

FT-IR Spectroscopy



Spectrum 65 FT-IR – Celebrating 65 Years of IR Excellence

Since the commercialization of our first IR system in 1944, PerkinElmer® FT-IR spectrometers are the standard by which all others are judged. In celebration of this 65 year achievement, we are proud to introduce our special edition FT-IR – Spectrum™ 65.

Simplicity of operation is at the core of the instrument design. This is achieved through new, state of the art software, while the spectrometer contains performance and reliability features previously unseen in a spectrometer at this price.

The Spectrum 65 provides the perfect combination of performance, reliability and ease of use required for everyday applications. If you need the highest value from your IR system, you will find the Spectrum 65 is ideal for the job.

Easily surmounts the challenges of everyday IR analysis

The Spectrum 65 effortlessly handles the IR measurement challenges of today's busy industrial and academic environments. Here's how:

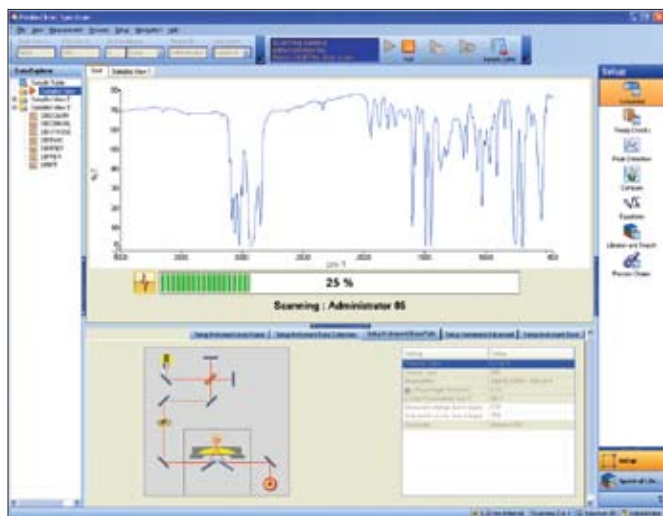


Figure 1. Spectrum 10 software allows simple data collection spectrum manipulation.

- **New full-featured software platform** designed for the busy operator who needs quality answers...fast. The sophisticated, yet simple new user interface provides single-press execution of even complex scan and analysis protocols, yet allows you to easily manage hundreds of spectra and results if required. The unique software desktop behaves like a desk which keeps *itself* tidy! The software is also backed by guided user tutorials and is available in a number of local language versions to minimize learning and simplify operation wherever the instrument is located.
- **Consistent high performance** ensures sensitivity in applications is achieved quickly and reliably – even when small spectral differences between materials need to be measured. The compact improved rotary interferometer design does not require mechanisms to correct for mis-alignment during the scan and provides superb spectral stability thanks to its inherent insensitivity to wear in the scanner bearing. This design is well established for its reputation in performance and reliability in over twenty thousand PerkinElmer FT-IR spectrometers worldwide. In addition to the interferometer engine, no compromises have been made with other critical optical elements such as source, optical mounts and detector, providing superb consistency in FT-IR performance.

- **Includes data integrity and system checks** to provide the highest levels of confidence in analysis. From internal automatic interferogram checks backed up by live spectrum quality checks through user-definable fitness-for purpose routines and optional system validation services, the Spectrum 65 provides the level of validation backup to suit your needs.
- **PerkinElmer's extensive instrument and applications experience** is embodied in the standard intelligent software routines, for example, COMPARE™ for materials identity confirmation (U.S. patent 5,023,804), improves on standard discrimination algorithms by including switchable automatic filtering to minimize effects of possible sampling artifacts thus increasing sensitivity and reliability of results.

Versatile for today's sample diversity. Upgradeable for tomorrow's new challenges.

The Spectrum 65 represents a gold star investment in IR analytical capability. The system is designed to accommodate a range of PerkinElmer dedicated, zero-alignment sampling stations like the best-selling Universal ATR accessory. In addition, the sample compartment is large enough to accommodate common third party sampling accessories including temperature-controlled devices, large gas cells, cryostats and more. Don't be constrained to using just a minor selection of single-supplier accessories. With Spectrum 65 – if it's a popular accessory, it will most likely fit directly into the instrument. Even many legacy sampling accessories from instruments such as the Model 1600 and Spectrum GX FT-IR systems can be used with Spectrum 65.

- **IR microsampling** is also fully supported without performance compromise, enabling measurement of microsamples and masked areas. Optional external beam steering optics allow direct connection to PerkinElmer MultiScope™ Systems. These systems incorporate high sensitivity detectors allowing sample areas down to ca 10 microns linear size to be delineated and easily measured. Research microscopy performance is now achievable using a routine analytical FT-IR bench.



Figure 2. Large sample compartment accommodates a wide range of sampling accessories.

Further upgrade pathways

When your needs demand a gear-shift to highest sensitivity, research performance, or customized sampling accessories, the Spectrum 65 provides further upgrade pathways. For highest sensitivity requirements and lowest energy throughput samples, an additional MCT detector can be installed simultaneously with the standard room temperature detector. This is also advisable for fast-scanning kinetics experiments which are also possible using the new Timebase version 3.1 software (Figure 3). In addition, further external beam input and output optics options provide for emission experiments and a General Purpose Optical Bench (GPOB) for custom accessories.

To maximize efficiency and minimize screen clutter, a fully configurable, high level 'Instrument Panel' allows you to setup which instrument parameters you need for easy access at the top of the screen, retaining less-used parameters at lower levels in the software (Figure 3).

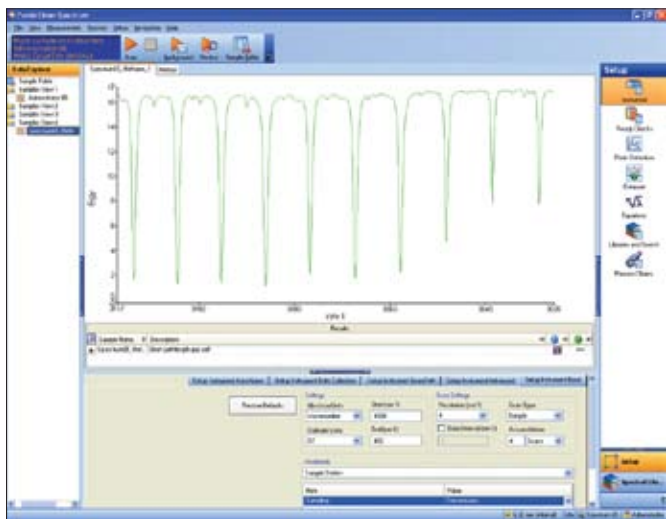


Figure 3. Simple screen layouts enable setting parameters without obscuring the important data.

Ideal for Academic and Learning Environments

The simple operation design of the Spectrum 65 makes this system ideal for academic or teaching environments. There are no external mechanical adjustments on the system. The spectrometer components are housed in a sealed and desiccated enclosure providing both protection and consistent optical performance. If required, the software can be 'locked down' to render the PC system a dedicated instrument controller using a dedicated configuration utility. Combined with fully configurable logins and strict user-rights, this system minimizes the risk of system mis-use and simplifies operation for busy 'walk-up and scan' teaching laboratories.

In addition to the excellent signal-to-noise and stability performance, the system provides spectral resolution of 0.5 cm^{-1} to allow basic gas phase rotation-vibration structure to be resolved in the common gas phase experiments. Kinetics experiments can be readily performed using the Timebase v3.1 software option providing sub-second time resolution and special kinetics setups such as external triggering of scanning, real time processing and extensive 3-D display options. For sub-second time resolution experiments, a faster response liquid nitrogen cooled MCT detector may be permanently installed alongside the standard room temperature device to allow rapid beam switchover between standard and cooled detectors

A range of specially configured sampling 'Starter Kits' for academic and teaching laboratories are available, providing the tools needed for simple sampling of solids, liquids, mulls and gases used in standard laboratory experiments. For academic use, additional sampling robustness can be achieved by using PerkinElmer's Universal ATR sampling incorporating diamond crystal or single-bounce ATR designs using ZnSe or germanium crystals. In addition, a special Educational Software package provides the basic software and 'IR Tutor' package demonstrating the fundamentals of FT-IR and spectral interpretation, available in single and multi-user licenses for off-line data analysis and teaching.

Upgrade options also include a Spectrum 100 performance upgrade kit to provide top of the range analytical power featured in the market-leading Spectrum 100 systems.

Software versatility

Unmatched versatility does not stop with the instrument hardware. A unique Equations Editor allows rapid setup of multi-step custom calculations with no programming, and simple macro building in the standard software allows these operations to merged with data collection and reporting. Complete analytical procedures can be quickly reduced to a single click with no knowledge of macro-programming whatsoever.

Our philosophy of providing a simple interface to third party accessories extends beyond the Spectrum 65 sample compartment and external beams to include our software design. For example, our 'Send To' features allow spectra to be sent directly to Sadtler® advanced search and spectrum interpretation software with access to the world's largest database of spectral information, and selected results such as COMPARE™ hit scores can be sent to third party spreadsheets to allow simple graphing of trends of almost any value calculated in the Spectrum 10 software.

Quality engineering and reliability from a trusted leader in routine FT-IR

PerkinElmer has pioneered low maintenance, high performance interferometer design since our first FT-IR system. The Spectrum 65 continues this design philosophy with the latest development of a simple rotary scanner which requires no complex dynamic alignment mechanisms. The only moving part which can wear is located such that any wear effects are non-critical to interferometer alignment, ensuring consistent operation over many years. Today the 65 adds further advances to improve reliability and performance – and at a price which represents more value than competing instruments.

Advancements include:

- **Automatic water vapor compensation (AVC)** using a sophisticated algorithm which requires no re-calibration when changing instrument conditions, unlike other systems available. Virtually eliminates the need for purge gases, cutting cost of ownership and improving data quality in the water vapor regions
- **Attention to critical components** as used with more expensive research systems. Examples include proprietary source hot spot stabilization, and convection current control to minimize drifts arising from source related issues, and the use of kinematic mounts for critical optical components – these are some of the critical components which combine to provide improved scan stability and ultimately, confidence in results. Advanced modern digital sampling electronics using sigma-delta sampling technology serve to further improve spectral fidelity especially with more challenging highly absorbing samples.
- **Minimal maintenance design**, backed up by on-demand component diagnostic tests with report logs. In the event of unplanned maintenance, common replacement components such as windows, desiccant pack, source and laser are user-replaceable.

Extending a long heritage of affordable, dependable IR systems

Beginning with the commercialization of the Model 12 IR spectrometer in 1944, PerkinElmer has maintained a long line of dependable, affordable IR spectrometers which have served thousands of laboratories worldwide. The special edition Spectrum 65 FT-IR model continues that lineage with a combination of new software and hardware design features which matter most for the everyday IR analyst, making it the IR system of choice for the value-conscious laboratory.

PerkinElmer, Inc.
940 Winter Street
Waltham, MA 02451 USA
P: (800) 762-4000 or
(+1) 203-925-4602
www.perkinelmer.com



For a complete listing of our global offices, visit www.perkinelmer.com/ContactUs

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