

Raman Solution

innoRam®

Research Grade Performance



The innoRam® is ideal for laboratory settings where research grade performance is necessary. Standard systems come with a choice of a 532nm or 785nm excitation laser, with custom wavelengths available. The innoRam® features an integrated touch screen computer combining portability and versatility, allowing for applications both in the lab and in a mobile environment.

Features:

- Spectral Resolution of 3.5cm^{-1} *
- 65cm^{-1} to the Rayleigh Line
- Patented CleanLaze® Technology for Laser Stabilization
- TE Cooled, Low Etaloning, Back-Thinned CCD
- High Throughput Optics
- Integrated Touch Screen Computer
- Network and Video Output Capabilities

Why Choose Raman?

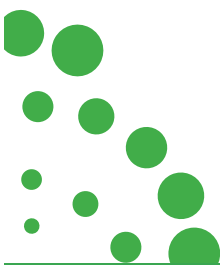
- No sample preparation required
- Measure through glass, quartz, plastic (non-contact)
- Samples can be solid, liquid or gas, transparent or opaque
- Small sample size to reduce cost
- Wide spectral coverage for diversity of applications
- Spectra that is more clean and precise than FTIR or NIR

Accessories:

- Raman Probes
- Cuvette Holders
- Probe Holders
- Video Microscope
- Microscope Adaptor
- Raman Flow Cells
- Laser Safety Goggles

Applications:

- Bioscience and Medical Diagnosis
- Pharmaceutical Industry
- Raman Microscopy
- Polymers and Chemical Processes
- Environmental Science
- Forensic Analysis
- Gemology
- Geology and Mineralogy
- Food & Agriculture Industry
- Semiconductor & Solar Industry



Specifications:

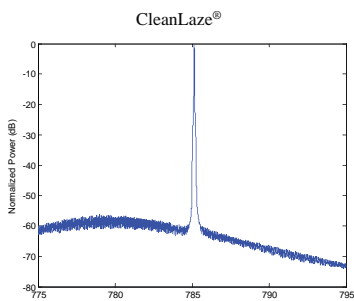
Lasers		
532nm Excitation	> 50mW*	
785nm Excitation	> 300mW*	
Laser Power Control	532nm, 785nm	
Spectrometer	Range	Resolution**
innoRam-532S	$65\text{cm}^{-1} - 3750\text{cm}^{-1}$	$\sim 5.0\text{cm}^{-1}$ @609nm
innoRam-532H	$65\text{cm}^{-1} - 3000\text{cm}^{-1}$	$\sim 3.5\text{cm}^{-1}$ @609nm
innoRam-785S	$65\text{cm}^{-1} - 3000\text{cm}^{-1}$	$\sim 4.0\text{cm}^{-1}$ @912nm
innoRam-785H	$65\text{cm}^{-1} - 2500\text{cm}^{-1}$	$\sim 3.5\text{cm}^{-1}$ @912nm
Detector		
Detector Type	TE Cooled, Back-thinned, 2D Binning CCD	
Pixel Number	2048	
Pixel Size	$12\mu\text{m} \times 12\mu\text{m}$	
TE Cooling Temperature	$\sim -20^\circ\text{C}$	
Max Quantum Efficiency	90%	
Well Depth	200,000 Electrons	
Dynamic Range	30,000:1 (minimum)	
Digitization Resolution	16-bit or 65,535:1	
Readout Speed	250 kHz	
Integration Time	27ms - 16 minutes	
System Operation		
USB	2 External Ports (2.0)	
Trigger Mode	5V TTL	
Ethernet	1 Port	
Power Options		
DC (Standard)	12V DC @ 10.8 Amps	
AC (Optional)	100 - 240V AC, 50 - 60Hz	
Battery	Optional w/ DC only	
Form Factor		
Dimensions	41 x 22 x 30.3cm (16.1 x 8.7 x 11.9in)	
Weight	$\sim 9.98\text{ kg}$ ($\sim 22\text{ lbs}$)	
Operating Temperature	$10^\circ\text{C} - 35^\circ\text{C}$	
Storage Temperature	$-10^\circ\text{C} - 60^\circ\text{C}$	
Humidity	10% - 85%	

Excitation Wavelength

Laser

Creating Raman Scatter

In Raman spectroscopy it is essential to utilize a clean, narrow bandwidth laser due to the fact that the quality of the Raman peaks are directly affected by the sharpness and stability of the delivered light source. The innoRam[®] spectrometer system features a patented CleanLaze[®] technology with a linewidth < 0.3nm when equipped with our 785nm laser. This technology results in the correct center wavelength and avoids the phenomenon of "mode hopping." In addition, the laser output power can be adjusted in the software from 0 - 100%, allowing you to maximize the signal-to-noise ratio and minimize integration time. Our standard automatic shutter will reduce photobleaching for a variety of different sample types.



Laser lifetime of 10,000 hours ensures quality data for years to come!

Near-Excitation

Filter

Collects Data within 65cm⁻¹ of the Rayleigh Line

The center wavelength of the laser line is precisely maintained even when the peak power is increased by utilizing a series of high end filters. A laser line filter is used to clean up any side bands and ensure a narrow excitation is delivered to the sample by removing all secondary excitation lines before exciting the sample. The light collected from the sample is then filtered via a notch filter. Finally, an ultra steep long pass filter further removes lingering laser line to allow accurate measurement of Raman peaks as close as 65cm⁻¹ from the Rayleigh line.

Interface

Integrated Computer

State-of-the-Art Touch Screen

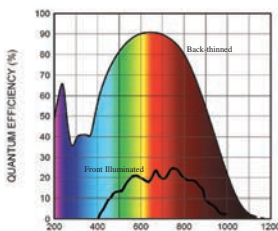
The innoRam[®] is battery operated and incorporates an integrated computer, making it ideal for applications that require portability. This computer features an embedded version of Windows XP and a 5" LVDS touch screen with LED backlighting, making it easy to use. With its ATOM Z500 1.6GHz CPU, 8 GB compact flash hard drive, 1 GB RAM, USB port, ethernet port, and video output capabilities, this system provides a total solution for Raman spectroscopy applications.

Sensitivity

Detector

Digitization of Photons

The innoRam[®] features a two dimensional back-thinned CCD that detects the dispersed Raman signal in applications that require a sensitive detector. The detector is TE Cooled to -20°C to maximize dynamic range by reducing dark current. A back-thinned CCD obtains a 90% QE by collecting incoming photons that do not pass through a front illuminated CCD. This achieves maximum photon collection for low-light applications.

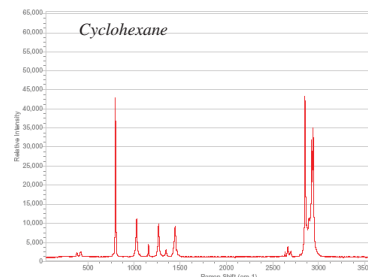


Sharp Resolution

Spectrometer

Optimized for Raman Spectroscopy

The standard configurations for the spectrometer in the innoRam[®] are for 532nm and 785nm laser excitation wavelengths. Our double pass transmission optics provide research grade spectral resolution of 3.5cm⁻¹ while the f/2 spectrograph allows you to more efficiently collect the Raman signal. For weakly scattering materials, the high-throughput optical layout of the innoRam[®] is ideal. The innoRam[®] is also available with a wider spectral range, while still providing resolution finer than most portable Raman systems.



Easy Sampling

Probe

Easy Transition Between Sample Types

The probe allows for measurement of various materials in the form of liquids, gels, powders, or solids under both lab conditions (Lab Grade) or demanding environmental conditions (Industrial Grade). Constructed with state-of-the-art telecom packaging techniques, the probe has a flexible fiber coupling encased in a durable protective jacketing material which delivers Rayleigh scatter rejection as high as 10 photons per billion. An E-grade Filter upgrade is available allowing the measurement of Raman peaks as close as 65cm⁻¹ from the Rayleigh line. Wavelength excitation probes come in 532nm or 785nm.

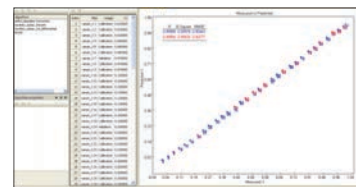
Custom wavelength excitation probes available.

Convenient

Software

State of the Art Chemometric Software

B&W Tek offers comprehensive software packages that provide solutions all application needs. Powerful calculations, easy data management, and user friendly easy-to-follow work flow!



BWSpec[™] is the foundation for all B&W Tek software platforms and come standard with every spectrometer. Built on the proven BWSpec[™] platform, BWID[™] is optimized for identification and verification of materials. For industrial Raman applications that require federal compliance: BWID[™]-Pharma supports all requirements for FDA 21 CFR Part 11 Compliance.

The most recent addition to B&W Tek's software portfolio, BWIQ[™] chemometrics software for use with the innoRam[®] and other high resolution Raman products. BWIQ[™] is a multivariate analysis software package which can analyze spectral data and discover internal relationships between spectra and response data or spectra and sample classes. By coupling new and transitional chemometric methods with cutting edge computer science technology such as sparse linear algebra algorithms, BWIQ[™] represents the next generation in speed, accuracy, and performance.