



DXR3xi Raman Imaging Microscope

Powerful Raman imaging, simplified

- Exceptional stability for highest quality Raman imaging over small and large areas
- Intelligent autofocus and automated feature identification tools reduce total experiment time
- Powerful, real-time component analysis
- Visual control and parameter optimization lets you focus on the answer, not the technique

The Thermo Scientific™ DXR3xi Raman Imaging Microscope is engineered for rapid Raman imaging, delivering exceptional stability, intelligent automation, and real-time component analysis for advanced materials characterization.

Performance specifications

Spatial resolution	Resolution (X, Y axes)	Better than 0.5 μm
	Confocal depth resolution	Better than 2 μm

Automated polarization

Laser polarization	Horizontal, vertical, or depolarized
Analyzer polarization	Not in beam, horizontal, vertical, or custom angle (1° increments) Imaging with polarization is possible

Spectrograph

Design	Triplet spectrograph	No moving parts
	Camera technology	TE cooled back illuminated EMCCD
		TE cooled front illuminated EMCCD
Aperture	Four software-selectable apertures	25 and 50 μm confocal pinhole apertures 25 and 50 μm slit apertures

Imaging performance		
Typical image collection time	Single 100 μm \times 100 μm image with 1 μm image pixel size in both directions	35 seconds
	10 mm diameter tablet with 20 μm image pixel size	11 minutes
Maximum spectral acquisition rate	600 spectra per second	
Maximum image area	101.6 mm \times 76.2 mm	
Minimum image pixel size in X and Y	100 nm	
Minimum step size in Z	200 nm	

Physical dimensions	
Width	94 cm
Depth	68 cm
Height	61 cm
Weight	86 kg

Fiber optic port for DXR3 Raman family

Installation	Pre-aligned, user-installable/removable without the need for tools
SmartLock installation	Fiber optic port is precision-locked into place
Compatibility	Compatible with 532 nm and 785 nm excitation laser frequencies, accepts probes with standard FC connectors
Smart technology	Fiber optic port stores serial number

DXR3xi microscopy options

Illuminator options

Brightfield microscope illuminator, plus nosepiece	Reflection illumination. Accepts brightfield objectives.
Brightfield/darkfield microscope illuminator, plus nosepiece	Reflection illumination. Accepts brightfield/darkfield objectives and brightfield-only objectives with adaptor. Supports optional transmission illumination.

Microscopy options

Reflected and transmitted light polarized kit/ fixed analyzer
Reflected and transmitted light differential interference contrast (DIC) or Nomarski Illumination Kit
Rotatable analyzer



Sampling stage options

Heated and cooled stage	Temperature range: -196 $^{\circ}\text{C}$ to 600 $^{\circ}\text{C}$
Polymer slicer	Secures a multilayered polymer vertically for cross-sectional analysis
Single and dual slide insert	Holds one or two standard microscope slides (75 mm \times 25 mm)
Rotating stage insert	Accepts standard microscope slide, manually rotatable to any position
Sample holder breadboard with clips	Provides maximum flexibility for holding small and uniquely shaped samples without risk of contamination with adhesives
Microtiter well-plate holder	Holds standard 96 well microplates
Capillary tube array holder	Accommodates up to 16 capillary tubes
XPS sample holder	Permits easy transfer of samples from the Thermo Scientific™ K-Alpha XPS System

Objectives

Standard working distance objectives	10×, 20×, 50×, 100×
Long working distance objectives	10×, 20×, 50×, 100×
Oil immersion objectives	50×, 100×
Water immersion objectives	60×
Macro sampling adapter	Includes 4× objective, accepts brightfield objectives only
User-supplied objectives	Must be compatible with Olympus® BF or BD nosepieces
Extended reach sampling accessory	Enables external sampling



DXR3 family shared component specifications

The DXR3xi Raman Imaging Microscope is based on the same reliable research-grade design as our other DXR3 benchtop and microscope systems, providing robust performance while allowing you to easily exchange pre-aligned laser, filter, and grating components in the spectrometer.

General system features

Lasers	Multiple excitation lasers	Supported wavelengths 455, 532, 633, and 785 nm
	Laser safety	Class 1
	Laser power regulator	Active feedback system to control absolute laser power delivered to the sample
General	System alignment	Automatically optimized after component exchange or on-demand
	Fine laser power control	Power controlled and reported at samples in 0.1 mW increments
Replaceable components	Smart components	Pre-aligned user-exchangeable system components (laser, filters, gratings) lock into place and are automatically optimized with an internal calibration tool
		Software checks for laser, grating, and filter compatibility
		Software restores alignment and calibration setting when components are exchanged
Computer interface		Instrument communicates with single USB 2.0 connector (camera accessory communicates with a separate USB 2.0 connector)

Some components may not be interchangeable with all DXR3 models. Consult your Thermo Fisher Scientific rep for up to date compatibility information.

Laser

Laser	455 nm	532 nm		633 nm		785 nm	
		(high brightness)	(high powered)	(high brightness)	(high powered)	(high brightness)	(high powered)
Laser type	Frequency-stabilized single mode diode laser	Diode-pumped, solid state (DPSS)	Diode-pumped, solid state (DPSS)	HeNe gas	Single transverse mode, high power diode laser	Frequency-stabilized single mode diode laser	Multiple transverse mode, narrow-spectrum diode
Maximum laser output power	25 mW	24 mW	100 mW	20 mW	60 mW	80 mW	420 mW
Laser power at sample	Maximum power at sample 6 mW	Maximum power at sample 10 mW	Maximum power at sample 40 mW	Maximum power at sample 8 mW	Maximum power at sample 25 mW	Maximum power at sample 30 mW	Maximum power at sample 150 mW
Center wavelength	455 ± 0.2 nm	532 ± 1 nm	532 ± 1 nm	632.8 nm	632.8 nm	785 ± 0.2 nm	785 ± 0.5 nm
Transverse mode	TEM ₀₀	TEM ₀₀	–	TEM ₀₀	–	TEM ₀₀	–

System Performance – Spectral Range and Resolution

		Lasers					
		455 nm	532 nm		633 nm		785 nm
			(high brightness)	(high powered)	(high brightness)	(high powered)	
Full-range grating	Spectral resolution	Better than 5.0 cm ⁻¹ FWHM	Better than 5.0 cm ⁻¹ FWHM	Better than 5.0 cm ⁻¹ FWHM	Better than 5.0 cm ⁻¹ FWHM	Better than 5.0 cm ⁻¹ FWHM	Better than 5.0 cm ⁻¹ FWHM
	Spectral dispersion	2 cm ⁻¹ /CCD pixel element	2 cm ⁻¹ /CCD pixel element	2 cm ⁻¹ /CCD pixel element	2 cm ⁻¹ /CCD pixel element	2 cm ⁻¹ /CCD pixel element	2 cm ⁻¹ /CCD pixel element
	Upper cutoff	3500 cm ⁻¹	3500 cm ⁻¹	3500 cm ⁻¹	3500 cm ⁻¹	3500 cm ⁻¹	3250 cm ⁻¹
	Lower cutoff	85 cm ⁻¹	50 cm ⁻¹	50 cm ⁻¹	50 cm ⁻¹	50 cm ⁻¹	50 cm ⁻¹
High-resolution grating	Spectral resolution		2 cm ⁻¹ FWHM	2 cm ⁻¹ FWHM	2 cm ⁻¹ FWHM	2 cm ⁻¹ FWHM	2 cm ⁻¹ FWHM
	Spectral dispersion		1 cm ⁻¹ /CCD pixel element	1 cm ⁻¹ /CCD pixel element	1 cm ⁻¹ /CCD pixel element	1 cm ⁻¹ /CCD pixel element	1 cm ⁻¹ /CCD pixel element
	Upper cutoff		1800 cm ⁻¹	1800 cm ⁻¹	1800 cm ⁻¹	1800 cm ⁻¹	1800 cm ⁻¹
	Lower cutoff		50 cm ⁻¹	50 cm ⁻¹	50 cm ⁻¹	50 cm ⁻¹	50 cm ⁻¹
Extended-range grating	Spectral resolution		11 cm ⁻¹ FWHM	11 cm ⁻¹ FWHM			
	Upper cutoff		6000 cm ⁻¹	6000 cm ⁻¹			
	Lower cutoff		50 cm ⁻¹	50 cm ⁻¹			

Available Thermo Scientific software options

OMNICxi Raman Imaging Software	Visually driven chemical imaging and analysis software
OMNIC Software	Full featured molecular spectroscopy acquisition and analysis software
OMNIC Series Software	Supports time-based data collection
OMNIC Array Automation Software	Automated data collection and post-collection data analysis from micro-well plates and similar array formats
OMNIC Atlas Particle Analysis Software	Image directed particle location and analysis
OMNIC Atlas Software	Provides software-controlled hyperspectral mapping and image analysis
OMNIC Spectra Software	Provides efficient data management, simplifies data process, and provides powerful spectral identification
OMNIC Macros\Pro™ Software	Interface for advanced Visual Basic programming
OMNICxi 3D Visualization Software	3D image rendering of confocal Raman data
OMNICxi Advanced Particle Analysis Software	Automated particle identification and analysis of visual and chemical image
ValPro™ System Qualification Software	Full featured system qualification package for verifying instrument performance

Instrument alignment, calibration, and optimization

Alignment and calibration³	Entirely software controlled	Auto-alignment technique aligns laser and Raman emission
	Wavelength	Software-controlled calibration using multiple neon emission lines
	Laser Frequency	Software-controlled calibration using multiple polystyrene Raman peaks
	Intensity	Software-controlled calibration using a white light source
Automatic x-axis calibration		Recurring, fixed-interval wavelength calibration eliminating manual calibration
Laser power regulator		Absolute excitation laser power at the sample controlled by OMNIC Software (Laser power at sample reported in mW)
Automatic fluorescence correction		Compensates for fluorescence prior to data analysis
User interface	Autofocus	Optimizes signal from sample
	Autoexposure	Automatically sets optimal exposure time and number of repeat scans for highest quality data acquisition
	Smart Background	Automatically accounts for dark current, improving spectral quality and saving time

3: Standards incorporated into alignment tool.

Instrument serviceability

Replacement lasers	Can be installed by user
Instrument performance monitoring	Software provides real-time status of system readiness, including error condition checks and diagnostics
Additional lasers or filter grating sets	Can be installed by user

Other specifications

Environmental	Minimum temperature: 16 °C
	Maximum temperature: 27 °C
	Humidity range: 20-80%
Electrical	100-240 V AC, 47-63 Hz
Regulatory	CE, UL/CSA/ETL, 21 CFR1040.10
Warranty	12 month warranty standard, extended warranties available

The DXR3 Microscope is a class 1 laser product when used with sampling accessories. Class 3B when fiber optic interface is installed.

Learn more at thermofisher.com/raman

thermo scientific