CAI offers three FTIR models that deliver fast, accurate measurement of virtually any gas with an infrared absorption spectrum.

**FTIR Analyzer Features**
- Proven, rugged interferometer with gold mirrors
- No liquid nitrogen required
- 0.8 wave number (cm\(^{-1}\)) resolution
- Heated sample cell (50° or 191°C) handles hot/wet samples
- Measures 20+ gases simultaneously
- Rack-mount PC or laptop-controlled
- Variety of sample cell optical path lengths
- Low acquisition and operating costs

**Applications**
- Process control
- Stack gases (CEM / MACT)
- VOC abatement/scrubber efficiency
- Vehicle emissions
- Ammonia slip
- Gas purity
- Agricultural emissions
- Greenhouse gases
- Biomass / landfill gases
- Custom applications

**Examples of Gases Analyzed**
- Formaldehyde
- Hydrogen Chloride
- Ammonia
- Carbon Dioxide
- Carbon Monoxide
- Nitrogen Dioxide
- Nitric Oxide
- Nitrous Oxide
- Sulfur Dioxide
- Methane
- Propane
- Butane
- Ethane
- Ethanol
- Ethylene
- Propylene
- Toluene
- Acetylene
- Chloroform
- Dichloroethylene
- Ethyl Benzene
- Methyl Ketone
- Sulfur Hexafluoride
- Phosgene
- Vinyl Chloride
- R132A

**Many Additional Gases are Available – Contact CAI**
California Analytical Instruments FTIR analyzers deliver fast, continuous and stable analysis of virtually any gas that has an infrared absorption spectrum. The proprietary heated sample cell allows the instrument to accommodate ambient to hot samples containing high levels of moisture. Unlike other FTIR analyzers, CAI FTIR models do not require liquid nitrogen, eliminating the need to constantly fill LN2 dewars and the associated safety issues. Their small footprints and light weights allow easy installation and transportability when required.

### Method of Operation

CAI FTIR analyzers are based on Fourier Transform Infrared Spectroscopy. Non-symmetrical 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 a Michelson interferometer, where half of the light passes through to a fixed mirror and the other half is reflected toward a moving mirror. The two beams recombine and pass through a gas cell where the sample absorbs light at molecule-specific frequencies. The remaining light is measured with a DTGS detector and Fourier transformed to convert from time domain to frequency domain. This transformation produces a single-beam spectrum ratioed with a baseline spectrum, and produces an absorbance spectrum. The absorbance spectrum is quantified with chemometrics to produce a concentration value.

### Specifications

<table>
<thead>
<tr>
<th>Analysis Method</th>
<th>Fourier Transform Infrared (FTIR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Components</td>
<td>Multiple gases</td>
</tr>
<tr>
<td>Interferometer</td>
<td>Rocksolid,™ permanent alignment, high stability with cube corner reflectors and non-wear bearing for long life</td>
</tr>
<tr>
<td>Detector Type</td>
<td>DTGS</td>
</tr>
<tr>
<td>Ranges</td>
<td>From ppb to percent</td>
</tr>
<tr>
<td>Response Time</td>
<td>From approximately 10 seconds to 5 minutes, depending upon sensitivity</td>
</tr>
<tr>
<td>Spectral Resolution</td>
<td>0.8 cm(^{-1}) to 128 cm(^{-1})</td>
</tr>
<tr>
<td>Spectral Range</td>
<td>305-7500 cm(^{-1})</td>
</tr>
<tr>
<td>Outputs Available</td>
<td>4-20 mA, 0-10V, OPC, CSV</td>
</tr>
<tr>
<td>Control</td>
<td>PC, Windows XP or higher</td>
</tr>
<tr>
<td>Sample Flow</td>
<td>Typically 0.2 to 5 lpm</td>
</tr>
<tr>
<td>Ambient Temperature</td>
<td>5° to 40°C</td>
</tr>
</tbody>
</table>

CAI’s support team is available for prompt application and technical support. Our proprietary software program enables remote access by computer at CAI, allowing immediate diagnosis and correction of any calibrations or other instrument performance issues.

<table>
<thead>
<tr>
<th>Ambient Humidity</th>
<th>Less than 90% RH (non-condensing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Requirements</td>
<td>115/230 VAC (+/- 10%), 50/60 Hz</td>
</tr>
</tbody>
</table>

### Gas Cell

<table>
<thead>
<tr>
<th>Construction</th>
<th>316 Stainless Steel (50°C or 191°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mirrors (700 and 600 FTIR only)</td>
<td>Gold-plated SS 316</td>
</tr>
<tr>
<td>Windows</td>
<td>ZnSe standard, others available</td>
</tr>
<tr>
<td>O-rings</td>
<td>Parafluor</td>
</tr>
<tr>
<td>Inlet/Outlet Connections</td>
<td>(\frac{3}{8}), (\frac{1}{4}), (\frac{1}{2}) (cell dependent)</td>
</tr>
<tr>
<td>Purge Fittings</td>
<td>(\frac{1}{4})-inch Swagelok® compression</td>
</tr>
</tbody>
</table>

Specifications subject to change without notice.
CAI offers complete systems featuring FTIR, hydrocarbon and oxygen analyzers.

<table>
<thead>
<tr>
<th>Feature</th>
<th>700 FTIR</th>
<th>600 FTIR</th>
<th>600 SC FTIR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Path Length</td>
<td>10.2 m</td>
<td>4.3 m</td>
<td>8.2 cm</td>
</tr>
<tr>
<td>Volume</td>
<td>550 cm³</td>
<td>880 cm³</td>
<td>22 cm³</td>
</tr>
<tr>
<td>Dimensions</td>
<td>10.5&quot;H x 19&quot;W x 28&quot;D</td>
<td>8&quot; H x 19&quot;W x 24&quot;D</td>
<td>8&quot; H x 19&quot;W x 18&quot;D</td>
</tr>
<tr>
<td>Max Resolution</td>
<td>0.8 cm⁻¹</td>
<td>0.8 cm⁻¹</td>
<td>0.8 cm⁻¹</td>
</tr>
<tr>
<td>Gas Cell Temp</td>
<td>50°C or 191°C</td>
<td>50°C or 191°C</td>
<td>50°C or 150°C</td>
</tr>
<tr>
<td>Flow Rate Range</td>
<td>1-10+ lpm</td>
<td>3-10+ lpm</td>
<td>0.05-1 lpm</td>
</tr>
<tr>
<td>Recommended Flow Range</td>
<td>2 lpm</td>
<td>3.5 lpm</td>
<td>0.5 lpm</td>
</tr>
<tr>
<td>Options</td>
<td>None</td>
<td>None</td>
<td>Pump.02 (50°C only)</td>
</tr>
<tr>
<td>Best Fit</td>
<td>PPB to low-ppm levels</td>
<td>Low to high PPM levels</td>
<td>High ppm to high % levels, low simple volumes</td>
</tr>
</tbody>
</table>

700 FTIR Internal View.
FTIR Sample Handling Accessories

700 FTIR Heated Sampler
- Specifically designed for maintaining optimal sample handling on CAI FTIR analyzers
- Temperature control for oven, pump, internal heated sample line (up to 10 ft. between sampler and analyzer) and heated jacket
- Critical components heated to 191°C
- Single heated-head pump (7.0 lpm)
- T-handle heated filter on front panel for easy access and replacement
- Heavy-duty, high-temperature-resistant flow meter
- Calibration solenoid valves for zero, span and bias calibrations
- Remote / local calibration control
- Electrically actuated ball valve for switching between sampling and calibration modes
- Stainless-steel tubing and ¼-inch SS bulkhead connections
- Digital I/O including temperature alarm outputs
- Optional remote control via Modbus TCP or external software
- 19-inch rack-mount, fan-cooled enclosure (17”W x 22”D x 8.5”H)

700 Temperature Control Accessory
- Provides temperature control circuits for external heated sample line and filter

700 Multi-Point Sampler
- 4, 8, 12 or 16 sample points are available through solenoid valve switching
- 7” TFT LCD touch screen
- LCD displays active sample point with time-remaining countdown
- Selectable sample time and sample stream identification
- Remote control via digital inputs, Modbus TCP or external software

700 I/O Module
- Converts the digital signal from OPUS Software to either voltage (0 - 10 V) or current (4 - 20 mA)
- Adds Modbus TCP capability
- 16 analog outputs, 8 digital inputs, 8 digital outputs or 24 analog outputs