SPECIFICATIONS

FT-IR Microscopy

Spotlight 150i and 200i FT-IR Microscopy Systems

Spotlight 200i with Spectrum Two FT-IR Spectrometer

Introduction

PerkinElmer Spotlight™ FT-IR Microscopy Systems are built to the highest ISO-9001 manufacturing standards. This document presents technical information and typical performance specifications based on factory tests.

The Spotlight systems take the proven and popular IR microscopy technique and add a new level of performance, automation and and applications capability. Spotlight 150i and 200i systems can be configured from a range of FT-IR, detector and microscope stage options to best suit the application requirement.

The Spotlight150i and 200i systems can be configured with either Spectrum Two or Frontier FT-IR instruments; in addition Spectrum 100, 400 and Spectrum One FT-IR systems are upgradeable to Spotlight 150i/200i systems.

Spotlight 150i IR Microscopy Systems

The Spotlight 150i is the perfect everyday point-and-shoot infrared microscope system with unmatched performance to address even the most challenging samples. A range of intelligent features such as automatic illumination, and aperture control cut instrument setup time and allow you to focus on results. Microscope sampling options include manual and motorized ATR accessories. High sensitivity MCT or thermoelectrically-cooled DTGS detector options are available to suit a range of laboratory requirements. Full FT-IR capability is also provided, utilizing industry-leading features such as proven Dynascan™ interferometer, hot-spot stabilized source and patented innovative atmospheric compensation algorithms for dependable results. When your laboratory needs change, Spotlight 150i is upgradeable with further microscope, and FT-IR macro-sampling options.

Spotlight 200i with Frontier FT-IR Spectrometer

Spotlight 200i IR Microscopy Systems

Choose the Spotlight 200i for single point microscopy, automated mapping and small area imaging applications. The Spotlight 200i is the ultimate infrared microscopy system providing unrivalled performance and FT-IR versatility for the broadest range of sample types and application studies. The Spotlight 200 combines the hardware features available on the Spotlight 150 with the added ability to define line scans and maps using automated stage operation. In addition, a fully automatic ATR option is available plus further intelligent software automation features to accelerate setup and analysis. Extended detector options are available, including various MCT types; thermoelectrically cooled DTGS and InGaAs elements allow the system to be best configured for your application. This system is also upgradeable to full imaging capabilities.

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Technical Description and Specifications

	Spotlight 150i	Spotlight 200i
Optical System		
Microscope Platform	All reflective, triple cassegrain optical system. One touch software switches between transmission and reflectance modes. Lower cassegrain adjustable to optimize through-put for transmission measurements.	All reflective, triple cassegrain optical system. One touch software switches between transmission and reflectance modes. Lower cassegrain automatically optimizes through-put for transmission measurements.
Numerical Aperture (N.A.)	0.6 (IR mode) automatic change of NA between IR and visible modes for improved depth of field in visible mode	0.6 (IR mode) automatic change of NA between IR and visible modes for improved depth of field in visible mode
Spectrometer	Improved Michelson interferometer, self-compensating for dynamic alignment changes due to tilt and shear, incorporating high reflectivity first-surface aluminum-coated optics. Gold coated optics option available with Frontier Spotlights.	Improved Michelson interferometer, self compensating for dynamic alignment changes due to tilt and shear, incorporating high reflectivity first-surface aluminum-coated optics. Gold coated optics option available with Frontier Spotlights.
IR Source	Long-life source with proprietary hot-spot stabilization to maintain alignment with time. User replaceable.	Long-life source with proprietary hot-spot stabilization to maintain alignment with time. User replaceable.
Micro-Attenuated Total Reflection (ATR) (manual version)	Optional integrated Micro-ATR with 100 µ Silicon or Germanium ATR crystal. ATR objective does not require re-alignment before or after use. Contact PerkinElmer for further options for crystal materials and coatings.	Optional integrated Micro-ATR with 100 µ Silicon or Germanium ATR crystal. ATR objective does not require re-alignment before or after use. Contact PerkinElmer for further options for crystal materials and coatings.
Auto-Micro-Attenuated Reflection (ATR)	Optional fully integrated Micro-ATR with 100 u silicon or germanium ATR crystal. Crystal positioning with motorized drive via software control.	Optional fully integrated automated micro-ATR with motorized drive and pressure control. Fully operated from software with automatic pressure sensing and adjustable force control
Purge	Sample area purge available.	Sample area purge available. Optional environmental enclosure available.
Sample Viewing		
Sample Illumination	White light LED illumination for true color display. Auto-illumination function available as well as easy access to wide-range brightness and contrast controls.	White light LED illumination for true color display. Auto-illumination function available as well as easy access to wide-range brightness and contrast controls. Focus software or joystick control of focus. One-touch-autofocus mode available.
Mode Switching	Dichroic mirrors provide mechanism-free switching between IR and visible viewing. IR and visible beam use identical beam paths for optimum geometric image accuracy. Full view of sampling region with aperture position defined. Micro-ATR accessories can be permanently mounted and lowered into measurement position. No manual re-alignment required.	Dichroic mirrors provide mechanism-free switching between IR and visible viewing. IR and visible beam use identical beam paths for optimum geometric image accuracy. Full view of sampling region with aperture position defined. Micro-ATR accessories can be permanently mounted and lowered into measurement position. No manual re-alignment required.
Image	On screen viewing using USB camera with over 32,000 colors. Image size is scaleable to full screen.	On screen viewing using USB camera with over 32,000 colors. Image size is scaleable to full screen.
Magnification		Continuously variable magnification enables views of the samples at different magnifications to be viewed on-screen
Sample Area	75 x 50 mm (3 x 2 in)	160 x 60 mm (6.3 x 2.4 in) or 75 x 50 mm (3 x 2 in)
Stage Accuracy		Stage movement accuracy of 0.1 u

Technical Description and Specifications continued

	Spotlight 150i	Spotlight 200i
Software		
General	A single software platform incorporates all of the functions required for Spotlight 150i micro-spectroscopy and FT-IR macro-sampling; including instrument control, data-manipulation and analysis. Optional software packages provide advanced capabilities or functions designed for specific application areas. Optional enhanced security (ES) version available for 21 CFR11 technical compliance.	A single software platform incorporates all of the functions required for Spotlight 200i micro-spectroscopy and FT-IR macro-sampling; including instrument control, data-manipulation and analysis. Intelligent automation features include automatic Region of Interest (ROI) location, automatic aperture setup and ATR control. Data analysis can be included with data collection for real-time result reporting. Optional software packages provide advanced capabilities or functions designed for specific application areas. Optional enhanced security (ES) version available for 21CFR11 technical compliance.
Data Display	Real time data display. Full spectra or overall energy are live during data collection.	Real time image display. Full spectra or overall energy are live during data collection.
Show Structure		Single button-click chemometrics-based function in SpectrumIMAGE viewer to automate contrast enhancement in collected images by identifying and revealing true spectral differences.
Interactive Multimedia	Integral video camera provides calibrated on-screen visible image. Apertures areas are defined by direct interaction with live visible image.	Integral video camera provides calibrated on-screen visible image. Sampling points and aperture areas for all data collection modes are defined by direct interaction with live visible image.
System Diagnostics	Key microscope and instrument components are checked on startup. Status of Spotlight components are displayed via PC software.	Key microscope and instrument components are checked on startup. Status of Spotlight components are displayed via PC software.
Atmospheric Compensation	Minimizes effect of atmospheric water and CO_2 on the sample spectra without the need for reference or calibration spectra.	Minimizes effect of atmospheric water and CO_2 on the sample spectra without the need for reference or calibration spectra.
Optional Accessories		
Polarizers	Visible and IR polarizers available.	Visible and IR polarizers available.
Hot and Cold Sample Stage		Optional sample stage covering temperature range -196 °C – 600 °C.
Sampling	Includes compression cell, hot stage, diamond anvil cell and micro-sampling tools.	Includes compression cell, hot stage, diamond anvil cell and micro-sampling tools. Stage mounted tablet autosampler accessory. Provided with 11, 15 and 22 mm diameter tablet holders. Compatible with PerkinElmer Tablet Autosampler molds for accommodating irregular shaped samples. Compatible with Leica® EM Trim supports for depth profiling. Sample cup version for powder or blend analyses available.
Large Detector Dewar	Additional Liquid N_2 dewar providing total detector cool time greater than 24 hours.	Additional Liquid N2 dewar providing total detector cool time greater than 24 hours.
IR Optics Description		
Objectives	Ge, Si Micro-ATR Objective options. Further coating options available on request. ATR can be permanently mounted with simple ATR/standard IR switching. No need for condenser realignment after ATR use.	Ge, Si Micro-ATR Objective options. Further coating options available on request. ATR can be permanently mounted with simple ATR/standard IR switching. No need for condenser realignment after ATR use.
Detector Type	Single element medium-band MCT detector standard. Other detector types including DTGS and wide-band MCT available on request.	Single element medium-band MCT detector standard. Other detector types including DTGS, wide-band MCT and InGaAs available on request.

Single Element Specifications*

	Spotlight 150i	Spotlight 200i
Wavelength Range Medium-Band MCT Detector	8300-600 cm^{-1}	8300-600 cm^{-1}
Wide-Band MCT Detector	8300-500 cm^{-1}	8300-500 cm^{-1}
DTGS Thermo-Electrically Cooled Detector	8300-400 cm^{-1}	8300-400 cm^{-1}
InGaAs Thermo-Electrically Cooled Detector*	Lower limit ca 4000 cm^{-1}	Lower limit 4000 cm^{-1}
*upper spectral range depends on IR source beamsplitter used. Values given apply for standard mid-IR source and beamsplitter.		
Signal-to-noise** MB-MCT	For 2 minutes total scanning and processing time at 4 cm^{-1} resolution over 2100-2000 cm-1 range.	
MB-MCT	>40,000:1	>40,000:1
**for non-standard detectors, more information is available on request.		

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