i-Raman® Pro ST

Raman Solution

Portable Raman Analyzer for Rapid Analysis and Identification Through Opaque Barriers

The i-Raman® Pro ST unites a high throughput spectrometer, specialized sampling optics and advanced algorithms in a portable Raman system to deliver rapid material identification capabilities through a variety of barrier layers and packaging previously impenetrable with Raman. Using our patent–pending technology, the i-Raman Pro ST can collect Raman signal generated underneath diffusive top layers to identify material inside even visually opaque barriers such as white plastic bottles, paper envelopes, tablet coatings, and more. This removes the need to open containers and come in contact with the material, thus maintaining package and sample integrity. The system design features a large sampling depth and sampling area and minimized power density, facilitating the measurement of samples that can be challenging for conventional focused Raman spectroscopy.

SENSITIVE:

Featuring a high quantum efficiency CCD array detector with a high-throughput spectrograph and specialized sample probe, the system can collect Raman signal generated underneath diffusive top layers while largely avoiding their signature from overwhelming that of the sample. With a sampling area on the order of millimeters, heterogeneous material measurement is improved, giving more representative measurement of sample composition. The laser power is distributed over a larger area, resulting in lower power density and making it possible to measure materials that may be susceptible to photo damage when using conventional Raman.

VERSATILE:

The system provides versatility for see through measurements through barriers and for focused Raman measurement directly on a sample with easily attached adaptors. The system can be used for Raman analysis across a wide range of applications for rapid analysis and identification covering diverse samples forms.

TOUCHSCREEN INTERFACE:

The i-Raman Pro ST is a fully integrated system with a tablet computer running touch-friendly software, providing material identification and real-time predictions. With a battery option for easy portability, the system provides research grade Raman capabilities wherever needed.

Applications:

- **Through-Package Material Identification**
- **Customs and Logistics Package Inspection**
- **Pharmaceutical Raw Material Identification**
- **Narcotics Detection**
- **Art and Archaeological Study**
- **Bioscience and Medical Analysis**
- **Forensic Analysis**
- **Geological and Mineralogical Research**
- **Material Science Research**

Specifications:

Laser

785nm Excitation	400 mW at probe
Laser Power Control	0 to 100% (adjustable at 1% increments)

Spectrometer

Range	150 – 2800 cm^{-1}
Resolution*	< 6.0 cm^{-1} @ 912 nm

Detector

Detector Type	High Quantum Efficiency CCD Array
Pixel Number	2048 Effective Detector Elements
CCD Temperature	-25 ˚C
Digitization Resolution	16-bit
Integration Time	7 ms – 30 mins

Electronics

Computer Interface	USB 2.0
Trigger	Yes (Compatible with B&W Tek Probes)

Power Options

DC Power Adaptor	12V DC @ 6.6 Amps
Battery	Optional

Physical

Dimensions	15.7in x 10.2in x 9.8in (40cm x 26cm x 25cm)
Weight	~19.5 lbs (~8.8 kg)
Operating Temperature	0 ˚C – 35 ˚C
Storage Temperature	-10 ˚C – 60 ˚C
Humidity	10% - 85%

*Resolution measured using atomic emission lines. Raman resolution per ASTM E2529-06 (Standard Guide for Testing the Resolution of a Raman Spectrometer).

Accessories Included:

• See through fiber optic Raman probe
• Sampling kit with surface adaptor
• Laser safety goggles
• BWSpec Mobile software with STID (installed on embedded tablet)
• Windows-based BWSpec operating software
• BWIQ® chemometric software (trial version)
• Wheeled carrying case

Available Accessories:

• Standard 9.5mm dia. probe shaft
• Probe holder & XYZ positioning stage
• Tablet holder
• A range of long working distance lenses
• Video microscope
• Industrial Raman immersion probe

Software:

B&W Tek offers a suite of software packages for Raman spectroscopy.

The i-Raman Pro ST is controlled using the touch-friendly onboard BWSpec® Mobile software which includes identification and prediction functions, giving real-time results. The advanced algorithms of the STID plug-in provide through package material identification.

In the laboratory, the system can be connected to an external computer and used with the ever-improving BWSpec PC software and a suite of accessories, offering additional analysis capabilities and viewing comfort.

The optional BWID® software is optimized for rapid identification and verification of materials. For Raman applications in regulated environments, BWID-Pharma software supports requirements for FDA 21 CFR Part 11 Compliance.

B&W Tek's software portfolio also includes BWIQ®, a multivariate software package for qualitative and quantitative analysis of spectral data. Models can be used for real-time predictions in the BWSpec Mobile software. BWIQ supports chemometric methods such as Partial Least Squares Regression (PLS), Principal Component Analysis (PCA) and Support Vector Machine (SVM) and numerous preprocessing tools. The BWIQ chemometrics software package is ideal for online use with the i-Raman Series for real-time prediction and offline use for analysis of spectroscopic data.