



CH₄ Isotope Monitor for $\delta^{13}\text{CH}_4$ and $\delta\text{CH}_3\text{D}$

**Direct Spectroscopic Measurement
of Both Methane Isotopes with No
Chemical Processing or Separation.**

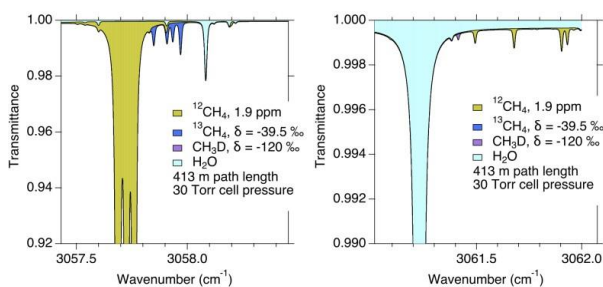


Features:

- < 1 ‰ precision for $\delta^{13}\text{CH}_4$ in air in 1 s.
- < 20 ‰ precision for $\delta\text{CH}_3\text{D}$ in air in 1 s.
- Fast time response (4 Hz).
- Repeatability exceeding 0.1 ‰ for $\delta^{13}\text{CH}_4$ and 3 ‰ for $\delta\text{CH}_3\text{D}$ for a 30-minute measurement including balanced working reference measurements.
- Direct measurement of methane isotopes in air without chemical processing or separation.

TILDAS TECHNOLOGY

Aerodyne instruments use tunable infrared laser direct absorption spectroscopy (TILDAS) at mid-IR wavelengths to probe molecules at their strongest “finger-print” transition frequencies. We further enhance sensitivity by employing a patented multi-pass broad-band absorption cell that provides optical path lengths up to 400 m. 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.



Rugged, field-ready instruments

Direct absorption spectroscopy allows for highly specific and accurate gas detection

Mid-IR detection enables maximum measurement sensitivity

APPLICATIONS

- Determination of atmospheric sources, sinks, and transport through CH₄ isotopic ratios.
- Biosphere exchange.
- Laboratory measurements of discrete samples.
- Breath analysis.

AERODYNE CH₄ ISOTOPE ADVANTAGES

- Measurement precision comparable to much larger and more expensive IRMS instruments.
- Time response up to 4 Hz enables eddy covariance studies.
- Powerful TDLWintel software provides flexible instrument control, and real-time data analysis.
- Valve control capable of complex scheduling and automatic background and calibrations.
- Turn-key design allows unattended operation in remote field sites.
- Optional automated sample handling system providing automatic dilution for samples with high methane concentrations.

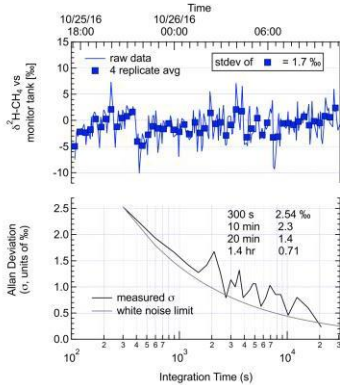
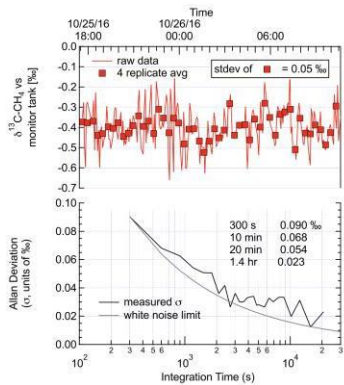
CH₄ Isotope Monitor for $\delta^{13}\text{C-CH}_4$ and $\delta\text{CH}_3\text{D}$

SPECIFICATIONS

Best Precision for Discrete Samples with Sample/Reference Switching

$\delta^{13}\text{C-CH}_4$: 0.054 ‰

$\delta^2\text{H-CH}_4$: 1.4 ‰



Instrument Operations

Operating temperature: 10 to 35 °C

Sample flow rate: 0 to 20 slpm

Instrument Components

Core instrument

Thermoelectric chiller

Keyboard, mouse, and monitor

Vacuum pump (customer specified)

Inlet sampling system (customizable)

Data Outputs

RS-232, USB drive, ethernet

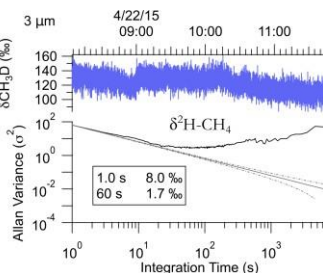
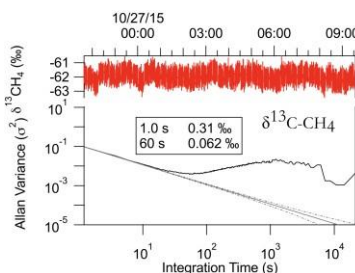
Size, Weight, Power

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)

Best Precision During Continuous Flow Air Measurements



Installation

19' rack mountable or benchtop

Flushing the optics with CO₂-free gas is recommended

Related Instruments

Dual laser monitor for CH₄ ($\delta^{13}\text{C}$) and N₂O ($\delta^{15}\text{N}_\alpha$, $\delta^{15}\text{N}_\beta$ and $\delta^{18}\text{O}$) isotopes

Dual laser monitor for “clumped” isotope of methane: ¹³CH₃D

Aerodyne specializes in collaboration and custom design. Please contact us if you would like to discuss additional measurement options and applications.

REFERENCES

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