



HUMAN HEALTH

ENVIRONMENTAL HEALTH

YOUR CHALLENGES COME
IN ALL SHAPES
AND SIZES

Infrared Imaging and Microscopy Systems


PerkinElmer[®]
For the Better



SEE HOW
AMAZING
YOUR RESULTS CAN BE

IT'S A WHOLE NEW LEVEL OF IR PERFORMANCE

In science, great leaps are usually made from a springboard of inspiration, innovation, and hard work of those who came before. The same can be said of scientific *instrumentation*.

Introducing the PerkinElmer infrared imaging and microscopy systems family.

These fine instruments are the culmination of a long PerkinElmer tradition of exceptional optics and purpose-built IR microscopes and FT-IR systems. There are no add-ons or afterthoughts here. Renowned for their sensitivity, spatial resolution, ease of use, and results, they're engineered to the highest quality specifications and ISO-9000 standards and deliver the highest levels of throughput, reproducibility, and accuracy. So you're able to analyze even the smallest sample with pinpoint precision.

It's simply the industry's broadest infrared instrument range and covers all modes – transmission, reflectance, and micro- and macro-Attenuated Reflectance (ATR). It's also one of the easiest to use, even for nonprofessionals, with no (or minimal) manual adjustments necessary. And you can even get unattended operation if you need it. Nothing could be simpler.

A new level of imaging performance and flexibility

We know that service and support are key components of your lab's efficiency and effectiveness. And you're backed by a cadre of IR professionals who are grounded in the science of infrared detection. With more than 60 years in the business, we know our stuff.

And as an infrared technology leader, we're keeping it that way by continually offering the kinds of innovation that we're singularly positioned to deliver, built on powerful, proven, and often patented technologies.

PerkinElmer. It's simply the clear choice for IR microscopy and imaging today – and an integral part of your lab for years to come.



Spotlight 400 FT-IR Imaging System

IF BEAUTY IS IN THE DETAILS, THEN THIS IS GORGEOUS MICRO FT-IR

The flagship instrument of our FT-IR imaging line, the Spotlight™ 400 FT-IR imaging system dramatically improves the understanding of materials across a broad spectrum of industries – it's simply one of the fastest, most efficient, and most flexible systems of its kind.

The Spotlight 400 system delivers uncompromising data quality and clear, highly detailed results from virtually every sample, every time. It supports multimode detection – standard transmission, reflection, ATR imaging, and more – and makes switching between modes a snap. And your images can run with astonishing speed and efficiency, with exceptional signal-to-noise ratios.

But it's the clarity that's truly eye-opening – and we mean clarity in the widest possible spectral area. Its 6.25 μ and 25 μ pixel sizes are augmented by a 1.56 pixel option on our ATR imaging accessory. And for applications where speed is more important than absolute clarity, there's a 50 μ pixel option available for faster survey images.

What's more, there's an optional extended imaging stage that increases your available sampling area. It's perfect for large numbers of samples or large areas that need to be run in a single operation. And best of all, it provides an unattended mode that frees resources – and can even be set for overnight operation.

The Spotlight 400 system also offers unique array detector options to enable access to spectral regions with fidelity that's simply not possible with other commercial systems. For example, the wide-band MCT option provides imaging for inorganics and semiconductors to ca 580 cm^{-1} , while the dedicated InGaAs array option provides the highest quality NIR imaging without need for liquid nitrogen cooling.

Fast, efficient, and amazingly flexible. The Spotlight 400 imaging system is the platform of choice for FT-IR imaging.

Two technologies, one remarkable imaging system

PerkinElmer was the first instrument company to couple large-area microscopic ATR imaging with a Linear Array Detector – and that combination still makes for incredibly high spatial resolution, clarity, and speed over an exceptionally large image area.

ATR: Small samples, maximum information

Our ATR Imaging Accessory captures infrared spectral images with up to four times higher spatial resolution than conventional reflectance or transmission imaging, with remarkable image integrity and quality. It provides:

- Up to 400 times larger images than before, without repositioning or stitching
- Unsurpassed clarity in the widest spectral range, with pixel sizes of 6.25 μ and 25 μ
- An effective pixel size of 1.56 μ – far beyond the limitations of traditional IR

Linear Array Detector: It's all in the details

Our Linear Array Detector incorporates high-quality pure mercury cadmium telluride (MCT) arranged as 16 gold-wired infrared detector elements. Patented technologies maximize data-collection speed, so the system delivers image data from all 16 elements, with a 100% fill factor – high-quality spectra can be generated in a single scan. It delivers benefits that far surpass focal-plane array (FPA) detectors, including:

- Higher sensitivity and spectral range for any given sample area and analysis time
- The ability to measure beyond 720 cm^{-1} , for detection of material characteristics impossible on other FT-IR imaging systems
- An MCT wide-range array option that provides rapid IR imaging coverage to ca 580 cm^{-1} for improved polymer and inorganics mapping, and a unique InGaAs linear array option for highest fidelity NIR hyper spectral imaging requiring no liquid nitrogen cooling

Together, they're a big part of what sets the Spotlight 400 FT-IR imaging system apart.

There's clarity, then there's *this* kind of clarity

Spectrum™ Image software is specifically designed for those who want advanced efficiencies written into their imaging systems. This software is much more than a general-purpose imaging software system – it's a suite of tools that enables you to see the most relevant areas of your sample. So you get the information you need with the least amount of time and effort.

Spectrum Image software enables fast, high-quality image collection – even by non specialized operators. Its 50 μ pixel option quickly collects survey images and previews a large sample area, allowing you to determine what part of the image you need to see in a higher resolution form. Using the Scan Images at All Markers mode, you don't waste time imaging areas of no interest. The result? High-quality imaging at up to 170 spectra per second.

What's more, the Show Structure feature can be used to quickly and easily enhance the contrast of your image. By automatically analyzing all infrared spectra in the image, the true chemical variations within your sample can be displayed, not in a matter of hours, but in *seconds*.

Best of all, multiple samples or sample areas can be set up easily and left to run unattended. Spectrum Image software has the ability to use multiple-sample image templates that efficiently capture and store multiple images from one press of a button. A number of predefined templates allow quick operation with tablet and powder accessories. Plus, you can define, store, and recall custom multiple sample templates, allowing for custom holders to be used.

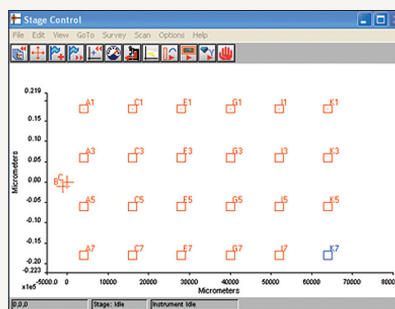


Image markers from the Spotlight 400 Multiple Image templates form a grid that's user definable, reducing setup times for multiple sample experiments.

GREAT MICROSCOPY STARTS WITH EXCEPTIONAL OPTICS

Spotlight 200: FT-IR microscopy and mapping start here

The Spotlight 200 FT-IR microscopy system is simply reinventing the way FT-IR microscopy gets done. Today's lab environments need accurate information from their samples right away – and the Spotlight 200 delivers that reproducible data with exceptionally short analysis times. Plus, the system is highly automated, so time-consuming manual adjustments to focus, aperture, and sample location are virtually eliminated. Highly intuitive and fully integrated, it's actually simple to operate, from spectral collection, extraction, and processing right through to results.

Like all our Spotlight instruments, the Spotlight 200 FT-IR system is built for infrared microscopy and imaging. Its simple optical layout delivers exceptional signal-to-noise ratio and spatial resolution, for better accuracy on small samples, and dichroic mirrors eliminate alignment problems. And for visible images, white-light LED illumination displays true color and provides a range of sample viewing options.

Spotlight 150: The simple art of IR microscopy

Say you're a budget-conscious lab considering upgrading to IR microscopy to complement your FT-IR system. Or a forensics, academic, or an analytical services lab, or a company looking to perform production troubleshooting. For these types of applications and more, the Spotlight 150 is an ideal solution. Built on the solid Spotlight IR optical platform, the Spotlight 150 system adds features and functionality not usually seen on systems in its class.

For example, the Spotlight 150 system enables you to switch easily between transmission, direct reflection, and ATR detection modes. If direct reflection doesn't give the results you need, the ATR crystal can be brought down and activated, then switched back to transmission mode for subsequent samples – with no realignment. It's that simple.

In addition, Spotlight 200 and 150 microscopy systems offer a range of detector options, including MCT and DTGS, to ensure that you can match the right detector to your application and laboratory requirements.

All labs are different, with different detection and analysis requirements. And that's the thinking behind our complete family of microscopy solutions. Each system is engineered to the highest quality specifications, providing high energy throughput, reproducibility – and a real sense of confidence in the quality of your results.



Spotlight 200 FT-IR Microscope System

As for flexibility, the Spotlight 200 system measures in transmission, reflectance, or micro-ATR collections modes, and its removable lower cassegrain easily accommodates larger samples. What's more, our micro-ATR optics require no separate objective – and that means no realignment and much simpler operation.

And best of all, the Spotlight 200 system is fully upgradable to the industry-leading Spotlight 400 FT-IR imaging technology.



Spotlight 150 IR Microscope System

What's more, popular Spectrum 10 software makes the Spotlight 150 system easy to operate, even for nonspecialized users. When you have repeated analysis of samples over time, you can set up sequences of operations, including scanning, data preprocessing, and spectral searching. Often-used processes can be automated to run at a single mouse click. And it's easy to store special sample information right along with your spectra.

MultiScope: Rounding out your IR solution

With just a few simple, familiar controls and reliable operation, all at an attractive price point, the MultiScope FT-IR microscope system makes a perfect entry-level IR analysis solution without compromising IR sensitivity. It can provide all three detection modes, along with a maximum spatial resolution of ca 10 μ . With simple manual microscopy focus and stage movement, a high signal-to-noise ratio, variable power tungsten/halogen illumination, and special video capture software, the MultiScope FT-IR microscope can provide a simple, powerful addition to your lab, right from the start.

And like all of our IR products, it can remain an integral part of your infrastructure as you move ahead, with upgrade options such as a purge capability, IR and visible polarization for molecular structure studies, a heated sample holder, and micro-sampling accessories available.



MultiScope FT-IR
Microscope System

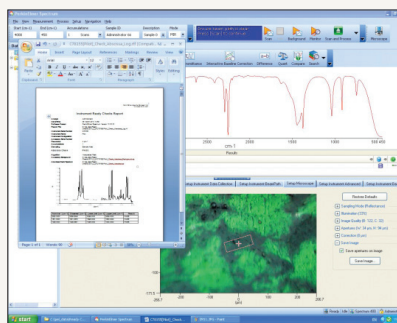
Software by spectroscopists, for spectroscopists

Spectrum 10 software is the infrared spectroscopy platform for FT-IR spectrometers. Built for industrial or academic laboratories that want efficient operation and a wide range of capabilities, this comprehensive package sets the standard for simplicity and efficiency in data collection, processing – and most important, generating results.

Its simple operation is a breakthrough in spectroscopy software. Spectrum 10 software combines single-click access to common functions with powerful data and results management. And unlike other packages that trade ease of use for advanced capability, Spectrum 10 software provides both – making it the ideal platform for novices and advanced users alike.

Spectrum 10 includes a full suite of standard data processing commands designed specifically for spectroscopic processing. In addition, a unique Equations Editor enables you to quickly define nonstandard process commands and make them single-click buttons on the toolbar or components in macro programs. No programming knowledge is required to use the smart equations or macro editors – customizing data commands is fast and intuitive.

Sample verification of known materials is performed using specialized data filters to minimize effects of sampling variations and FT-IR noise distribution, improving accuracy and robustness of results. Identification of unknown compounds and mixtures is accomplished with the standard Search function, which performs rapid comparisons with commercial databases and user-generated spectral databases. And for quantitative analysis, the software provides a full range of options, from peak height to full-spectrum partial least squares prediction – with easy transfer to spreadsheets for trending and analysis.



Simplified layout means
you can easily manage
data, associated results,
and setup information.



Frontier™ IR System

GREAT RESEARCH IS ALL ABOUT OPTIONS

Frontier FT-IR and FT-NIR: Great technologies for Spotlight systems

They're called Frontier systems, and they've never met a challenge they can't take on. These powerful, adaptable IR solutions are specially developed to provide exceptional performance in your most demanding applications. They deliver the high levels of sensitivity and configurability you need to take on everything from simple measurement to the most complex, advanced data analysis.

And as your research goals change and develop, these Frontier systems can grow right along with you. Their flexible, upgradable optics system delivers the highest quality spectra in all infrared ranges – near, near-mid, mid-far, and far alike. And unlike fully integrated FT-IR microscopy and imaging systems, these adaptable instruments let you switch ranges at a moment's notice – and at the touch of a button – giving you much more time to perform deeper analyses on your samples.

Frontier systems can also accommodate a full range of specialized sampling accessories – whatever your sample size or makeup, there's a plug-in accessory to meet your need. You can switch the sampling accessory to address a variety of applications using a single instrument – and there's a comprehensive range of third-party accessories available to meet occasional challenges, including heatable sampling systems and gas cells.

For the chemicals and materials industries, Frontier spectrometers are ideal for troubleshooting manufacturing

problems, identifying contaminants to gain a better understanding of advanced material properties, and much more – and they can even deliver the highest ordinate accuracy for glass and coatings manufacturers.

Pharmaceutical companies can get a better understanding of product formulations, analyze coatings, and quickly screen for the quality of raw materials, intermediates, and finished products.

And academics and researchers can perform complete FIR characterization of novel and synthesized materials, and they can adapt the platform for a variety of research areas – quickly and easily.

Frontier FT-NIR/MIR You get uncompromised mid-IR and near-IR dual-range performance, with automated range switch to quickly move onto the next sample at hand – and that means more productivity from all your operators.

Frontier FT-IR/FT-FIR This system delivers exceptional performance in both the mid- and far-IR regions, even in the 700 – 30 cm^{-1} area, with an automatic beam-splitter changeover and easy switching between ranges, and minimal purge stabilization time.

It's the little things that complete the picture

All our IR and FT-IR systems deliver unrivaled flexibility. So when you purchase a Frontier instrument either as a standalone FT-IR or as part of the Spotlight system, you're purchasing a clear, clean upgrade path to more advanced technology today, and to innovative technologies yet to come.

And these systems accommodate a whole host of accessories that make it easy to complement your research and get every bit of information your sample has to give you.

For Frontier systems, ATR techniques offer a great alternative to thin-film, KBr-pellet, or diffuse-reflectance measurements. For example, the permanently aligned, easy-to-use **Micro-ATR Objective** accessory for Spotlight systems provides point measurements of spot sizes ca 100 μ while the ATR Imaging accessory for the Spotlight 400 is used to deliver high resolution ATR images.

At the same time, the **Spectrum Universal ATR Accessory** allows macro-ATR analysis of a wide range of samples, from liquids to solids, with a range of ATR crystal options, assuring perfect measurement-to-measurement reproducibility with a permanently aligned, kinematically mounted sampling. It automatically recognizes top crystal material, number of reflections, and serial number, and the smart plug-and-go accessory recognition and integrated diagnostics warn of sampling or analysis errors.

For pharmaceuticals, our **Tablet and Powder Imaging Accessories** provide automated imaging of multiple tablets or powders, reducing operator interaction and maximizing efficiency. The flexible tablet holders allow measurement of a wide range of tablet sizes and shapes, while its drop-on design enables fast switching between accessories. And the **Spectrum NIR Tablet Autosampler** provides rapid, nondestructive characterization of whole tablets by transmission or reflection, giving you vital information on active and excipient concentrations.

Our **Input Beam Accessory** greatly extends the potential applications for spectrometers by allowing the input beam from an external source to be directed into the interferometer via a port in the interferometer cover, replacing the standard internal source. It can be used in the design of custom apparatuses that can be coupled with the base casting of the spectrometer, simplifying optical alignment of system components.

And our **General Purpose Optical Bench (GPOB) Accessory** is ideal for situations where the standard sample compartment needs to be free for normal operation and an additional accessory has to be permanently "parked" in a second position in the instrument.



Frontier IR Accessories



INFRARED EXPERTISE YOU WON'T FIND ANYWHERE ELSE

Many of today's scientific instrument builders are latecomers to infrared technology. But PerkinElmer has always been a leader in the field. More than 60 years ago, PerkinElmer introduced the IR spectrophotometer, pioneering the commercial use of IR analysis – and we've been technology and thought leaders in IR ever since. Our sales professionals and service engineers boast years of collective expertise, and they're second to none.

What does all that mean for your lab? For one, our professional field engineers are able to understand and tailor an IR solution to your specific industry requirements. And once you're part of the PerkinElmer network, you can benefit from OneSource Laboratory Services, with 1,600 certified engineers caring for

more than 400,000 multivendor instruments in 120 countries around the world.

Our OneSource Strategic Lab Solutions can actually serve as a front end to a whole host of other OneSource services, including Analytical Method Services, Asset Procurement and Disposition, Business Intelligence Solutions, Instrument Service and Repair, Laboratory Relocation, Qualification and Validation, and Scientific IT Service – all designed to keep your lab running at peak efficiency.

It's the perfect way to ensure that your scientific endeavors and your business goals are aligned – and moving ahead.

Microscopy or imaging: which is right for your lab?

While infrared microscopy provides the highest sensitivity and widest spectral range for small-area FT-IR measurements, collecting a microscopic chemical "picture" of your sample can be time consuming, depending on your data-collection and sample-size requirements.

Unlike IR microscopes, which employ a single detector measuring a point at a time, Spotlight 400 FT-IR imaging systems contain multi-element detectors, producing IR images at incredible speeds.

So the question remains: Which technology is more appropriate for the work you do? That's where an engagement with PerkinElmer IR technical specialists can help. We take into account your entire lab – your people, your processes, and yes, your technologies – to determine just the right IR instrumentation to meet your specific needs.

Where can you find us working?

In fact, you'll see us in just about every industry and application area you can name. We're troubleshooting and improving manufacturing processes, speeding the pace of research, revolutionizing drug discovery processes, helping law enforcement and other security organizations, and much more. Look around. You'll be amazed by what you see.



MATERIALS

In industries like consumer goods, food, packaging, transportation, high tech, and more, our systems can speed product development, improve troubleshooting, aid in process improvements, reduce costs – and increase competitiveness.



FORENSICS

Enhanced visualization enables counterterrorism organizations and law enforcement to analyze paint chips, drugs, fibers, explosives, tablets, packaging, documents, and more.



PHARMACEUTICALS

Pharmaceutical companies use IR imaging analysis to shorten manufacturing cycle times and reduce end-product variability, speeding time to market and making product failures less likely.



BIOMEDICAL

Our instruments and software are used to examine processes and chemical changes in a wide range of diseases – osteoporosis, cancer, Alzheimer's, and other protein-folding maladies among them.



ACADEMIA

Getting a more complete chemical "view" of your samples is made much easier through enhanced imaging capabilities, making Spotlight the platform of choice for researchers worldwide.



BIOMATERIALS

Spotlight systems can be used to examine the composition of new biomaterials and explore the events that can occur at the biomaterial-host interface.

Real-world samples, really amazing results

Most labs realize that there can be significant differences between performance claims on benchmark tests and how systems perform in the actual laboratory environments. And that's why our FT-IR experts encourage you to actually visit one of our facilities and run a sample to see the amazing real-world difference PerkinElmer delivers.

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