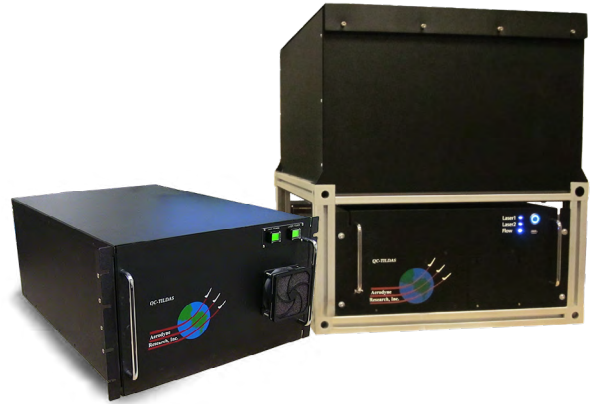


TILDAS Ethylene Oxide Analyzers

Ultra-sensitive and highly specific real-time measurements of EtO at parts-per-trillion level in ambient air



TILDAS TECHNOLOGY

Aerodyne instruments use **tunable infrared laser direct absorption spectroscopy (TILDAS)** at mid-IR wavelengths to probe molecules at their strongest “fingerprint” transition frequencies. We further enhance sensitivity by employing a patented multi-pass broad-band absorption cell that provides optical path lengths up to 400 meters. Direct absorption spectroscopy allows for fast (<1 sec) absolute trace gas concentrations without need for elaborate calibration procedures. Moreover, TILDAS instruments are relatively free of measurement interference from other molecular species, enabling extremely specific detection.

Applications

- Process control
- Fence-line monitoring
- Community monitoring
- Stationary and mobile applications

Advantages

- Real time EtO measurements
- Fast time response (up to 0.1 s)
- No sample preparation
- No preconcentration
- Best detection limit on the market*
 - < 75 ppt in 1 second
 - < 20 ppt in 100 seconds
- < 10 ppt longer-term averaging with frequent auto-backgrounds on scrubbed air

* Requires extra long 413m path cell model

TILDAS

- Rugged, field-ready instruments
- Direct absorption spectroscopy allows for highly specific and accurate gas detection
- Mid-IR detection enables maximum measurement sensitivity
- Time response up to 10 Hz enables eddy covariance studies
- Spectroscopic accountability: fingerprint spectrum for unambiguous measurement
- Powerful TDLWintel software provides flexible instrument control and real-time data analysis
- Valve control capable of complex scheduling and automatic background and calibrations
- 19" rack mountable for easy installation
- Turn-key design allows unattended operation in remote field sites

TILDAS Ethylene Oxide Analyzers

Specifications

Process/Fence-line monitor

TILDAS-CS platform

76 m pathlength

< 300 ppt (1σ in 1s); 80 ppt (1σ in 100s)

100 ppm (max range)



Community monitor

TILDAS-FD platform (1 laser operation)

413 m pathlength

< 75 ppt (1σ in 1s); 20 ppt (1σ in 100s)

20 ppm (max range)



Instrument Components

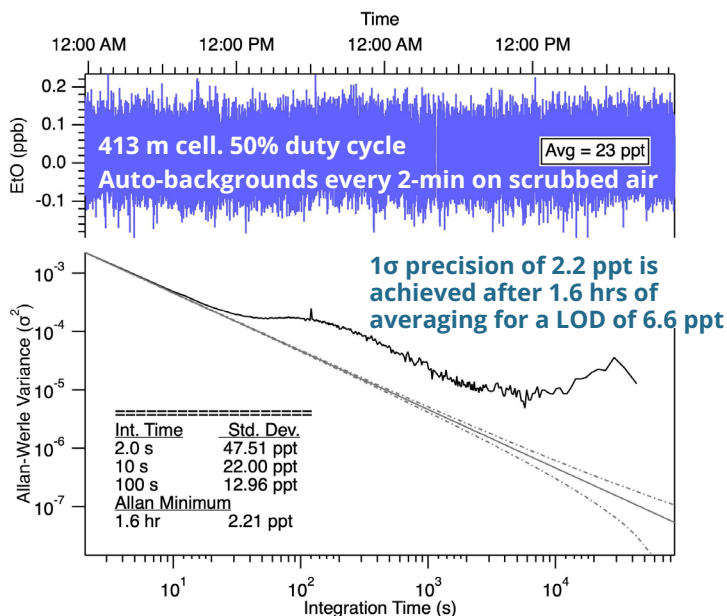
- Core instrument
- Thermoelectric chiller
- Keyboard, mouse and monitor
- Vacuum pump (customer specified)

Data Outputs

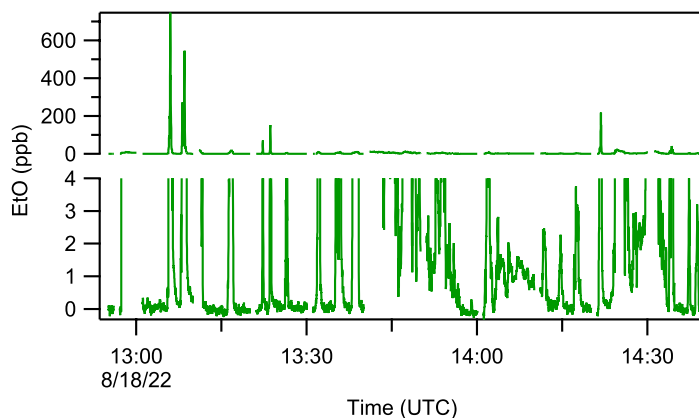
- RS-232, USB drive, ethernet

Operating Conditions

- Operating temperature: -20 to +40 °C
- Sample flow rate: 0 to 20 slpm



Mobile TILDAS spectrometer measurement results downwind from known EtO source.



MECHANICAL SPECIFICATIONS FOR TILDAS-CS PLATFORM

Dimensions: 440 mm x 660 mm x 6U (267mm) (W x D x H) (core instrument)

Weight: 35 kg (core instrument) • Electrical Power: 250 W, 120/240 V, 50/60 Hz (without pump)

MECHANICAL SPECIFICATIONS FOR TILDAS-FD PLATFORM

Dimensions: 560 mm x 770 mm x 640 mm (W x D x H)

Weight: 75 kg • Electrical Power: 250-500 W, 120/240 V, 50/60 Hz (without pump)

REFERENCES

Yacovitch, T. I., C. Dyroff, J. R. Roscioli, C. Daube, J. B. McManus, and S. C. Herndon (2023), Ethylene oxide monitor with part-per-trillion precision for in situ measurements, *Atmospheric Measurement Techniques*, 16(7), 1915-1921, doi:10.5194/amt-16-1915-2023.