

Modular gas sampling system

Fast, accurate solutions for FTIR gas analysis

Flexible gas sampling options to meet the unique requirements of each application

The Thermo Scientific™ Modular Gas Sampling™ system allows scientists and engineers to design an accurate, reproducible gas analysis system based on their unique requirements. The system delivers a complete, turn-key FTIR system for environmental, industrial, or specialty gas analysis. Accurate gas analysis requires that the gas samples are maintained at a constant temperature and pressure through the entire sample system. The Modular gas sampling system components provide the tools to configure a reliable gas sampling system specific to a customer's unique requirements. Alternately, only those sample components required to integrate an FTIR into an existing analyzer scheme may be sourced.

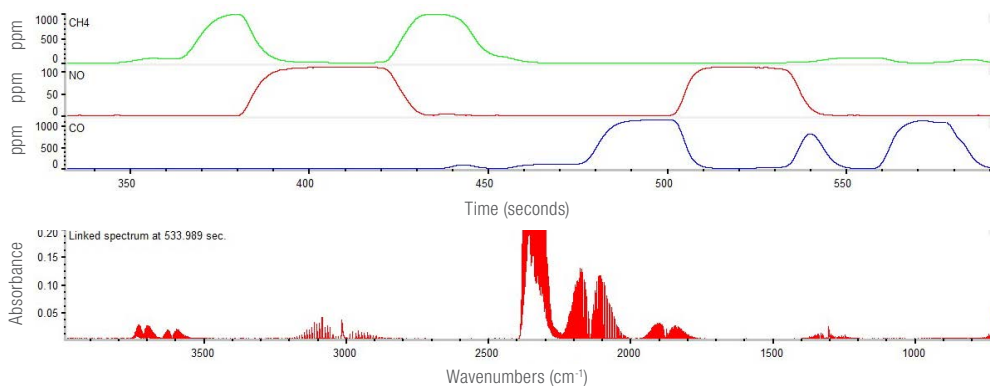
FT-IR spectroscopy offers several key advantages for gas measurements, including

- Multiple gases in a single sample—up to 30 gases of interest in a single measurement
- Broad dynamic range—from percent levels to parts-per-billion
- Fast, convenient sampling—flow gas samples directly to the FTIR from the sample source, without tedious data collection/chemical derivatization, or need for solvents
- Advanced data analysis techniques—ensure data integrity with statistical confidence limits, interference rejection, and ability to adjust methods for different chemical composition

The **Gas Control Panel** provides a simple, logical interface for user control of gas temperature, pressure, and flow rates for gas sample streams or calibration/validation inputs.



Complete dedicated solution for gas analysis. TFS Modular Gas Sampling system configured with Antaris IGS FTIR spectrometer



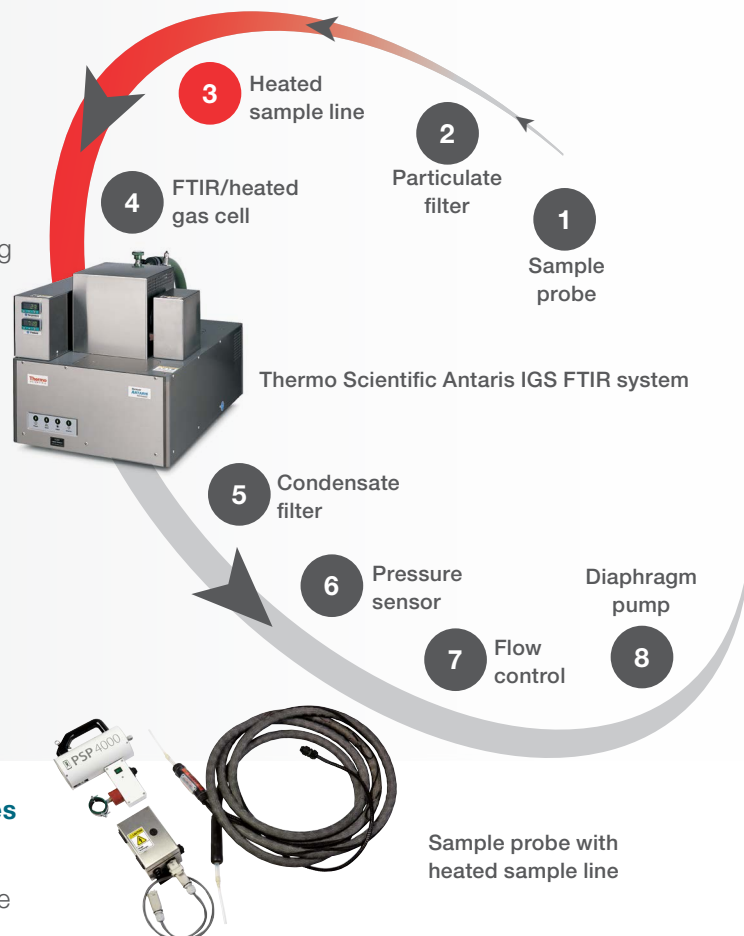
FTIR spectroscopy provides continuous on-line analysis of multiple gas components. TFS offers dedicated calibrations for turn-key analysis of specified components

Practical considerations for gas sampling

Accurate gas-phase analysis requires that the gas samples be delivered reproducibly through the gas cell of the FTIR. Special care is given to maintain a constant temperature throughout the sample chain, particularly for hot gases from combustion, as cold spots can cause water vapor or other high boiling compounds to condense. Combustion samples also are often dirty with partially oxidized particulates, which can clog the sample lines or coat the gas cell, decreasing energy throughput and sensitivity. For all gas samples, repeatable pressure and flow through the gas cell are important to reduce variation in predicted results.

Key components of a FTIR Gas Sampling system

1. Sample probe—connects to the sample spot (smoke chamber, chimney, exhaust flue).
2. Particulate filter—removes solid particles from gas stream. Heated to avoid condensation
3. Heated sample line—1 to 10 meters heated line to bring gas from the sample point to the FTIR
4. FTIR/heated gas cell—constant temperature and pressure required for accurate sampling
5. Condensate filter—removes water and other condensing gases
6. Pressure sensor—used to measure/control sample pressure in the gas cell
7. Flow control valves /flow meters—used to select sample inlet and set flow rate
8. Diaphragm pump—creates vacuum to pull gas sample through the MGS system



Example configuration for analysis of combustion gases

- Stainless steel probe mounted to a smoke chamber or cone calorimeter
- Entire sampling system heated to 180 °C
- Heated soot filter, 2 micron
- Heated sample line, 3-meter length, 4 mm ID, PTFE
- Secondary soot filter into gas cell
- Gas cell, 2 meters pathlength, 200 ml volume
- Pressure maintained at 650 mmHg
- FTIR sampling resolution, 0.5 cm⁻¹
- Certified traceable Fire Science calibration
- Flow rate, 1.5 liters/minute
- H₂O condenser
- Diaphragm pump

Customized solutions from Thermo Fisher Scientific

Let TFS work with you to design customized sampling solutions, such as an automated multi-channel operation for industrial process monitoring applications. The FTIR integrates into a client/server network, providing gas concentration values and system diagnostics to external clients such as Digital Control Systems (DCS) or Programmable Logic Controllers (PLC). You can rely on Thermo's global applications and service network for training and support worldwide. Contact your local TFS sales/service representatives for more details.

Find out more at [thermofisher.com/gas](https://www.thermofisher.com/gas)

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