

Thermo Scientific DXR Raman Microscope



Raman Microscopy for Working Applications



Innovative Point and Shoot Raman microscopy



Exceptional sensitivity and spatial resolution



Designed to be easy and reliable for hard working labs



Focused on answers rather than experiments

DXR Raman Microscope

Rethinking Raman for Industry and Applied Research

We've completely redefined the Raman microscope so that it meets the demands of busy laboratories.

Without sacrificing performance, we've built an instrument family around reliability, confidence, and useability. Furthermore, we've solved practical application problems with innovations that improve your ability to get to good information quickly.

We've put expertise under the hood, real world problem solving into the design, and support everywhere in the world.

Welcome to Thermo Scientific DXR Raman spectroscopy, designed for getting work done.



Refocusing Raman from Scientific Experiments to Analytical Questions

Instrumentation used in solving analytical challenges and characterizing materials in today's fast paced, results-driven world is very different than what is required in advanced spectroscopic experiments. We designed the DXR Raman system for users who are trying to solve an engineering problem, defend a materials patent, or tackle a backlog of evidence. We designed an instrument that is not only powerful but considers your need for reliability, repeatability, ease of use, and assurance in results. If your analysis is a means to an end that simply requires answers quickly and confidently, the DXR microscope is without question the right Raman for your laboratory.



Packaging



Forensics



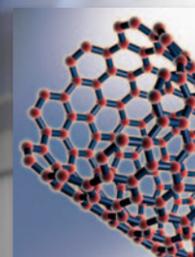
Fibers



Gems/Geology



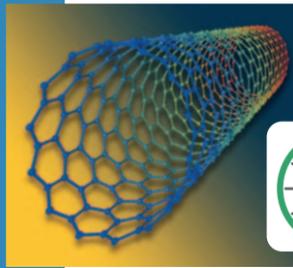
Art Restoration



Nanotechnology

DXR Raman Designed for Real World Problems...

DXR Raman and Materials Characterization



Unprecedented laser power control and patented* **three path alignment** assure that you are getting the best results from the right part of your material. The sensitivity of the DXR microscope rivals that of any research Raman system. Low concentration materials, sensitive samples, and poor Raman scatterers are more easily handled by DXR Raman.



The DXR microscope can quickly be **adapted or upgraded by the user** for new sample types. Add sampling, resolution, magnification, and wavelength capabilities and automatically optimize the system for new sample types.

** US patents 6,661,509 B2 and 7,460,229 B2*

DXR Raman and Identification of Unknown Materials

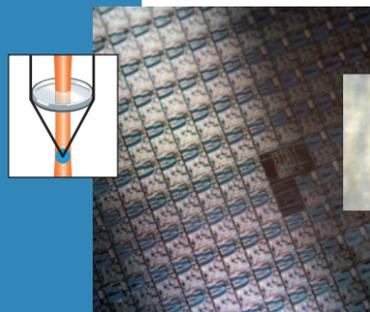


One of the DXR microscope's greatest strengths is its ability to positively identify materials using Raman's fingerprinting nature combined with years of molecular identification experience and algorithm development. The DXR spectrometer has the **largest commercially available collection of searchable spectra** to identify unknown materials in the world, with more being added all the time. Our patented* **multi-component searching** decodes complex samples and provides visual proof of constituents in a material, taking all the labor and uncertainty out of materials identification.

Your instrument can be configured to "point and shoot" and provide the identification of a material with a single button press.

**US patent 7,698,098 B2*

DXR Raman and Defect and Failure Analysis



Defects are often small, foreign objects. **High brightness lasers** and patented* **fine adjusting alignment** scheme provide the enhanced ability to resolve small objects; The DXR system boasts some of the **best achievable single point spatial resolution** available today. A vast library collection and patented* searching algorithms provide rapid identification even down to the components making up a mixture.

Analytical services labs are often staffed with scientists and technicians who must be able to walk up to any piece of equipment and get results without technique expertise. **Patented* optimization algorithms** and **automated system setup** make the instrument easy to approach and enables a non-specialist to generate excellent results.

**US patents 6,661,509 B2, 7,698,098 B2 and 7,460,229 B2*

DXR Raman and Product Testing



While the DXR microscope is a research-ready system, its ease of use and shared software suite with the Thermo Scientific FT-IR products make it ready-to-implement for end of line and work in progress materials requiring microscopic inspection. **Classification, pass fail, and quantification** software combined with a **powerful task automation** package transform your DXR instrument into a dedicated method microscope. Patented* data optimization tools help identify ideal method conditions. **Automated calibration and alignment** ensure results are obtained with a system that is working optimally.

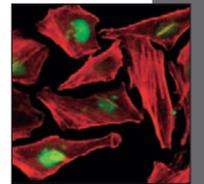
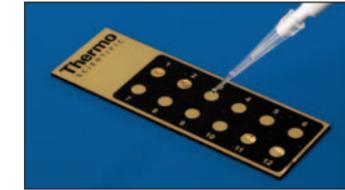
**US patent 7,698,098 B2*

...Provides Effective Analytical Solutions

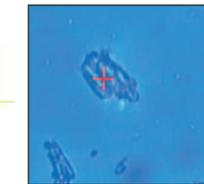
Carbon Nanomaterials
Determination of graphene layer thickness and determination of relative tube diameter populations

Life Science Applications

Rapid high sensitivity detection of biomolecules using the DXR SERS kit

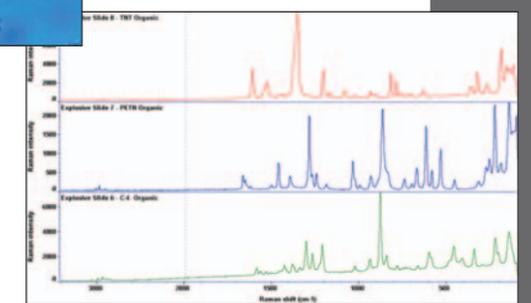


Pharmaceuticals
High speed polymorph screening and recrystallization studies



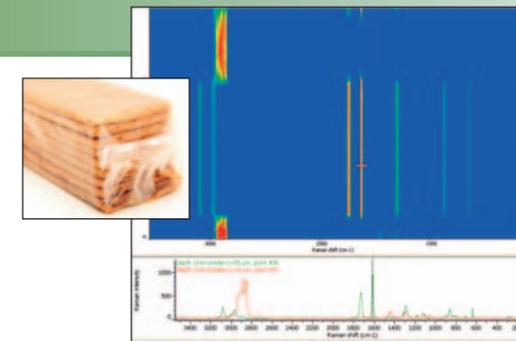
Forensic Science

Identification of components in explosives residue



Polymers and Packaging

Depth profiling to identify sub-surface inclusions without sample preparation



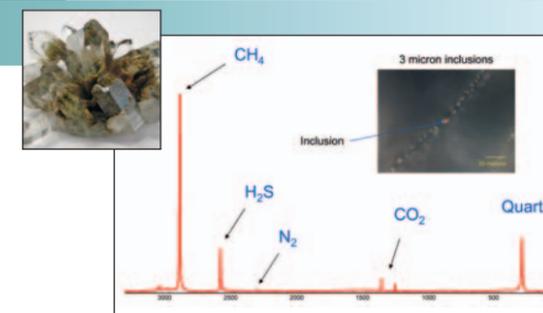
Art Restoration and Archeology

Identification and discrimination of paint pigments using DXR microscopy and fiber optic analysis



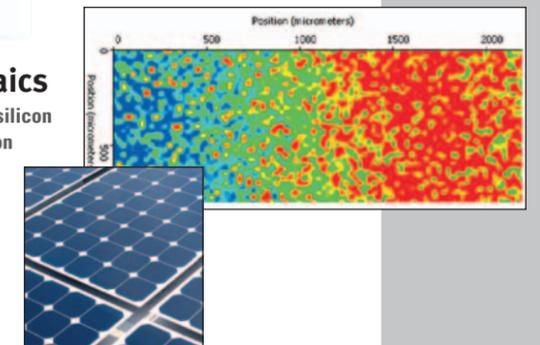
Gemstones and Geology

Rapid on-destructive identification of fluid inclusions in minerals using DXR confocal analysis



Photovoltaics

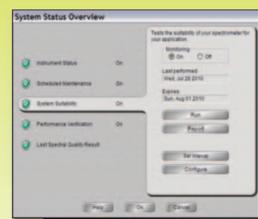
Measurement of silicon crystalline fraction using automated macro analysis as a routine test procedure



Reliability

Walk up and run it

Intelligent monitoring of instrument performance assure that the system is tuned for analysis.



A **patented* triplet spectrograph** with no moving parts eliminates reliability and repeatability issues associated with motor movement in the heart of the detection system.

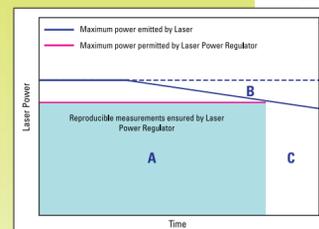
Single piece cast optical frame mimics the robust philosophy of an optical table, eliminating connection points that can flex and shift with vibration or temperature change and degrade performance.

*US patent 7,345,760 B2

Trust

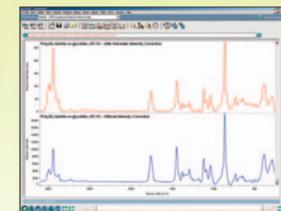
Confidence your results are good

Unique **laser power regulation** and lifetime tracking compensates for natural laser power fluctuations ensuring that you have consistent sample excitation and data conditions every time you use the spectrometer.



Multiple software innovations created from years of our scientists' experience interpret your data and handle any necessary corrections so you don't have to, including patented* cosmic ray rejection, the best Raman fluorescence handling available, and automatic intensity correction to standardize data between laser wavelengths.

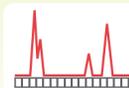
*US patent 7,233,870 B1



Automatic Intensity Correction

Patented* Smart Backgrounds account for electronic conditions in the detection system to ensure spectral response is due only to a spectroscopic sample.

*US patent 7,471,390 B2

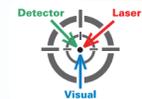


Uncompromising Performance

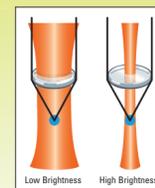
Research power without the complexity

Patented* three path fine beam alignment maintains peak performance automatically and guarantees data and visual target correlate perfectly.

*US patents 6,661,509 B2 and 7,460,229 B2



Superior visual imaging and a full range of **Olympus® optical components** give you full benefits of a light microscope.



High brightness lasers maximize contrast and signal strength, providing a significant advance over traditional high power lasers in taking true advantage of Raman's small spot capabilities and all the best confocal depth resolution available.

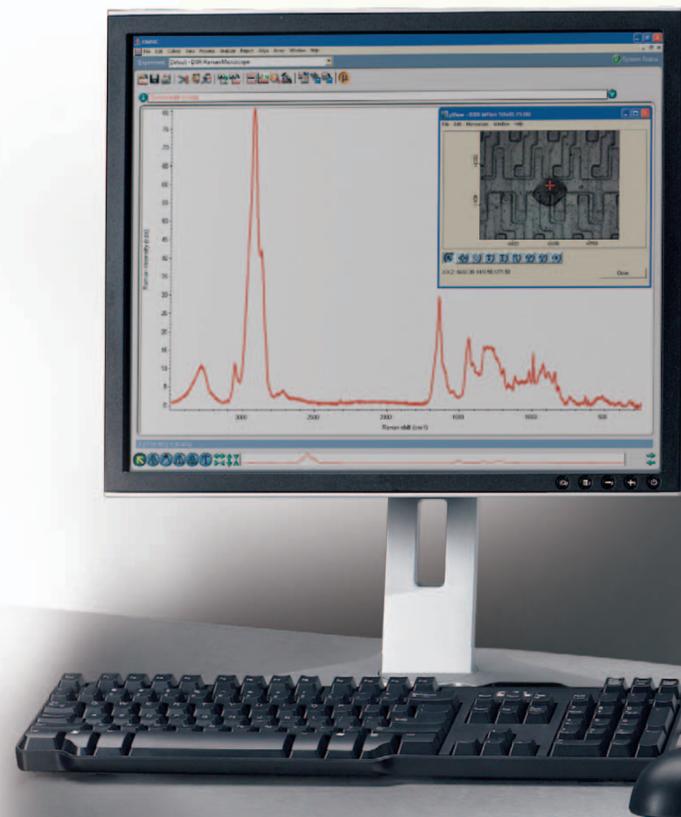
Patented* triplet spectrograph design optimizes performance across all wavelengths simultaneously and improves small spot performance while eliminating motor driven moving parts that can affect alignment and reliability.



*US patent 7,345,760 B2



Fine laser power control allows maximum signal from sensitive samples without physically changing them.



Utility

Used by experts and non-experts alike

Numerous patented* innovations create **under-the-hood intelligence** that enables a non-expert to get professional results, much like today's digital camera.



Prealigned and **lock-in-place components** allow any user to reconfigure an instrument in seconds using automatic recognition and stored alignment parameters.

Autofocus and patented* Raman **autoexposure** take the guesswork out of set up for data collection and move the user quickly to useful data.

*US Patent 7,605,918 B2



Productive

Flexibility and options that WORK

Sampling options including fiber optics, well plate automation, and a **wide range of sampling stage options** are available.



In minutes, users can change excitation lasers, spectral resolution, and viewing options, and then collect new data. **Smart Component options** can be added and installed or replaced by the user without a service call.



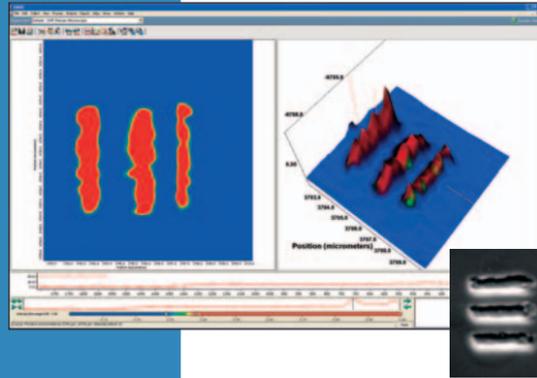
Adding more Raman instrumentation and sampling capability to your site is economical as **components and options are interchangeable in seconds** with other Thermo Scientific DXR microscopes or DXR SmartRaman spectrometers.



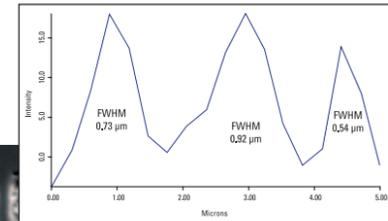
† US Patents 6,661,509 B2, 7,460,229 B2, 7,345,760 B2, 7,471,390 B2, 7,233,870 B1 and 7,605,918 B2

Helping You Get the Best Possible Data...

Exceptional Spatial Resolution



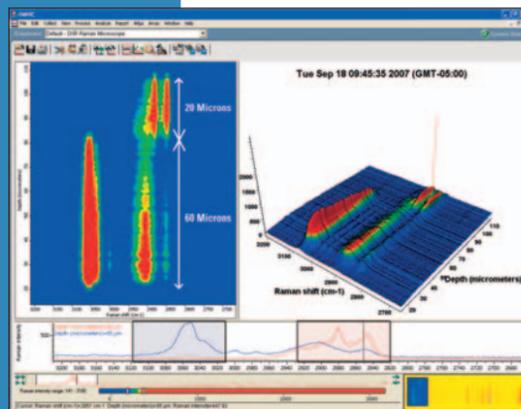
As materials advance and our understanding of them becomes more sophisticated, analytical concerns are with smaller and smaller samples. The DXR microscope excels at measurement of **micron-sized samples** and in isolating them from surrounding materials, while still being extremely **easy to use**.



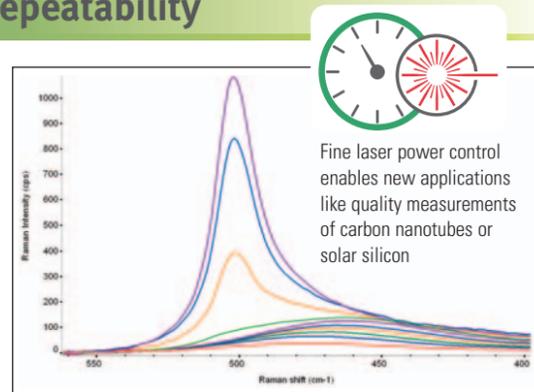
Rethinking Raman Spectroscopy

Challenging Sample Sensitivity and Repeatability

In Raman spectroscopy, finding the optimal excitation laser power can make the difference between the best possible results and a sample that is physically changed during the measurement. Unique active feedback **fine laser power control** and **live data preview** solve this problem.



True confocal microscopy enables depth profiling of multi-layer samples without cross-sectioning



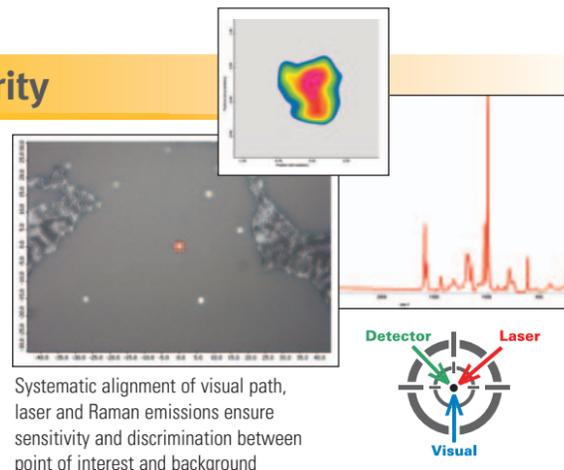
Fine laser power control enables new applications like quality measurements of carbon nanotubes or solar silicon

Fully Automated Confocal Microscopy

If you have multilayer samples or areas of interest beneath the surface of a sample, use the DXR microscope to conduct depth profiling and x-z mapping without sample preparation. Excellent results come from the system's **2-micron depth resolution** and software tools that pull the layer or sample information out for you.

Sampling Accuracy and Spectral Purity

The DXR microscope is the only Raman microscope to systematically align excitation laser to visual path, and Raman emissions path to the detection system. This unique scheme ensures that all three paths are aligned to precisely the same point. This **completely automatic process** ensures that sensitivity and sample discrimination are always at their best – without compromise or tedious manual setup.



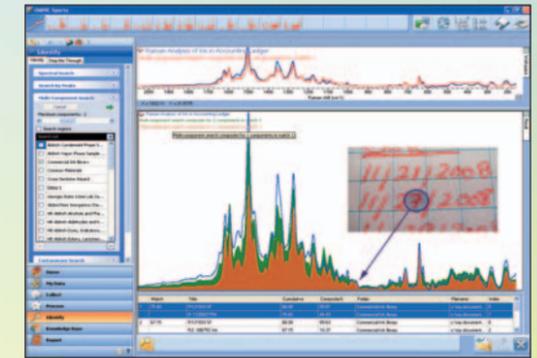
Systematic alignment of visual path, laser and Raman emissions ensure sensitivity and discrimination between point of interest and background

...and Convert it into the Information You Need

Identify the Composition of Pure and Composite Materials Effortlessly

Traditional spectral searching requires trained interpretation and data processing by user. In cases of composite materials or mixtures reliable answers are hard to obtain. Thermo Scientific OMNIC Spectra software revolutionizes how spectral searching gets done, automatically decomposing multi-component materials into their constituents automatically in minutes using a patented* multi-component searching algorithm. The DXR system boasts a database of over 14,000 searchable spectra with more being added all the time.

*US patent 7,698,098 B2

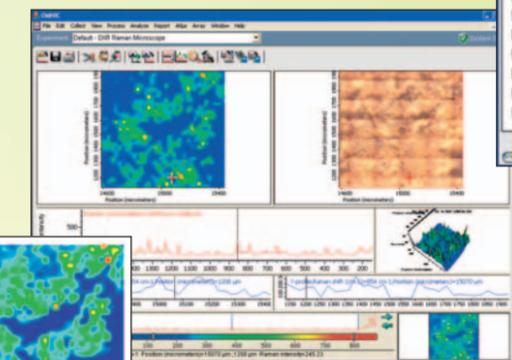
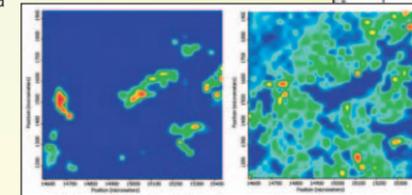


Patented* multi-component search quickly characterizes individual constituent compounds in mixtures, without user trial and error

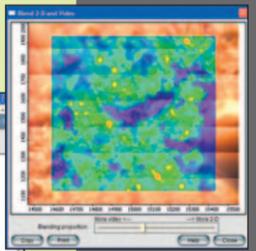
High Resolution Chemical Maps Solve the Big Picture without Sacrificing Data Purity and Accuracy

OMNIC™ Atlas software allows you to create chemical images and to probe them for the answers you are looking for. Atlas chemical mapping is a proven industrial technique that does not sacrifice sample detail or data quality, making it an ideal “macro analysis” Raman microscope tool for anyone who needs to retain detailed data for proof or review. It can be added any time without instrument modification.

Distribution of the two major tablet components generated by MCR analysis of the hyperspectral Atlas map



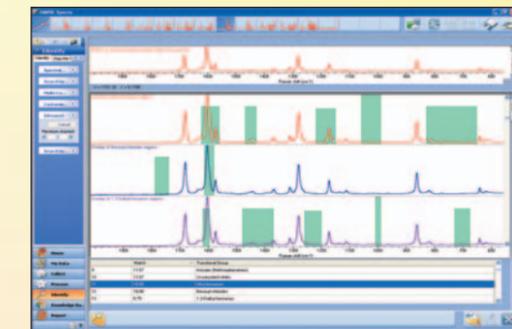
Atlas generates an information-rich map of a painkiller tablet



Overlay of chemical and video map to show distribution of components

Interpret the Molecular Structure of a Sample Effortlessly

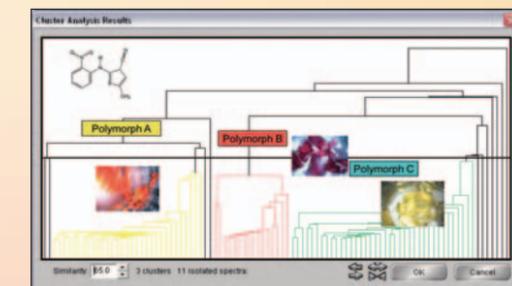
If you are characterizing the composition and behavior of materials, DXR Raman spectrometers can help you find functional groups and chemical classes quickly through its spectral interpretation engine. These tools, in conjunction with OMNIC Spectra™ software, searching can provide robust materials understanding from a single Raman spectrum.



OMNIC Spectra software dramatically shortens analysis time with task-oriented spectral search, interpretation and data management tools

Automate, Verify, and Classify

The DXR Raman microscope benefits from the rest of the Thermo Scientific molecular spectroscopy family for automating the analysis of multiple samples including data collection, quality checking, automatic classification, quantitative analysis, and reporting, at the push of a button. Results are given credibility through the use of the ValPro qualification package.



Unique analytical tools designed to get to answers quickly and with confidence

DXR Raman spectroscopy uses the richest collection of spectroscopic software available, shared with the Thermo Scientific FT-IR product family. Our software not only ensures easy operation and acquisition of high quality data, but is capable of extracting the information you really need from within the spectral data.

Laboratory Solutions Backed by Worldwide Service and Support

With its user-friendly patented* autoalignment and calibration, plus its user-replaceable lasers, gratings and filters, the DXR Raman microscope has been designed to need little service attention. However, we know that in today's busy, multifunctional laboratories you cannot afford to be without your workhorse instruments for even the shortest time. With the most extensive world-wide organization of field service engineers, you can count on us to keep you up and running.

First class service and support allow you to get the most out of your microscope and samples. With our expertise in applications support, we offer comprehensive training to take you to the next level.

*US patents 6,661,509 B2 and 7,460,229 B2

The Thermo Scientific Family of Raman Spectrometers



Nicolet Almega XR

The Thermo Scientific Nicolet Almega XR high-performance dispersive Raman spectrometer is fully automated and with micro and macro sampling combined in one instrument. The Almega XR spectrometer offers the ultimate in performance, automation and flexibility. The Almega XR spectrometer is ready for any sample and meets the needs of even the most demanding applications.

DXR SmartRaman

Built on the same platform as the DXR Raman microscope, the Thermo Scientific DXR SmartRaman spectrometer is dedicated to bulk sample analysis. It is intended for use in busy multi-purpose analytical labs, where the users are looking for reproducible and accurate results from a dependable, low maintenance instrument.



NXR FT-Raman Series

The Nicolet NXR FT-Raman spectrometer uses 1064- or 976-nm excitation lasers for radical reduction in fluorescence interference. With the most extensive sampling accessories available, including the FT-Raman MicroStage accessory for microscopic analysis, the NXR FT-Raman spectrometer can be configured either as a dedicated, stand-alone system or as an accessory for FT-IR spectrometers.



In addition to these offices, Thermo Fisher Scientific maintains a network of representative organizations throughout the world.

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

The DXR Raman microscope is a Class IIIb laser-safe product, unless installed with the Class I Laser Safety Enclosure. Installation of a fiber optic probe launcher and fiber probe will convert all microscopes to Class IIIb laser-safe, even with the Laser Safety Enclosure installed.

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