**Nicolet™ FT-IR spectrometers from Thermo Electron Corporation are the highest performance FT-IR systems available. Every facet of Nicolet FT-IR has been engineered to facilitate sample handling, introduce options to scientists, and increase throughput in the laboratory. Because it is built on a common optical and electronics platform, it is easy to upgrade to the highest level of performance and application.**

Nicolet FT-IR Spectrometer

Combining superior FT-IR performance with exceptional versatility
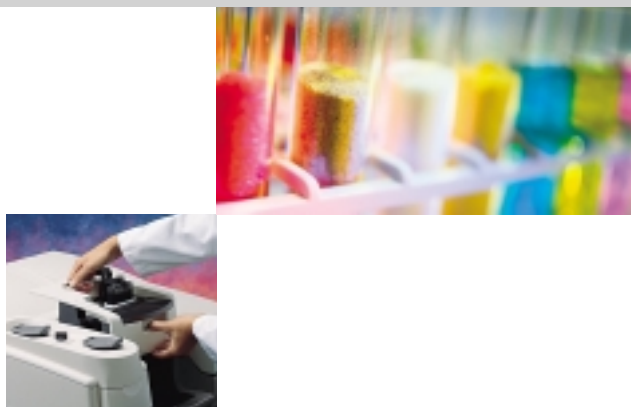
OMNIC™ software is a full-featured package providing the tools necessary for FT-IR, Raman analyses and imaging
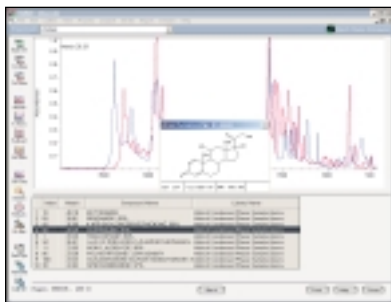
The Nicolet FT-IR Spectrometer Family Includes:

- Superior optical throughput
- Superior signal-to-noise ratio
- High resolution
- Multiple spectral ranges: *mid-IR, near-IR, far-IR, UV-Visible*
- Rapid scanning for fast kinetics
- Smart Accessories™
- Infrared (IR) microscopy
- FT-Raman
- Hyphenated techniques: *gas chromatography-IR (GC-IR), thermogravimetric analysis-IR (TGA-IR), liquid chromatography-IR (LC-IR)*
- Smart Purge™ system
- Advanced data collection including:
  - *Linear-scan dual-channel (IRRAS, VCD, VLD)*
  - *Step-scan amplitude modulation (emission)*
  - *Step-scan phase modulation (photoacoustic depth profiling)*
  - *Step-scan sample modulation (polymer stretching)*
  - *Step-scan time-resolved spectroscopy*
  - *Step-scan space-resolved spectroscopy (Imaging)*

Nicolet FT-IR Smart System

Smart Systems from Thermo automatically link the setup, testing, and operation of spectrometers, software, sampling accessories, and spectral information, leaving you free to focus on the experiment or analysis. Smart Systems recognize how you normally use the system and automatically set up the spectrometer for a particular experiment.

Smart Accessories

Nicolet FT-IR is compatible with all commercial accessories that fit into a standard sample compartment. However, the full power of a Smart System from Thermo can be utilized with Smart Accessories, which provide:

- Quick and easy, snap-in installation
- Automatic recognition and optimization
- Permanent, pinned-in-place alignment
- High throughput
- High performance
- Exceptionally efficient purge

Analyze • Detect • Measure • Control™

Thermo
ELECTRON CORPORATION

Thermo has partnered with the world's most innovative accessory manufacturers to develop Smart Accessories for:

- Transmission
- Diffuse reflectance
- Single-bounce ATR
- Multiple-bounce ATR
- Mid-IR fiber optics
- Near-IR fiber optics
- Corrosion-resistant HATR
- Research-grade HATR
- Research-grade diffuse reflectance
- Near-IR diffuse reflectance
- Diamond crystal HATR
- Micro ATR
- Specular reflectance
- Grazing angle reflectance

Advanced Experiment Modules

In addition to Smart Accessories, the Nicolet FT-IR spectrometer is complemented by a full range of advanced sampling modules and accessories including:

- Infrared microscopes: Nicolet Centaurµs™, Nicolet Continuµm™, and Nicolet Continuµm XL
- FT-Raman modules
- Hyphenated techniques: GC-IR, TGA-IR, LC-IR
- Gas analysis experiment modules
- PEM modules: IRRAS, VLD, and VCD
- Polymer stretcher
- Photoacoustic accessory
- IR imaging

System Optics

The foundation of the Nicolet FT-IR spectrometer is its precision-cast baseplate. Its compact optical path minimizes beam pathlength and improves spectral performance by limiting the number of beam reflections. This opto-mechanical excellence means your results are extremely reproducible from scan to scan, and there is no instrument drift.

Precision-Cast Optics

- Pinned-in-place
- Compact optical path
- Best reproducibility
- Monolithic diamond-turned mirrors
- Permanent alignment
- Highest throughput

Five External Beam Options

- Emission port
- Right-side Passport™
- Left-side Passport
- Front-facing external port
- Front-facing external detector port

Sources

The high-intensity, long-lasting ETC EverGlo* mid-IR source is standard on the Nicolet FT-IR spectrometer. The source is even more efficient than water-cooled sources, and delivers a significantly higher energy output. The computerized, dual-source option provides the greatest flexibility for multiple spectral ranges, allowing coverage from the UV-Visible to the far-IR. The computer-controlled aperture for Nicolet FT-IR spectrometers automatically sets the correct aperture size depending upon the resolution and spectral range selected. The 'Rest' mode extends the life of the source and users have the option of a 'Turbo' mode for further enhancements in throughput. The computer-controlled screen wheel provides convenient beam attenuation for highly sensitive quantum detectors.

COMPUTER-CONTROLLED DUAL SOURCES

	HIGH (cm^{-1})	LOW (cm^{-1})
ETC EverGlo*	9600	20
Whitelight	27000	2000
External	Custom	Custom

*Patent Pending

Detectors

Thermo offers the widest variety of detectors designed and optimized to cover any spectral range or experimental configuration with the highest possible performance.

Features

- Pinned-in-place
- Easy interchange
- Automatic detector recognition

Smart Systems recognize which detectors have been installed and where they are located. No switches, adjustments, or changes are required to the hardware or software for the detector to be active. The Monoflect™ dual detector system allows you to quickly switch between internally mounted detectors. New thermo-electrical designs enable faster cooling of detectors using less power, resulting in higher stability and faster response.

DETECTOR	HIGH (cm^{-1})	LOW (cm^{-1})
DLaTGS	12500	350
TE-cooled DLaTGS	12500	350
MCT-High D*	11700	800
MCT-A	11700	600
MCT-B	11700	400
Time-resolved MCT	11700	650
Silicon	27000	8600
PbSe	13000	2000
InGaAs (1.9 µm)	12000	5300
InGaAs (2.6 µm)	12000	3800
InSb	11500	1850
CsI	6400	200
Poly(ethylene)	700	50
Si bolometer	600	15
Photoacoustic	10000	400

Beamsplitters

For mid-IR applications, Thermo offers either a mid-IR optimized Ge-on-KBr beamsplitter, or the proprietary XT-KBr™ beamsplitter that can cover the region from 11000 cm^{-1} to 375 cm^{-1} as the standard beamsplitter.

Features

- Automatic recognition
- Optimized spectral range
- Instant alignment

Extra beamsplitters can be stored easily inside the purged and thermally equilibrated environment of the optical bench. A latched access door and the quick-release Talon™

Nicolet FT-IR Spectrometer with Nicolet Continuµm XL Imaging System

beamsplitter-locking mechanism allow easy access to the beamsplitter without breaking instrument purge and preventing beamsplitter fogging.

BEAMSPLITTER	HIGH (cm^{-1})	LOW (cm^{-1})
Ge-on-KBr	7800	350
XT-KBr	11000	375
Quartz	27000	2800
Si-on-CaF$_2$	14500	1200
ZnSe	6000	650
CsI	6400	200
Solid-Substrate™	700	15

Smart Purge System

The unique Smart Purge system available for the Nicolet FT-IR automatically detects when you have opened the spectrometer door. Smart Purge then automatically increases the flow of purge gas in your spectrometer to blast the sample compartment area free from unpurged lab air. Smart Purge automatically turns itself down when the spectrometer is ready to collect data, and provides the fastest possible purge recovery time in between successive samples to ensure that you are collecting data as quickly and efficiently as possible.

Vectra Interferometer

The Nicolet FT-IR spectrometer incorporates the highest performance interferometer available in the industry. The Vectra™ interferometer bearing rides on a cushion of air and has performance characteristics that are similar to a traditional air-bearing interferometer, with the added advantage of not requiring an external air supply. The standard resolution of the Nicolet 4700 is 0.4 cm^{-1} and that of the Nicolet 6700 and Nicolet 8700 spectrometers is 0.09 cm^{-1}. In addition, the Vectra interferometer features dynamic alignment ensuring that it is constantly maintained at optimum performance. Dynamic alignment is the only mechanism that can actively compensate for all known modes of interferometer misalignment, including ambient temperature changes.

Advanced Step-Scan Applications

For advanced step-scan applications the Nicolet 8700 spectrometer incorporates the enhanced Vectra-Piezo™ interferometer. The design of the Vectra-Piezo interferometer is optimized for both time-resolved and phase modulation step-scan experiments. During step scan, the Vectra-Piezo moving mirror comes to a complete rest and can be held to a position of better than ± 0.20 nm — the best in the industry. This positional accuracy is critical to time-resolved, amplitude modulation and other step-scan experiments where precise positioning of the moving mirror ensures ultimate signal-to-noise ratio of the experiment. Unlike traditional air-bearing interferometers that are highly sensitive to external vibrations, the Vectra-Piezo is nearly immune to normal laboratory vibrations and acoustic noise. Thus, the Vectra-Piezo can be used for the most sensitive step-scan experiments without requiring an expensive and bulky optical table.

LINEAR-SCAN AND DUAL-CHANNEL EXPERIMENT SPECIFICATIONS

Rapid scan	77 spectra/second, 8 cm^{-1} spacing
Dual-channel collect	PM-IRRAS, VLD and VCD experiments

STEP-SCAN SPECIFICATIONS

Mirror positional stability	± 0.20 nm
Phase modulation frequency	5 – 1,000 Hz
Phase modulation amplitude	0.5 – 3.5 λ_{HeNe}
Phase modulation stability	< 0.1% peak-to-peak
Time-resolved spectroscopy	2 ns (8-bit), 10 ns (14-bit), 10 µs (16-bit)

Software

OMNIC software for Nicolet FT-IR spectrometers provides a powerful Windows® compatible interface for complete data collection and processing. Live data displays, active spectrometer diagnostics, and spectral quality checking assure the best possible data. Extensive data processing analysis and reporting tools allow you to make the most of your results. And it has the most extensive on-line help system currently available, which includes FT-IR theory and sample handling. OMNIC software is available in five languages (English, Spanish, French, German, and Japanese).

Four standard OMNIC packages are available:
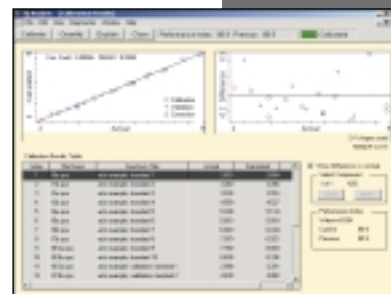
Basic OMNIC Includes:

- Data collection, manipulation, and processing packages
- Preview data collection
- Search of commercial libraries and the creation and management of user-generated libraries with the Advanced Library Manager
- QC Compare for raw materials quality control
- Basic quantitative analysis tools
- GLP-ready electronic Report Notebook
- Spectral interpretation
- Automated atmospheric correction
- File conversion utilities, for older Thermo and other common file formats

Analytical OMNIC Includes:

- The features of Basic OMNIC
- Creation of user generated macros
- Searchable bibliography of over 3,000 IR and Raman references
- An IR spectral interpretation teaching tool

Advanced OMNIC Includes:

- The features of Analytical OMNIC
- TQ Analyst™ advanced quantitative and qualitative data analysis package
- Creation of chemical structures which can be added to user generated libraries or attached to spectra that are plotted through the report notebook

Research OMNIC Includes:

- The features of Analytical OMNIC
- Creation of chemical structures which can be added to user generated libraries or attached to spectra that are plotted through the report notebook
- Kinetic data acquisition and data display
- Step-scan data acquisition
- Dual-channel data acquisition
- Advanced, three-dimensional data display and plotting
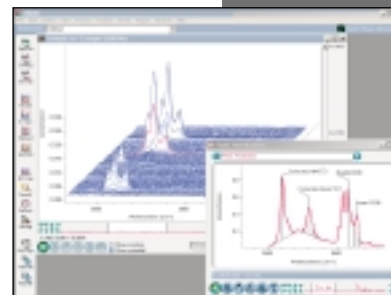
Custom OMNIC software packages are also available for gas analysis, liquid analysis, semiconductor analysis, 21 CFR Part 11, and hard disk lubricant analysis.

	Nicolet 4700	Nicolet 6700	Nicolet 8700
Nicolet FT-IR Smart System			
Smart Accessories	Standard	Standard	Standard
Smart Detectors	Standard	Standard	Standard
Smart Beamsplitter Exchange	Option	Standard	Standard
Smart Purge	Option	Option	Option
Smart Validation	Option	Option	Option
Optical Bench			
Software-Controlled Iris Aperture	Upgrade	Standard	Standard
Gold-Coated Optics	Upgrade	Standard	Standard
ETC EverGlo* Source	Standard	Standard	Standard
Turbo Source Mode	Standard	Standard	Standard
Rest Source Mode	Standard	Standard	Standard
Tungsten-Halogen Near-IR/Visible Source	Option	Option	Standard
Software-Controlled, Dual-Source Mirror	Upgrade	Option	Standard
Software-Controlled, Dual-Detector Mirror	Option	Option	Standard
External Beam Capabilities			
Software-Controlled, Dual-Side External Beams	Option	Option	Option
Software-Controlled, Emission Port	Upgrade	Option	Option
Software-Controlled, Front External Beam	Upgrade	Option	Option
Software-Controlled, Front External Detector Port	Option	Option	Option
Performance Specifications			
Spectral Range (Standard)	$7800 - 350\ cm^{-1}$	$7800 - 350\ cm^{-1}$	$7800 - 350\ cm^{-1}$
Spectral Range (Option, CsI Optics)	$6400 - 200\ cm^{-1}$	$6400 - 200\ cm^{-1}$	$6400 - 200\ cm^{-1}$
Spectral Range (Option, Extended-Range Optics)	$11000 - 375\ cm^{-1}$	$11000 - 375\ cm^{-1}$	$11000 - 375\ cm^{-1}$
Spectral Range (Option, Multi-Range Optics)	$27000 - 15\ cm^{-1}$ (Option)	$27000 - 15\ cm^{-1}$ (Standard)	$27000 - 15\ cm^{-1}$ (Standard)
Optical Resolution	$0.4\ cm^{-1}$	$0.09\ cm^{-1}$	$0.09\ cm^{-1}$
Peak-To-Peak Noise (1 minute scan)	$< 8.68 \times 10^{-6}\ AU^{**}$ (50,000:1)	$< 8.68 \times 10^{-6}\ AU^{**}$ (50,000:1)	$< 8.68 \times 10^{-6}\ AU^{**}$ (50,000:1)
RMS Noise (1 minute scan)	$< 1.95 \times 10^{-6}\ AU^{**}$	$< 1.95 \times 10^{-6}\ AU^{**}$	$< 1.95 \times 10^{-6}\ AU^{**}$
Ordinate Linearity	0.07 %T	0.07 %T	0.07 %T
Wavenumber Precision	$0.01\ cm^{-1}$	$0.01\ cm^{-1}$	$0.01\ cm^{-1}$
Slowest Linear Scan Velocity	0.158 cm/sec	0.158 cm/sec	0.0158 cm/sec
Fastest Linear Scan Velocity	5.06 cm/sec	6.33 cm/sec	8.22 cm/sec
Number of Scan Velocities	13	15	22
Rapid Scan (Spectra/second @ $16\ cm^{-1}$, $32\ cm^{-1}$)	50, 75	65, 95	77, 105
Throughput Increase in Turbo Mode (@ $3000\ cm^{-1}$)	25%	25%	25%
Liquid Nitrogen-Cooled Detector Hold Time***	18 hours	18 hours	18 hours
Advanced Applications			
FT-Raman Capability	Upgrade	Option	Option
Linear-Scan, Dual-Channel Data Collect	Upgrade	Option	Standard
Step-Scan Amplitude Modulation	Upgrade	Upgrade	Standard
Step-Scan Phase Modulation	Upgrade	Upgrade	Standard
Step-Scan Simultaneous Multiple Modulation	Upgrade	Upgrade	Standard
Step-Scan, Time-Resolved Spectroscopy	Upgrade	Upgrade	Standard
Step-Scan Imaging	Upgrade	Upgrade	Standard
Warranty			
Source and Interferometer Warranty	5 Year	5 Year	5 Year
Spectrometer Warranty	1 Year	1 Year	1 Year
Spectrometer			
Operating System	Win XP Pro, Win 2000	Win XP Pro, Win 2000	Win XP Pro, Win 2000
Spectrometer Dimensions	69.2 cm (w) x 65.5 cm (d) x 25.4 cm (h)	69.2 cm (w) x 65.5 cm (d) x 25.4 cm (h)	69.2 cm (w) x 65.5 cm (d) x 25.4 cm (h)
Spectrometer Weight	66 kg	69 kg	71 kg
Sample Compartment Dimensions	21 cm (w) x 26 cm (d) x 20 cm (h)	21 cm (w) x 26 cm (d) x 20 cm (h)	21 cm (w) x 26 cm (d) x 20 cm (h)
Other			
Regulatory Approvals	GS CE LISTED NO29153711G	GS CE LISTED NO29153711G	GS CE LISTED NO29153711G
System Validation	Option	Option	Option
21 CFR Part 11	Option	Option	Option

*Patent Pending; ** AU: Absorbance Units; *** USP # 4,740,702*

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