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**عطاء رقم 32/ل ر/2021**

**توريد وتركيب وتشغيل جهاز FTIR/ كلية الهندسة**

**المواصفات الفنية:ـ**

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## OPTICAL PERFORMANCE

Wavelength Range 8,300 – 350 $cm^{-1}$ optimized, proprietary KBr beamsplitter 6500-550 cm-1 with ZnSe optics

Spectral Resolution 0.5 $cm^{-1}$ standard

Wavelength Precision Better than 0.01 $cm^{-1}$ at 3000 $cm^{-1}$

Wavelength Accuracy 0.1 $cm^{-1}$ at 3000 $cm^{-1}$

Signal-to-noise 9,300:1 peak-peak, 5 seconds

32,000:1 peak-peak, 1 minute

14,500:1 peak-peak, 5 seconds

50,000:1 peak-peak, 1 minute

with optional performance pack

## OPTICAL SYSTEM

General Long-life sealed and desiccated optical unit, Vibration isolated baseplate.

Interferometer Rotary Michelson interferometer, High stability, self-compensating for dynamic alignment changes due to a tilt and shear.

Optics Kinematically mounted, zero alignment optics, with high reflectivity and a low-angle off axis design.

High linearity room temperature detector (standard) Temperature-stabilised room temperature DTGS detector optional.

Source Long-life source with proprietary hot-spot stabilization. User replaceable from outside instrument

Beamsplitter Proprietary extended range KBr.

Desiccant Long-life desiccant system accepts disposable packs. Software controlled desiccant status indicator.

Validation Software controlled validation wheel option containing a polystyrene reference material, traceable to a NIST standard for wavenumber accuracy and a Schott NG11 filter for ordinate repeatability.

Optical Windows KBr (standard), ZnSe option for exceptionally high humidity environments

## DATA SYSTEM AND ELECTRONICS

Signal sampling Over-sampling delta-sigma converter.

Communication USB, wireless and TCP/IP interface allows direct connection with LAN. Instruments can be configured with wireless router communication.

Calibration Transfer Absolute Virtual Instrument (AVI) option – actively standardizes instrument response to further 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. Operates at various instrument settings without having to recalibrate the correction.

Accessory recognition: accessories are automatically detected as soon as they are locked into the sampling area. Instrument parameters are optimized for the installed accessory. Accessories information stored with spectral data.

Error Trapping All sample spectra are checked for common spectroscopic and sampling problems. Key instrument components are continuously monitored.

Component Checks Individual component checks under software control can be executed on-demand or automatically scheduled at preset times/intervals

Powersave mode Instrument standby and power-up can be automatically scheduled.

## BENCH DETAILS

Size 450 mm x 300 mm x 210 mm (W x D x H).

Weight 13 kg

Power supply Universal voltage power supply enables operation from mains. Optional rechargeable battery pack for remote operation, chargeable from mains or car battery. Optional power pack also serves as an Uninterrupted Power Supply (UPS).

Operating Range 10-35 C

Typical desiccant lifetime 5 years at 25 C and 90% relative humidity.

## 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. Optional Spectrum Touch functionality optimised for touchscreen operation allows simple user interface for turnkey operation with selected applications.

Sample Table Increases productivity by enabling multiple samples to be defined in batches facilitating 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. Send to Word functions for simple formatting via Microsoft Word.

Processing $1^{st}$-$4^{th}$ 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, interpolate, blank, Kramers-Kronig, ATR correction, peak table, peak height and peak area. Cell Pathlength data command, enables effective handling of cell pathlength with demountable transmission cells.

ScanalyseTM Enables real time update of spectral information plus results to provide faster feedback of information data status.

Materials testing Patented COMPARE™ spectral comparison algorithm and Euclidean searching. Spectral searching against commercially available or customer-developed libraries.

Quantitative analysis Single frequency, method development software. Spectrum includes Beer's Law, and chemometrics-based quantitative prediction.

Validation Instrument performance, user configurable system suitability routines and international Pharmacopeia test methods available in standard software. Instrument Scheduler facility allows auto-programming of instrument validation testing.

Macros Macro Editor and Equations Editor provide the ability to setup sequences of data collection and custom spectral processing. These procedures can then be stored and repeated using a single mouse click. Spectrum Touch user interface software for exceptional ease of use in touchscreen-driven and handheld PC driven systems.

User training Instrument use, common maintenance and software operation. Context-sensitive help provides assistance throughout the software. Optional packages include IR Introductory Kit for faster self-learning, Educational Package for more comprehensive learning and on-site assisted learning programs.

## Software packages

21 CFR Part 11 Spectrum 10 Enhanced SecurityTM (ES) software meets the technical requirements for the FDA's 21 CFR Part 11 with SQL database audit trail and data storage/retrieval.

Sample Analysis Workflows AssureID™ software designed for FT-IR materials testing and product verification. Simple turnkey Compare, SIMCA, quantitative analyses with user defined instructions and reports can be readily configured. OLE-DB compliant data storage with ES and non-ES versions available for 21CFR11 compliance.

Quantitative analysis Spectrum Quant for chemometrics-based quantitative method development. Includes Expert Assist for method troubleshooting.

Validation CD Data validation CD contains test algorithm descriptions, test data and results for data transform algorithms. Comprehensive IQ/OQ documentation and services available.

## Application and Learning Packages

Accelerated learning IR Introductory Kit, Educational Package and on-site assisted learning options available. Application-specific packages and options tailored for pharmaceuticals analysis, polymer analysis, nutraceuticals, used oils, fuels and environmental hydrocarbon analysis available. See separate literature in individual packages for further details

## ATR diamond

A universal attenuated total reflectance (ATR) for direct analysis of both solid and liquid samples, without sample prep. The UATR produces high quality spectra through the use of a pressure arm allowing good contact of the sample with the diamond crystal. The pressure arm force indicator ensures first-class sample-to-sample and operator-to-operator reproducibility.

Features of the UATR:

1) Automatic recognition - as soon as the accessory is placed in the sample compartment the Universal ATR module is recognized along with its unique number, and system suitability checks can be carried out.

2) Zero alignment, zero set-up - once locked the system is ready to be used without any alignment necessary.

3) Integrated - the plug-in module design means the accessory becomes an integral part of the instrument once installed.

4) Pressure arm with pressure sensor supplied as standard. Live spectral preview mode and force readout in Spectrum ensures good contact before scanning.

**<u>PC</u>**
i3 PC + 22" LED