

Technical Specifications for the Spotlight 200 and 400 FT-IR Microscopy and Imaging Systems



SPOTLIGHT 400

Choose the Spotlight 400 imaging system for ultimate IR imaging speed, efficiency and accuracy. The Spotlight 400 incorporates a number of unique productivity tools and features plus the revolutionary PerkinElmer duet detector, providing the highest performing single point MCT detector for ultra-high sensitivity experiments from 7800-600 cm^{-1} and a unique highly efficient linear MCT array detector for extremely fast, exceptional quality IR imaging.



SPOTLIGHT 200

Choose the Spotlight 200 microscope for the most challenging IR microscopy problems. The superior signal-to-noise and wide spectral range enable the most information to be obtained from your samples in the quickest time possible. The Spotlight 200 can be easily upgraded to provide full imaging capabilities.

INTRODUCTION

PerkinElmer® Spotlight™ FT-IR Microscopy and Imaging systems are built to the highest ISO-9001 manufacturing standards. This document presents confirmed performance specifications based on factory tests.

All instruments will meet or achieve better than the confirmed

specifications, under normal operation as described in the user manual.

The Spotlight systems take the proven and popular IR microscopy technique and add a new level of speed and applications capability. Spotlight systems incorporate a high performance, single point

detector which delivers the ultimate in sensitivity, easily out-performing competitive top-of-the line IR microscopes. The revolutionary imaging capabilities enable previously time-consuming and difficult chemical composition studies to be performed without compromising data quality.

Technical description and specifications

Spotlight 200

Spotlight 400

Optical System

Microscope Platform	All reflective, triple cassegrain optical system. One touch software switches between transmission and reflectance modes. Lower cassegrain automatically optimizes throughput for transmission measurements.	All reflective, triple cassegrain optical system. One touch software switches between transmission and reflectance modes. Lower cassegrain automatically optimizes throughput for transmission measurements.
Numerical Aperture (N.A.)	0.6	0.6
Spectrometer	Spectrum 100 rapid-scan spectrometer. "Plug-and-go" sampling accessory capabilities. Improved Michelson interferometer, self-compensating for dynamic alignment changes due to tilt and shear, incorporating high reflectivity first-surface aluminum-coated optics.	Spectrum 100 rapid-scan spectrometer. "Plug-and-go" sampling accessory capabilities. Improved Michelson interferometer, self-compensating for dynamic alignment changes due to tilt and shear, incorporating high reflectivity first-surface aluminum-coated optics.
IR Source	Long-life source with proprietary hot-spot stabilization. User replaceable.	Long-life source with proprietary hot-spot stabilization. User replaceable.
Micro-Attenuated Total Reflection (ATR)	Integrated Micro-ATR with 100 μ Silicon or Germanium ATR crystal. ATR objective does not require re-alignment before or after use.	Integrated Micro-ATR with 100 μ Silicon or Germanium ATR crystal. ATR objective does not require re-alignment before or after use.
Imaging-Attenuated Total Reflection (ATR)		Stage mounted Germanium ATR imaging crystal providing a maximum ATR imaging area diameter of 500 μ . ATR imaging software wizard automates alignment procedure and guides users through data collection ensuring the highest quality of data. Crystal can be inverted for easy cleaning.
Purge	Sample area purge available. Optional environmental enclosure 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. Focus software or joystick control of focus. One-touch autofocus mode available.	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. Micro-ATR accessory 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. Micro-ATR accessory can be permanently mounted and lowered into measurement position. No manual re-alignment required. Drop-in stage mounted ATR imaging accessory enables quick and easy switching between ATR and traditional transmission or reflectance measurements.
Image	On screen viewing of image with over 32,000 colors. Image size is scaleable to full screen.	On screen viewing of image with over 32,000 colors. Image size is scaleable to full screen.
Magnification	Continuously variable magnification. Simultaneous Variable Magnification (SVM) enables views of the samples at different magnifications to be viewed at the same time.	Continuously variable magnification. Simultaneous Variable Magnification (SVM) enables views of the samples at different magnifications to be viewed at the same time.
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 μ	Stage movement accuracy of 0.1 μ

Software	Spotlight 200	Spotlight 400
General	A single software platform incorporates all of the functions required for infrared micro spectroscopy; instrument control, data-manipulation and analysis. Optional software packages provide advanced capabilities or functions designed for specific applications areas.	A single software platform incorporates all of the functions required for infrared micro spectroscopy; instrument control, data-manipulation and analysis. Optional software packages provide advanced capabilities or functions designed for specific applications areas.
Data Display	Real time data display. Full spectra are live during data collection.	Real time image display. 10 updates per second.
Show Structure	Upgrade required	Single button-click operation to automate contrast enhancement in collected images by identifying and revealing true spectral differences.
Interactive Multimedia	Integral video camera provides on-screen visible image. Sampling points for all data collection modes are defined by direct interaction with live visible image.	Integral video camera provides on-screen visible image. Sampling points 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 all Spotlight components are displayed via PC control toolbox.	Key microscope and instrument components are checked on startup. Status of all Spotlight components are displayed via PC control toolbox.
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.

Accessories

Polarizers	Visible and IR polarizers available.	Visible and IR polarizers available.
Sampling	Include compression cell, hot stage, diamond anvil cell and micro-sampling tools.	Include 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.
Detector		Additional Liquid N ₂ dewar providing total detector cool time greater than 24 hours.

IR Optics Description

Objectives	Ge, Si Micro-ATR Objective	Ge, Si Micro-ATR Objective Ge ATR imaging Objective Z-fold magnification system provides automatic switching between wide area survey and high definition imaging modes.
Detector Type	Single element detector	Dual Mode Detector (Duet) containing single element and array detector on common dewar. Requires no mechanical switchover.
Detector Technology	Single element: 100 μ medium-band MCT Array: Upgrade required	Single element: 100μ medium-band MCT. Array: Photoconductive array exclusive for PerkinElmer with guaranteed 0 dead pixels.
Detector Switching	Upgrade required	One-touch software switch between imaging and single element mode.

Single Element Specifications

	Spotlight 200	Spotlight 400
Wavelength Range	Confirmed: 7800 - 600 cm^{-1}	Confirmed: 7800 - 600 cm^{-1}
Signal-to-noise	Confirmed: >7000:1 Typically: >12000:1	Confirmed: >7000:1 Typically: >12000:1

IR Imaging Specifications

Image Pixel Size	Upgrade required	50 μ , 25 μ , 6.25 μ
ATR Image Pixel Sizes	Upgrade required	6.25 μ , 1.56 μ
Number of dead pixels	Upgrade required	Zero
Wavelength Range	Upgrade required	Confirmed: 7800 - 720 cm^{-1}
Sampling/detector fill-factor	Upgrade required	100%
Signal-to-noise (25 μ pixel size, 16 cm^{-1} spectral resolution, 4 scans)	Upgrade required	Confirmed: >500:1 Typically: >800:1
Signal-to-noise (6.25 μ pixel size, 16 cm^{-1} spectral resolution, 4 scans)	Upgrade required	Confirmed: >150:1 Typically: >400:1
Image Size	Upgrade required	Continuously variable image size and aspect ratio, limited by PC's RAM memory.

IR Imaging Collection Speeds

100 x 100u, 6.25u, 7,800 – 700 cm^{-1}	Upgrade required	1.6 seconds
400 x 400u, 25u, 7,800 – 700 cm^{-1}	Upgrade required	1.6 seconds
0.8mm x 0.8mm u, 50u, 7,800 – 700 cm^{-1}	Upgrade required	1.6 seconds
Full spectra collected a minute	Upgrade required	170 full range spectra (16 cm^{-1} , 7,800 - 700 cm^{-1})

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