Technical Specifications for Spectrum 100 FT-IR Spectrometer

Introduction

PerkinElmer FT-IR spectrometers are built to the highest ISO-9001 manufacturing standards. This document presents confirmed performance specifications based on 100% product factory testing. All instruments will meet or achieve better than the confirmed specifications, under normal conditions of use as described in the user manual.

The Spectrum™ 100 Series is the gold standard in FT-IR and FT-NIR spectrometers enabling laboratories to obtain the highest quality and most reproducible data with exceptional ease. A broad range of "plug-and-go" sampling accessories and software packages ensure the best solution for a range of applications. Whatever your specific laboratory requirements, the Spectrum 100 series delivers best-in-class accuracy, precision and reliability ensuring the utmost confidence in your results

Optical Performance

Wavelength range	7,800-350 cm^{-1} Optimized, proprietary KBr beamsplitter
	7,800-230 cm^{-1} CsI beamsplitter
	14,700-2,000 cm^{-1} CaF_2 optics

Signal-to-noise	35,000:1 RMS	1.2 x 10^{-5} Abs
	7,000:1 peak-peak	6.2 x 10^{-5} Abs

(4 cm^{-1} spectral resolution, 5 second data collection time, room temperature, KBr optics, DTGS detector)

Wavelength accuracy	Better than 0.1 cm^{-1} at 1,600 cm^{-1}

(1 scan accumulation, 4 cm^{-1} spectral resolution, measured peak maxima deviation from peak position @ 3060.02 cm^{-1})

PerkinElmer®
precisely.

Optical system

General	Sealed and desiccated optical unit. Vibration isolated baseplate.
Interferometer	Improved Michelson interferometer, self-compensating for dynamic alignment changes due to tilt and shear, incorporating high-reflectivity, first-surface aluminum-coated optics.
Optics	Kinematically mounted, zero alignment optics.
Mirrors	High reflectivity, first-surface, aluminum-coated optics incorporating a low-angle off axis design.
Detectors	Capabilities for two permanently installed detectors. Single software click to switch active detectors. Choose from: • Electronically, temperature-stabilized fast recovery deuterated triglycine sulfate (FR-DTGS) • Lithium tantalate ($LiTaO_3$) • Liquid-nitrogen-cooled mercury cadmium telluride (MCT) detector.
Source	Long-life source with proprietary hot-spot stabilization. User replaceable. • Quartz/halogen • Tungsten
Beamsplitter	• Extended range KBr • Extended range CsI • CaF_2 option available
Desiccant	Accepts disposable packs or rechargeable desiccant cartridges. Visible desiccant lifetime indicator.

Electronics

Signal sampling	Over-sampling, delta-sigma converter.

Data system

Communication	TCP/IP interface allows direct connection or a Local Area Network (LAN). Instruments are given their own unique IP address and can be controlled over the internet.
General	Windows® 2000 and Windows XP compatible.
Calibration transfer	Absolute Virtual Instrument (AVI) – actively standardizes instrument response to improve repeatability and protect data integrity.
Atmospheric compensation	Minimizes effect of atmospheric water and CO_2 on the sample spectra without the need for reference or calibration spectra.
Accessory recognition	Spectrum 100 accessories and ATR top plates are automatically detected as soon as they are locked into the sampling area. Instrument parameters are optimized for the installed accessory.
Error trapping	All sample spectra are checked for common spectroscopic and sampling problems. Key instrument components are continuously monitored.
Productivity	Look-ahead function automatically detects when a sample is placed into the sample compartment. Data is collected while the operator is entering sample information.

Bench details

Size	520 mm x 600 mm x 300 mm (W x D x H)
Weight	34 Kg

Software

General	A single software platform incorporates all of the functions required for infrared analyses; instrument control, data manipulation and analysis, and flexible report utilities. A suite of optional software packages provide advanced capabilities or functions designed for specific application areas.
Sample table	Increases productivity by enabling multiple samples to be defined in batches. Integrates with Go button allowing remote continuous operation.
User interface	Password-protected user login function. Access to methods and routines, menu, toolbar and toolbox functions can be controlled by a supervisor.
Reports	Quick print facility for graphs, spectra and results windows. User defined templates can be created to enable custom printed and electronic reports.
Processing	1st-4th derivative with a variable filter, smooth (Savitsky-Golay, moving average and triangular), difference, normalization, A, %T, %R, KM, LOG (1/R), ordinate modes, cm^{-1}, nm and micron abscissa modes, +,-,*,/, difference, baseline correction, smooth, deconvolution, normalize, apex, interpolate, blank, Kramers-Kronig, ATR correction, peak table, peak height and peak area.
Materials testing	Patented COMPARE™ spectral comparison algorithm and Euclidean searching available. Spectral searching against commercially available or customer developed libraries.
Quantitative analysis	Single frequency, method development software. Spectrum includes Beer's Law, PLS and PCR quantitative prediction.
User training	Full multimedia tutorials CD guides users through operation of the instrument and its accessories, and provides both an overview and detailed training on the software. Accessory training is accompanied by multimedia testing and certification. HTML tutorials provide additional training for common maintenance and software operation. Context-sensitive help provides assistance throughout the software.
Macros	IR Assistant guides users through analysis by selecting preferences from simple options presented to them. Spectrum Learn Mode allows custom procedures to be generated by development of a script or by recording mouse actions. These procedures can then be stored and repeated using a single mouse click.
Validation	Data processing Validation and Suitability CD contains test algorithm descriptions, test data and results for all Spectrum algorithms. Comprehensive IQ/OQ documentation and services available.

Optional software packages

21 CFR Part 11	Spectrum Enhanced Security™ (ES) software meets the technical requirements for the FDA's 21 CFR Part 11.
Macros	Advanced macro programming that provides access to instrument functionality through a graphical programming interface while also providing access to Microsoft®'s powerful Visual Basic® development environment.

Materials testing	AssureID™ – software designed for materials testing. Advanced features guide developers through building a robust, reliable materials testing method. A customizable wizard-style interface provides a risk-free environment for routine materials testing packages. OLE-DB compliant data storage.
Quantitative analysis	Spectrum QuantC™ for curve fitting and Spectrum Quant+™ for PLS and PCR quantitative method development. Includes Expert Assist for method troubleshooting.

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