

Raw Material ID Analyzer



Configuration of the System

Performance

- Spectral range: 3800 to 12000 cm^{-1}
- Wavenumber reproducibility: 0.04 cm^{-1} at 7300 cm^{-1} ($\pm 2\sigma$)
- Wavenumber repeatability: $\pm 0.002 \text{ cm}^{-1}$ ($\pm 2\sigma$)
- Calibration transferability test: All NIR models will reproduce the absorbance spectrum of toluene (4100-6000 cm^{-1}) in a 0.5 mm cell at $28^\circ\text{C} \pm 1^\circ$ to within 0.002 A when compared with any other NIR unit.
- NIR RMS-noise absorbance at peak response is typically 4 μA for 1 min scan time, 16 cm^{-1} resolution, open beam.
- 100% line reproducibility is within 0.1% in the 8000 to 4500 cm^{-1} range for NIR models, for 2 consecutive measurements.
- 100% line long-term stability is affected only by temperature change. Temperature coefficient of change in 100% line is 1% / 1°C at 8000 cm^{-1} .
- Resolution selectable from 2 (NIR mode) to 64 cm^{-1} (apodized resolution) in steps of 2x.
- Arid-Zone main sample compartment with "Open-architecture" provides free space for accessories.

- Overall dimensions (WxDxH): 50.8 cm x 56.5 cm x 30.4 cm (20 in. x 22 1/4 in. x 12 in.)
- Weight: 44 kg (96 lb.)

Interferometer

- Four port optical design. Eliminates retro-modulation induced artifacts. Patented Michelson-type interferometer with 2 cube corner retro-reflectors mounted on a "wishbone" swing arm.
- Factory pre-aligned interferometer and input/output optics; does not require adjustment by user.
- Scanning is done by rotating the swing arm, driven by an induction motor, on a flex pivot bearing. This provides smooth, constant-velocity, perturbation-free scanning. The scanning mechanism has a lifetime warranty against breakage and wear-out. The swing arm is balanced to permit operation in any orientation.
- Self-compensating, single-plate beam-splitter/compensator.
- He-Ne reference laser for digital sampling, mirror velocity control, quadrature detection of scan direction, and fringe counting for path difference determination.
- Diagonal mirror with flipper mechanism to switch to side port beam.

Accessories

ACC102 Hand-Held Diffuse Reflectance Probe

- Includes probe with handle
- Must be mounted on an FTLA2000-160 spectrometer
- Fiber-optic interface mounted on included OUTPORT
- TE-Cooled InGaAs detector
- 1.8 meter standard-length FO cable, 5.0 meter optional length (model PH30A)
- Overall dimensions (WxDxH): 20 cm x 41 cm x 24 cm (7.9 in. x 16.1 in. x 9.4 in.)
- Weight: 8.5 kg (18.7 lb.)

Computer

- Pre-loaded Pentium 4 desktop Computer
- Two Ethernet interfaces
- Windows 2000 Service Pack 4 or Windows XP Service Pack 1
- 256 MB RAM minimum
- 20 GB Hard Drive minimum
- CD-ROM 48X
- 15" flat panel monitor or better
- Consult factory for updated specifications

Software

- GRAMS-AI7 version 7.00 data acquisition and spectroscopic package
- PLSPlus/IQ version 5.10 chemometrics package
- AIRS version 3.1 QA/QC data acquisition and reporting package

The software package includes functions that facilitate the use of the system in a 21 CFR Part 11 compliant environment. Complete software validation documentation is available as an option.

Options

- Accessories for temperature-controlled liquids accessories (ACC131, 122, 132, 118)
- Powder Sample^{IT} diffuse reflectance accessory for solids and powders analysis (ACC101)
- Validation standards (RSS05010, SRM2036)
- Installation (RMID-A & RMID-B)
- Modeling and Application support (RMID-Cal, APPSUP-3)
- Documentation (DOC-EQ, DOC-AIRS, DOC-OP, VALDOAIRS3)

- Validation services
- Preventive maintenance contracts

Performance

- Spectrometric technique: Fourier Transform near-infrared
- Sampling Solids: diffuse reflection measurement
- Sampling Liquids: transmission measurement
- Scan rate: 137 spectra/min at 32 cm⁻¹
- The calibration spectra are generally acquired at a resolution of 16 cm⁻¹ using 4 to 16 co-added scans (2 to 9 s acquisition time).

Calibration

- It takes approximately 3 to 4 weeks for a trained calibration developer to calibrate and the analyzer for 30 products, depending on the complexity of the discrimination. The steps required to build and implement the models are:
 - Family classification
 - Calibration and validation sample collection
 - Spectrum acquisition and interpretation
 - Data pre-processing
 - Modeling
 - Acceptance criteria settings

Operating environment

- AC input: 120 or 240 V manually selectable
- Power consumption: 150 W
- Ambient temperature: -15° to 50°C non-operating, 5° to 30°C operating stable within ±5°C
- Relative humidity (operating): 0% to 95% non-condensing.

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