

Nicolet iN10 Infrared Microscope

Beyond automation—a breakthrough in infrared microscopy simplicity

The Thermo Scientific™ Nicolet™ iN10 Infrared Microscope sets the benchmark for modern, productive, and cost-effective infrared microanalysis. The efficient optical design of the integrated Nicolet iN10 Infrared Microscope has a novel approach to instrument operation that provides users of all skill levels greater access to this valuable technique.

The Thermo Scientific Nicolet iN10 Infrared Microscope features efficient optical design for optimum performance. Its integrated design allows the analysis of microscope samples without the need for a Fourier transform infrared (FTIR) spectrometer.

With its intuitive Thermo Scientific OMNIC™ Picta™ user interface (UI), users with little prior experience in microscopy or spectroscopy can quickly and effectively collect sample data to characterize microscopic materials. OMNIC Picta (UI) assists users in driving to the proper sample area, with wizard software which guides users through common processes.

Nicolet iN10 Infrared Microscope benefits

The Nicolet iN10 Infrared Microscope is an integrated IR microscope, that has an innovative optical design and intuitive operation that bring tangible benefits and cost savings to IR microscopy. It provides the simplicity of a FTIR spectrometer with the ability to measure samples down to a few microns. The Nicolet iN10 Infrared Microscope provides these benefits:

- Samples as small as 50 microns can be analyzed without liquid nitrogen (LN), anytime, safely, and at lowered operating costs.
- Saves valuable space and budget, as it does not need a separate FTIR spectrometer.
- Built-in intelligence minimizes the learning process, automates instrument validation, and provides chemical, physical and distribution information through easy-to-follow procedures, letting you focus on the answers.

- When speed, resolution, and more analytical power become critical, the Nicolet iN10 Infrared Microscope grows with you. Using a mercuric cadmium telluride (MCT) detector, motorized stage, or MicroTip attenuated total reflection (ATR) enables you to identify materials as small as 3 microns.
- Add the Thermo Scientific Nicolet™ iZ10 FTIR module to get full spectrometer capabilities at minimal cost.

The Nicolet iN10 Infrared Microscope has superior video capturing technology built in, integral computer controlled automation, and dual monitor capability to allow you to access all system settings from the computer. Even the joystick for the motorized stage is controlled through the OMNIC Picta UI, to let you save space and time, so you can focus on your tasks.

Configured to meet your requirements

- Direct contact sampling with MicroTip ATR
- Sensitivity enhancement with LN-cooled MCT detector
- Manual or motorized stage
- Best viewing comfort with dual monitor operation
- Enhanced viewing with motorized visible polarizer



| | Specification | Benefit |
|---|--|---|
| Sample Viewing Illumination | Independent reflection and transmission electronic LED illuminators, software controlled separate LED illumination for aperture | Uniformly illuminated wide field of view. Allows viewing illuminators, software controlled. Separate LED illumination in reflection and collection of nontransparent materials for aperture. in transmission. Separate illumination for the aperture allows error-free operation. |
| Video Image | High resolution 1/3 inch color digital camera USB2 with 1024 × 768 XGA low-noise CCD real-time 500 micron field of view | Crisp, vivid color, high definition video imaging and mosaic acquisition. Image can be exported to a second monitor for viewing comfort. |
| Real-time IR Spectrum | Thermo Scientific TruView—simultaneous view of sample aperture positioned, even during collection | Observe sample and spectrum, without obscuration from masking aperture, in real time, for total confidence in results |
| Microscope Optics Gold Coated Optics | Gold coating of infrared beam conditioning, reflection/transmission, detectors and aperture mirrors | Superior sensitivity and maximum efficiency in any infrared sampling mode allows room temperature LN-free analysis |
| Aperture | Off-axis, rotating, motorized knife edge aperture | Computer controlled and separately illuminated, for aperture visualization before and during acquisition of data |
| IR/Visible Objective and Condenser | Permanently aligned 15x, 0.7 N.A. (half angle range 20° to 43.5°); objective with built-in purge collar ring and dovetail mount for Slide-On ATR crystal; Working distance 16 mm | High numerical aperture provides best performance with light scattering samples. No need for X-Y condenser centering; automatic focus adjustment for transmission analysis and auto park. |
| Sample Thickness | Up to 20 mm with standard sample holders | Allows the analysis in reflection and ATR of samples as thick as 20 mm with no need to remove condenser. Over 20 mm samples can be measured, depending on the overall size |
| ATR Option | Slide-On MicroTip Ge ATR crystal; microscopy optimized multi-coated crystal design (throughput >50%), 27° average angle | Precise mounting allows both ease of cleaning and accurate targeting. Enables sampling of 3 microns, or less sample-size. |
| Integrated FTIR Optics Interferometer | Dynamically aligned high-speed interferometer; high-speed collection up to 10 scans per second at 16 cm ⁻¹ and 0.4 cm ⁻¹ maximum resolution (with Nicolet iZ10 FTIR external module) | Provides best short and long-term stability, moving mirror tilt and share errors-free. High throughput for best sensitivity in any sampling mode and detector. Ultrafast collection of data. |
| Beamsplitter | Multicoated KBr/germanium | Spectral range is 7600–375 cm ⁻¹ . |
| Infrared Source | EverGlo air-cooled long lasting source, externally mounted | High throughput and easy to replace |
| Optics | Sealed and desiccated, optionally purged | Dessicants and humidity indicator side panel, for easy user replacement. System can be optionally purged. |
| Calibration Laser | HeNe with built-in power supply | Best wavelength calibration |
| External Beam | Right side external beam | Allows connection to the Nicolet iZ10 module with flexible, full-size macro sampling compartment. |
| Detectors Standard | Microscopy optimized room temperature DTGS; spectral range 7,600–450 cm ⁻¹ | Specifically designed for infrared microscopy, allows collection of data in any sampling mode (transmission, reflection and ATR), with no need for LN and samples as small as 50 microns. Extended range allows analysis of inorganics and fillers. |
| Optional | Exclusive design liquid nitrogen cooled MCT-A; spectral range 7,800–650 cm ⁻¹ | Long lasting vacuum lifetime, 16 hours LN hold time enables, overnight acquisition of large maps. MCT allows collection of samples as small as 10 microns. |

Figure 1. Standard sample plate with gold disc and transmission locations for automated background collection.



Figure 2. The Thermo Scientific ValPro™ System Qualification Software performance verification plate with transmission, reflection and ATR traceable standards; gold disc and transmission locations for background collection.

| | Specification | Benefit |
|--|---|---|
| Automations | Standard | Fully automated, computer controlled |
| Aperture | | |
| Condenser Focus/Park | Standard | Automatic adjustment in transmission, auto-park in reflection and ATR modes enable up to 20 mm sample thickness analysis, simplifying system setup |
| Sample Focus | Standard | Fully automated, computer controlled |
| Reflection/Transmission | Standard | Fully automated, computer controlled |
| ATR Contact Alert | Standard | Integrated, with digital display readout of applied pressure and custom selectable threshold for highest ATR mapping uniformity |
| Infrared/Viewing Mode | Not required | Simultaneous view and collection through dichroic mirrors does not require automation or user selection |
| Detector Selection | Standard | Fully automated, computer controlled |
| Motorized Stage | Optional | High-speed, 2.75x5" motorized stage and virtual joystick software control for precision and ergonomic design; slide plate holder with built-in gold mirror and void position for automatic background collection in reflection and transmission |
| Visible Polarizer | Optional | Fully automated, computer controlled |
| ValPro System Performance Verification | Optional | Fully automated, computer controlled |
| Stages | | Quick-release mount has a 2 x 3" X-Y stage |
| Manual | | |
| Motorized | | Quick-release mount 2.75 x 5" X-Y stage has an optional hardware joystick available |
| Performance Features | Better than 25,000:1 with cooled detector | Most samples require just few seconds of collection time. Provides superior sensitivity for challenging samples and smallest particles. |
| Signal-to-noise at 100 μm , 2100–2000 cm^{-1} , 4 cm^{-1} Resolution, 2 minutes | | |
| Spectral Range | 7,600–650 cm^{-1} | Mid-band MCT-A detector allows superior sensitivity in any sampling mode and optimal spectral range |
| Validation and Performance Qualifications | Transmission, Reflection and ATR | Ensures confidence that results, in any sampling mode, are in compliance with internationally accepted FTIR performance verification method |
| ASTM method | | |
| European Pharmacopoeia Methods | Transmission, Reflection and ATR | Ensures confidence that results, in any sampling mode, are in compliance with European Pharmacopoeia FTIR performance verification method |
| Reference Standards | NIST Traceable polystyrene standards; standards plate in protective case and traceability documentation | Ensures traceability to internationally accepted references |
| Validation Mode | Manual Fully automated (requires motorized stage) | Convenient validation kit is for manual stage Validation kit and procedure for transmission and reflection operation. If ATR test is included, requires manual displacement of crystal in place and removal of background acquisition. |



Figure 3. Dual screen operation enables you to view a full screen mosaic, zoom in and out and use the joystick while running OMNIC Picta software.

| | Specification | Benefit |
|--|--|---|
| OMNIC Picta w/Manual Stage Real Time Spectral Preview | Preview sample spectrum, sample image and aperture, while scanning | Survey sample to find best location to collect final data; ensures results and location consistency; allows continuous sample screening while moving the stage (manual or motorized) |
| Real Time Preview and Search | Dynamic library searching of preview spectra | Enables real-time identification of samples, while in preview mode |
| Automations | Focus, condenser focus and park, dual detector, reflection/transmission, aperture, external beam, illuminations | Provides total control of the microscope from workstation PC |
| Autofocus and Autoillumination | Adjusts focus and illumination for best viewing | Lowers optimal sample viewing setting skills, increases speed |
| Dual Screen Operation | Video or mosaic image and detachable joystick interface exportable to a second monitor | Improves comfort in viewing and magnifies sample for easier observation of details |
| Infrared Energy Optimizer | Adjusts optics for infrared reflection or transmission analysis | Eliminates the need for condenser adjustment or parking by user; lowers infrared microscopy skills requirement |
| ATR Contact Control | Built-in pressure monitoring sensor device with custom adjustable maximum pressure | Eliminates crystal damage; standardizes the pressure applied to multiple points increasing spectral uniformity; adjustable pressure to fit wide range of samples |
| Polarizer Control | Motorized polarizer and motorized rotatable analyzer | (Optional) Allows insertion and control of visible polarization analyzer viewing enhancement from workstation PC |
| Operating System | Windows® XP or Windows 7 | |
| Patented OMNIC Picta Wizards* (require motorized stage) Sample Locator | Slide view navigator automatically moves sample to the focus point | Lowers microscopy skill requirements. Greatly simplifies loading and locating samples. Move directly to sample locations on common slide formats using Slide View Graphical interface. |
| Mapping Controls | Discrete, line and map scans | Multiple random points, cross sections and areas map collection. No need to specify reference location for reflection or transmission background collection minimizes infrared microscopy skill requirements. |
| Particle Wizard | Measures particle(s) size, sets best fit aperture, collects spectrum and background, searches spectrum against library | Provides material identification, size, percentage of distribution and chemical image of particles within an area, automatically. Simplifies particle analysis for any type of use. |
| Inclusions Wizard | Similar to particle analyzer, but designed to remove spectral contribution from embedding material | Minimizes or removes the need for delamination or extraction of particles from bulk. Improves microscope usability, lowering skills requirements. |
| Random Mixtures Wizard | Extracts multiple chemical maps from a raw map | Provides self extraction of distribution information of multiple materials within an area. Displays material identification, total area and distribution, for each material identified. Enables chemical mapping usability to any type of user. |
| Laminates Wizard | Applicable to line maps, identifies layers and calculates thicknesses by spectral match | Provides thickness and material identification of laminates and paint chips by chemical properties. In conjunction with image analysis, provides dual thickness confirmation (video image and chemical image). |
| Other Power Requirements | 100–240 V AC 47–63 Hz 3.2 amp. | *U.S. Patent No. 7,496,220. |
| Regulatory Approvals |  | |
| Dimensions | 622 × 653 × 533 mm (W × D × H) | |
| Warranty | 12 month, full warranty, complete system | |

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