7000 FTIR
Fourier Transform Infrared Analyzer

The 7000 Series FTIR Analyzer delivers fast, accurate analysis of virtually any gas that has an infrared absorption spectrum.

Features

- Proven, rugged interferometer with gold mirrors
- 1 Hz live data output
- Live color-coded spectrum while scanning
- Live residual spectrum while scanning
- 0.5 wave number (cm^{-1}) resolution
- Heated sample cell (50° or 191°C)
- Internal computer controlled with Symbion and OPUS software
- High sensitivity with 10.2-meter optical path
- Pressure compensation
- Options include:
  - Analog output module
  - Intelligent multi-point sampler
  - Sample handling accessories
  - System integration

Examples of Gases Analyzed

- Carbon Dioxide
- Carbon Monoxide
- Nitric Oxide
- Nitrogen Dioxide
- Sulfur Dioxide
- Nitrous Oxide
- Hydrogen Chloride
- Ammonia
- Methane
- Propane
- Moisture
- Ethane
- Ethanol
- Ethylene
- Propylene
- Toluene
- Acetylene
- Chloroform
- Dichloroethylene
- Ethyl Benzene
- Methyl Ethyl Ketone
- Formaldehyde
- Sulfur Hexafluoride
- Phosgene
- Vinyl Chloride
- R134A
- Others upon request

7000 FTIR

Fourier Transform Infrared Analyzer

Description

The California Analytical Instruments 7000 FTIR Analyzer provides fast, continuous and stable analysis of virtually any gas that has an infrared absorption spectrum. The proprietary heated sample cell enables the instrument to accommodate hot samples containing high levels of moisture.

The 7000 FTIR can serve a variety of analytical applications, including automotive, diesel emissions, CEM monitoring, ammonia slip, SCR inlet/outlet monitoring, process monitoring and others.

Method of Operation

The 7000 FTIR Analyzer is based on Fourier Transform Infrared Spectroscopy. Nonsymmetrical gas-phase molecules absorb IR light, causing the molecular bonds to stretch, bend or rotate. This absorption is used to measure and quantify several chemical components simultaneously.

An IR source emits radiation in the range of 7500 to 375 cm^{-1}. The IR radiation is split in an interferometer, where the light is split toward two moving corner-cube mirrors. The two beams recombine and pass through a 10.2-meter multi-reflection gas cell where the sample absorbs light at molecule-specific frequencies. The remaining light is measured with an MCT detector and Fourier transformed to convert from the time domain to the frequency domain. This produces a single-beam spectrum that is ratioed with a baseline spectrum, producing an absorbance spectrum. The absorbance spectrum is quantified with PLS chemometrics to produce a concentration value.

Software

The 7000 FTIR uses a combination of Symbion software and OPUS software. Symbion software includes RTM (Real Time Monitor) and QT Builder (Quant Builder). RTM is used to rapidly scan and output data a 1 Hz or greater for many components. RTM has enhanced capability to display a live spectrum with color-coded analysis regions and includes the ability to see a live residual for each component.

The software is very customizable to allow many types of outputs and calculations. QT Builder is an automated quant method builder that can build, optimize and analyze quant methods. OPUS software is used to analyze spectra with exceptional ease. It allows all common spectral analysis tools to be used on mulitple spectra at the same time.

Specifications

Analysis Method – Fourier Transform Infrared (FTIR)
Components – Multiple gases
Interferometer – Rocksolid,™ permanent alignment, high stability with cube corner reflectors and non-wear bearing for long life
Detector Type – MCT-A
Ranges – From ppb to percent
Response Time – From approximately <1 second to 5 minutes, depending upon sensitivity
Spectral Resolution – 0.5 cm^{-1} to 128 cm^{-1}
Spectral Range – 305-7500 cm^{-1}
Control – PC, Windows XP or higher
Sample Flow – Typically 0.2 to 5 lpm
Ambient Temperature – 5° to 40°C
Ambient Humidity – Less than 90% RH (non-condensing)
Power Requirements – 115 VAC/60Hz or 230 VAC/50Hz
Dimensions – 10.5”H x 19”W x 28”D
Weight – Approximately 127 lbs.

Gas Cell

Construction – 316 Stainless Steel (50°C or 191°C)
Volume – 550 cc
Effective Pathlength – 10.2 meters
Mirrors – Gold-plated SS 316
Windows – ZnSe standard, others available
O-rings – Parafluor
Inlet/Outlet Connections – 3/8” tubing
Purge Fittings – ¼-inch Swagelok® compression

Specifications subject to change without notice.

California Analytical Instruments
1312 West Grove Ave., Orange, CA 92865
Phone: 714-974-5560 • Fax: 714-921-2531
www.gasanalyzers.com