PRODUCT NOTE

FT-NIR Spectroscopy

Key Features:

- High-performance fiber probe systems for solids or liquids
- Optimized fiber interface for high sensitivity
- Modular design with interchangeable probes for a range of applications
- Intelligent probe controls for ease of use
- Comprehensive software validation routines; available in Standard and Enhanced Security™ (ES) software versions

Near-Infrared Remote Sampling Systems for Spectrum Two N and Frontier FT-NIR Spectrometers

Introduction

Near-Infrared (NIR) fiber optic systems offer the potential to take the measurement directly to the sample and can provide real sampling advantages in situations where it is impractical or inconvenient to take sample aliquots and transfer to the lab for analysis. For example, in raw materials testing of powder materials in the warehouse, it is possible to collect the spectrum from the test sample by measuring directly through the sample bag in its container, or through the sample vial container to avoid cross-contamination risk between samples. In reflection, spectra may also be collected by placing the fiber probe tip either directly onto the sample, or slightly above at a fixed distance. PerkinElmer provides a range of remote sampling systems based on NIR fiber probe coupling to both the Spectrum Two N™ and Frontier™ FT-NIR spectrometers. Various options are available: performance-optimized versions for either solids or liquids measurements, or an interchangeable version for higher flexibility. These systems are modular in design, featuring a high-performance plug-in fiber interface, with dedicated high-sensitivity detector and universal fiber connectors, allowing the system to be coupled with PerkinElmer probes for optimum performance or even with third-party custom probes for specialized applications. NIR probes are used in a variety of applications: for example, in reaction monitoring, the sample may be immersed in the sample and the changes in spectra monitored over time. A very common application is simple, rapid ID checking of materials, where the probe may incorporate electronic control of instrument and display information at the probe itself so operators can control the measurement and analysis from the probe handle. PerkinElmer provides a range of NIR probes with and without electrical connection, and/or software support for various modes of data collection. All probe options described here are compatible with both Spectrum Two N and Frontier FT-NIR spectrometers.

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For the Better

High-performance Remote Solids Sampling System

This system combines a probe-tip design for high-quality NIR diffuse reflectance measurements, coupled via NIR fibers to the dedicated remote sampling interface, incorporating a stabilized high-sensitivity InGaAS detector (Figure 1). The probe holder incorporates a NIR reference material for easy measurement of sample backgrounds, and various lengths of fiber, from probe handle to instrument, are available. This probe has outstanding ease of use thanks to the smart communications between probe and Spectrum 10™, Spectrum Touch™, and AssureID™ software modules. At the probe tip, scans can be initiated via the trigger incorporated into the probe handle. In addition, for ease of measurement of multiple samples, the Sample Table feature of both Spectrum 10 and the AssureID probe workflows allows sample information for multiple samples to be entered first, then sample selection from the Sample Table is possible as the table is navigated via additional buttons in the probe handle, greatly streamlining the operation for multiple samples in a busy testing environment.

For more effective information display, relevant user instructions, ID results, and visual alerts can be displayed at the probe handle itself using the built-in LCD and LED displays. The LCD can echo text information displayed at the PC screen during the procedure, while the multi-color LED on the probe can reflect sample 'Hold', 'Pass' or 'Scanning' states during and after the analysis, using the acclaimed AssureID materials testing workflows (Figure 2).

Figure 1. High-performance solids probe.

Figure 2. Probe grip with built-in LCD and LED displays.

High-performance Liquids Sampling System

This system (Figure 3) features a proven high-throughput precision transmission tip with a single-pass through the sample with fixed pathlength for highest ordinate photometric performance. A single-fixed 1 mm pathlength is available. Other probe options with different pathlengths are available on request. This system is 'passive' and does not incorporate scan triggers or LED/LCDs as above.

Figure 3. High-performance liquids probe.

Versatile Remote Sampling System

In addition to the dedicated systems optimized for no-compromise performance, PerkinElmer offers a probe with interchangeable tips (Figure 4), which can be used for measurements of both solids and liquids. This system offers high optical performance in reflectance mode for solids and may also be used for qualitative work with the liquids probe tip. Liquids tips are available in a range of pathlengths. This is compatible with the PerkinElmer High-Performance Fiber Interface accessories. The interface features a software switchable gain if required when switching from low optical throughput solids to high optical throughput liquids. This is controllable via the Spectrum 10 software.

Figure 4. Versatile interchangeable tip probe.

Smart Software Control for Easy, Assured Measurement

Spectrum 10 and its associated software modules incorporate a number of features specifically designed to help make remote sample measurements more easily and reliably. First, the intelligent fiber interface plug-and-play module is easily installed and configured in seconds: as the fiber interface is recognized, Spectrum 10 software automaticalLy reconfigures the instrument scan parameters best suited for fiberprobe measurement. Intelligent, real-time spectral quality checks can be configured to recognize and warn of potential errors, and application-specific system suitability checks can be selected to ensure remote sampling systems are ready for use before measurement. A range of basic system validation checks, including USP testing protocols, are also supplied with the standard Spectrum 10 software, providing a comprehensive suite of checks to ensure confidence in analysis (Figure 5).

For workflow operation in environments where operators have limited spectroscopic experience, simple screen-driven procedures can be created using Spectrum Touch, ideal for tablet-PCs, or AssureID (Figure 6), incorporating a full ID method development and diagnostic toolkit. With AssureID, even the probe LCD display messages can be configured to suit local application requirements.

From routine raw materials testing to reaction monitoring applications, PerkinElmer offers a range of remote sampling systems, enabling analysts to bring the measurement closer to the point of sample, saving potential delays in extracting samples to streamline the analysis workflow.

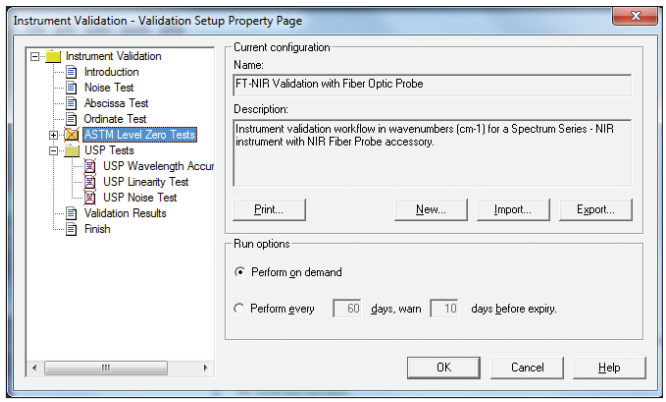

Figure 5. Configurable instrument checks in standard software.

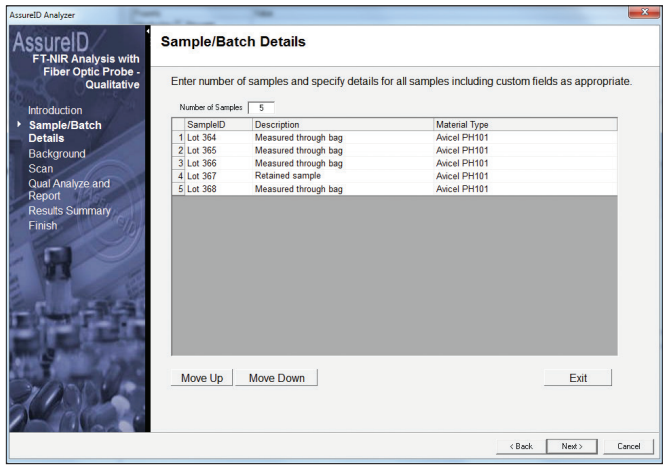

Figure 6. AssureID workflow screens for simple-to-follow measurement procedures.

Ordering Information

FT-NIR Instrument	Description	Part Number
Spectrum Two N	High-performance fiber optic interface (includes probe stand for Spectrum Two N FT-NIR)	L1390041
Frontier	High-performance fiber optic interface (includes probe stand for Frontier FT-NIR" at the end)	L1250029
Fiber Probe Options	**Description**	**Part Number**
	High-performance remote solids probe 2 m fiber (with intelligent control)	L1390042
	High-performance remote solids probe 3 m fiber (with intelligent control)	L1390043
	High-performance remote solids probe 5 m fiber (with intelligent control)	L1390045
	High-performance liquids probe 1 mm pathlength	L1181316
	High-performance liquids probe 10 mm pathlength	L1181314
	Interchangeable solids/liquids probe. Solids tip included. Liquids tips available.	L1250071

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