

# Breathing oxygen

## Quality control by FTIR spectroscopy

Fourier transform infrared (FTIR) spectroscopy is a powerful technique to analyze the purity of gas samples used in industrial applications. FTIR analysis is fast and precise, with minimal sample handling requirements.

An example of Thermo Fisher Scientific's FTIR analytical capabilities is the analysis of breathing oxygen (ABO) for contaminants. The entire process of oxygen production distribution must be carefully controlled to maintain high-purity O<sub>2</sub> without contaminants that can cause safety or health hazards. For example, contaminants like methane (CH<sub>4</sub>) or acetylene (C<sub>2</sub>H<sub>2</sub>) may pose risks of combustion or explosion. Other common contaminants in oxygen include chlorofluorocarbon/hydrochlorofluorocarbon (CFC/HCFC, or Freons) used as solvents or refrigerants.

Thermo Fisher Scientific provides FTIR ABO systems that meet the highest military quality control standards of US and NATO forces for aviator breathable oxygen, and the solution can be extended to certify oxygen or breathing air cylinders used by firefighters, scuba divers, etc.

The high-spectral resolution and broad bandwidth of an FTIR spectrometer allow it to analyze these gases and more in a single spectrum (Figure 1 shows example quantitative results).

Component	Concentration (ppm)	Component	Concentration (ppm)
Methane	45.35	Nitrous oxide	3.97
Ethane	5.48	Carbon monoxide	0.17
Ethylene	0.86	Water	2.76
Acetylene	0.17	Freon-141b	0.00
Propane	0.00	Sulfur hexafluoride	0.00
Propane	0.09	Freon-225	0.00
Freon-11	0.02	SurePrep	0.00
Freon-12	1.90	PFBI	0.00
Freon-13	1.97	Freon-134A	0.00
Freon-22	2.09	Freon-125	0.00
Freon-113	0.21	Solstice	0.00
TCETA	0.19	Carbon Dioxide	9.42
TCETA	0.00		

Figure 1: Example of quantitative results



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