards. Specifications are:

• Certified on each instrument before leaving the manufacturing floor

• Representative of actual instrument performance, not "typical" or "achievable"

• Not reliant on artificial data processing or manipulations
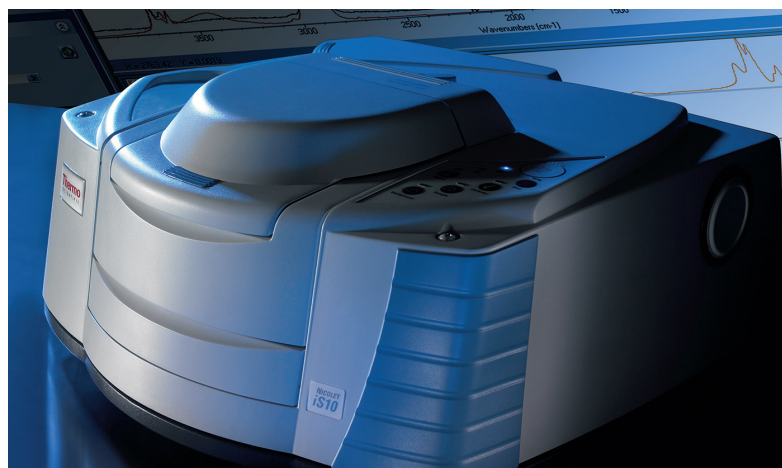
Designed for ease of use

The Nicolet iS10 FTIR spectrometer has been designed for the ease of use and reliability required by laboratories with heavy workloads.

• Easy to access, rechargeable desiccants and built-in humidity indicator

• Integrated scan button and SOP builder, for simple user interface, consistency and productivity

• Thermo Scientific™ Nicolet™ Smart Accessory™ technology for simple accessory exchange and experimental conditions setup

• Material verification package with standard and high sensitivity correlation algorithm, to fit variability of tested materials

• Innovative multi-component analysis allows identification of principal ingredients of mixtures, enabling every laboratory to troubleshoot contamination problems with confidence

Qualify System ▶ Input Sample Info ▶ Prepare Sample ▶ Select Method ▶ Verify Sample ▶ Pass / Fail ▶ Report Out

ThermoFisher
S C I E N T I F I C

Optical system

The sealed and desiccated optical unit protects the instrument from humidity and solvent vapors. A self-compensating, dynamically aligned interferometer removes any tilt and shear scanning error, automatically tunes the instrument for best throughput and provides analysis speed for real time survey or screening. Diamond turned, pinned-in-place, alignment-free optics guarantee long life system performance with minimum maintenance.

Detectors

- Fast recovery deuterated triglycine sulfate (DTGS) detector
- Liquid-nitrogen-cooled mercury cadmium telluride (MCT) detector

Source

- Mid-infrared Ever-Glo; user replaceable from sample compartment
- Tungsten/halogen; user replaceable from sample compartment

Beamsplitter

- KBr/Ge mid-infrared optimized
- XT-KBr/Ge extended range mid-infrared

Optional tungsten halogen source and desiccant compartment are easily accessible

The Nicolet iS10 source is mounted in the sample compartment allowing quick and easy optimization of data collection in the mid-near or infrared region

Humidity and vapor protection

- Sealed and desiccated optical bench with protective coating on KBr windows
- Rechargeable desiccant cartridges
- Humidity indicator
- Multi-zone pressure system for optional purge

Frequency calibration

- HeNe laser tube
- Does not require software optimization or calibration

Spectrometer performance verification

- Integrated validation wheel with NG-11 and NIST traceable polystyrene film standards, serialized
- System Performance Verification (SPV) software and programmable tasks interface
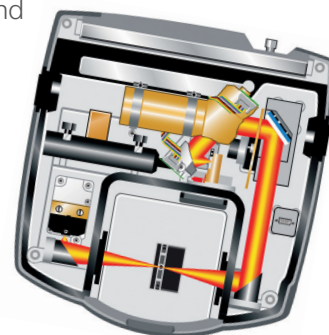
External beam options

- Optional external beam for infrared microscopes or external Thermo Scientific™ Nicolet™ iZ™10 FTIR module
- The Nicolet iZ10 FTIR module can be used with the NIR integrating sphere (InGaAs detector), TGA interface or any other mid-infrared accessories, and can be equipped with a DTGS or MCT detector

Quality and low cost of ownership—guaranteed

- Fully protected optics to ensure maximum resistance from chemical vapors and humidity
- Five-year warranty on diamond crystal of the Thermo Scientific™ Smart iTX™ ATR accessory, optimized for the Nicolet iS10 spectrometer

The optical efficiency, diamond turned mirrors and dynamically aligned interferometer of the Nicolet iS10 provide speed, sensitivity, precision and accuracy

Electronics

- 24-bit analog to digital converter; digital signal processor for spectrometer monitoring and software integrated controls
- Integrated scan button panel including LED control status for source, laser and interferometer
- USB 2.0 high-speed bidirectional communication
- Smart Accessory automatic recognition, parameter setting and spectral quality monitoring
- Enhanced synchronization protocol continuously monitors power supply, laser, source and detector

Nicolet iS10 FTIR spectrometer equipped with Smart iTX ATR accessory and integrating sphere mounted in the Nicolet iZ10 external module.

Enhanced analytical power and productivity

- Measure samples directly through vials with the integrating sphere conveniently mounted in the Nicolet iZ10 FTIR module

- Characterize materials quickly and easily by switching to TGA/IR interface installed in the Nicolet iZ10 FTIR module

- Achieve high throughput screening by powder and liquid auto samplers

- Identify unknowns with the power of Thermo Scientific™ OMNIC™ Specta™ software, which includes a 9,000 spectra database and innovative multi-component search routines

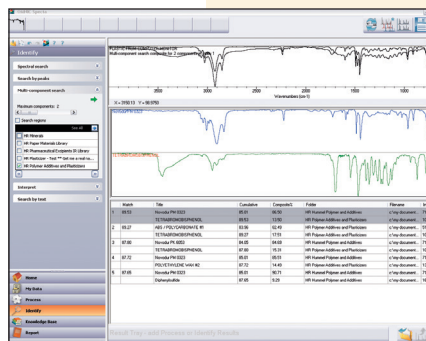## Designed for instrument qualification

System Performance Verification (SPV) is a powerful tool to ensure that the spectrometer is performing as expected, day after day. SPV includes hardware and software to test the instrument against the ASTM E1421 method by using Shott NG-11 and NIST traceable standards, contained in a built-in motorized wheel. The Nicolet iS10 system verification is programmable and can be set for:

- Daily performance verification
- System suitability
- Validation standards expiration date
- Scheduling preventative maintenance visits
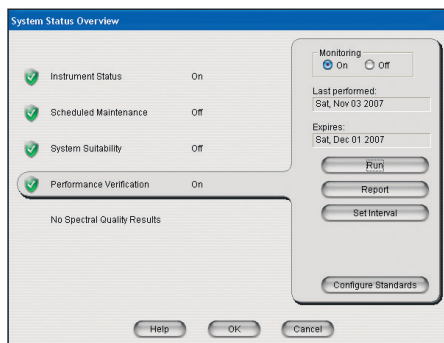
Nicolet iS10 FTIR spectrometer
Thermo Scientific OMNIC software suite

- Collect, set-up parameters and spectral preview, customizable toolbar and menu options

- Display capabilities: Zoom, roll, stack, overlay, offset and interactive display mode tools

- Data processing: Baseline correction (automatic and manual), smooth, blank and straight line, first and second derivative, curve fitting, spectral math, subtract (manual and automatic)

- Data conversion and corrections: Kubelka Munk, Kramers Kronig, Photoacoustic, ATR correction including settings for crystal material, reflections, angle and sample refractive index

- Spectral Search: High-resolution library generation, customizable information fields, single or multi-region search, library management, standard libraries (1400 spectra)

- Spectral peak picking, audit trails history log, multi-format converters for J-camp DX other vendors' spectral files and user libraries

- Spectral groups statistical analysis: Variance, average, and range

- Peak analysis tools: Peak area, peak height, cursor, peak text annotation

- Automatic atmospheric suppression (no standards needed) to remove H_2O and CO_2 interferences

- SOP builder (task-driven compiler) to execute through Integrated Scan Button panel (Thermo Scientific™ OMNIC™ Macros\Basic™ compiler and reader)

- Thermo Scientific™ QCheck™ for spectrum-to-spectrum or spectrum-to-multiple spectra QC/QA verification; includes correlation, high sensitivity compare, customizable pass/fail threshold

- Quantitative and discriminant analysis package including:
  - Beer-Lambert calibration and prediction (peak height or area integration)
  - Classical Least Squares calibration and prediction
  - Discriminant analysis, Partial Least Squares (PLS) and Principal Component Analysis (PCR) prediction

- Infrared spectral interpretation tool and online guide

The Nicolet iS10 provides efficient tools to identify pure compounds and mixtures with confidence and ease of use. OMNIC Specta software includes innovative ways to manage your results and provide answers with the confidence you need.
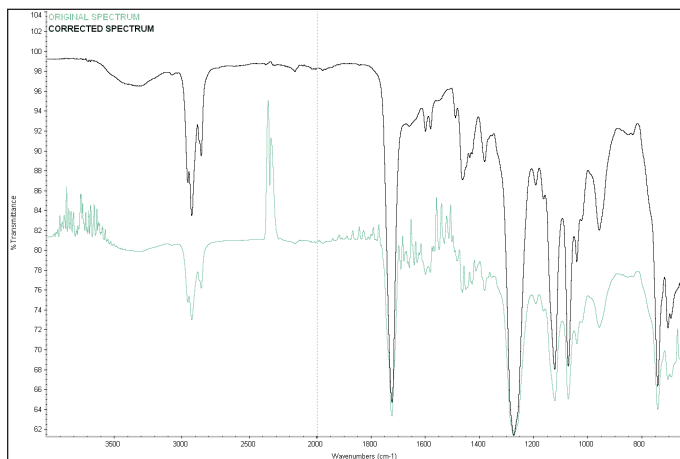
5-second collection time polymer film spectra with and without automatic atmospheric suppression (expanded region).

Smart Accessory compatibility

The Nicolet iS10 spectrometer is compatible with our extensive line of Smart Accessories specialized for quantitative analysis, reaction studies, surface and thin film measurements.

- Simple accessory exchange and experiment setup
- Maintain proper experimental conditions and pre-set parameters
- Automatic performance verification

Performance specifications*

- Spectral range:
  - *7800–350 cm^{-1} optimized, mid-infrared KBr beamsplitter*
  - *11000–375 cm^{-1} XT KBr extended range mid-infrared optics*
- Signal-to-noise: 1 minute: 50,000:1 (peak to peak)
- Wavenumber precision: 0.0008 cm^{-1} at 2000 cm^{-1}
- Wavenumber accuracy: 0.02 cm^{-1} at 2000 cm^{-1}
- Collection speed: variable from 0.16 cm/sec to 2.5 cm/sec; suitable to slow responsivity (PAS) and high-sensitivity (MCT) detectors
- Maximum speed: 40 spectra per second at 16 cm^{-1} resolution, individually collected and stored
- Spectral resolution: better than 0.4 cm^{-1}
- Ordinate linearity (ASTM E1421): <0.1 %T deviation from 0.0 %T

* Factory verified: Specifications are certified on every instrument before it leaves the manufacturing facility.

Validation options for FDA, EP or JP regulated industries

- Thermo Scientific™ ValPro™ System Qualification specifically addresses DQ/IQ/OQ (Design, Installation, and Operational Qualification). Provides "objective evidence" to regulators and ISO auditors, showing that their Thermo Scientific system has been properly selected, implemented, and verified for use in their process.
- Digital and electronic signature, 21 CFR Part 11 compliance package

Other specifications

- Dimensions (W × D × H): 550 × 570 × 250 mm (21.7 × 22.4 × 9.8 in.)
- Weight: 39 Kg (86 lb)
- Regulatory Approvals: CE, ETL
- Warranty:
  - *One year on complete system*
  - *Ten years on modulator*
  - *Five years on laser*
  - *Two years on source*
  - *Five years on Smart iTX (optional) diamond*

Find out more at **www.thermofisher.com/iS10**

Thermo Fisher
S C I E N T I F I C