



## Aerodyne Mini-TILDAS Ammonia Monitor

*Unprecedented NH<sub>3</sub> accuracy, precision, and time response in a compact, rugged package*



### Features:

- <50 ppt 1-s precision
- <10 ppt long term precision
- Fast time response (10 Hz)
- Option to correct for water dilution
- Inertial inlet provides filter-less particulate separation
- Option to improve time response using active passivation

**Rugged, field-ready instruments**

**Direct absorption spectroscopy allows for highly specific and accurate gas detection**

**Mid-IR detection enables maximum measurement sensitivity**

### TILDAS Technology

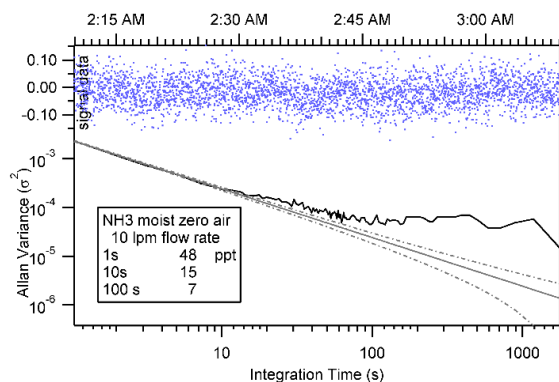
Aerodyne instruments use tunable infrared laser direct absorption spectroscopy (TILDAS) at mid-IR wavelengths to probe molecules at their strongest “finger-print” transition frequencies. We further enhance sensitivity by employing a patented multi-pass broad-band absorption cell that provides optical path lengths up to 76 m. Direct absorption spectroscopy allows for fast (<1 sec) absolute trace gas concentrations without need for elaborate calibration procedures. Moreover, TILDAS instruments are free of measurement interference from other molecular species, enabling extremely specific detection.

### Applications

- Determination of atmospheric nitrogen sources, sinks, and transport.
- Agricultural and biosphere exchange
- Mobile measurements aboard aircraft, marine, and ground-based platforms
- Long-term unattended operation in remote field sites.
- Eddy covariance flux measurements to quantify nitrogen deposition

### Aerodyne Ammonia Advantages

- Aerodyne inertial inlet provides particle separation with <1 s time response.
- Improved time response using active passivation
- 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 aboard aerial and mobile platforms



# Performance Specifications:

## Precision

1 seconds	<50 ppt
10 seconds	<15 ppt
100 seconds	<10 ppt

## Time response

1-10 Hz data rate  
 0.5 s minimum Rise/Fall time (1/e)  
 (using inertial inlet with active passivation)

## Drift (peak-to-peak, 24 hrs)

< 0.5 %

## Dynamic Range (air)

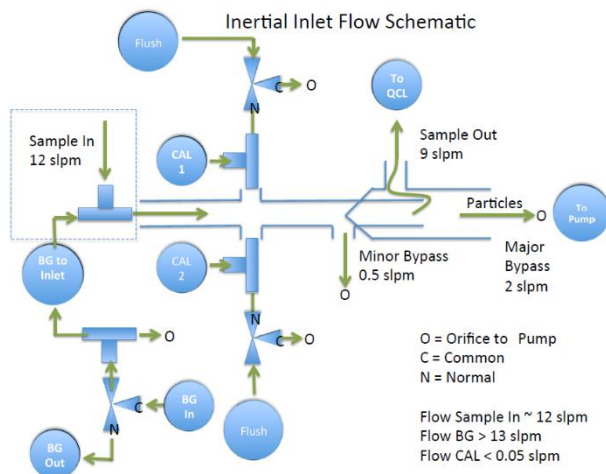
	min	max
<b>NH<sub>3</sub></b>	0 ppb	10 ppm

## Enhanced Measurement Options

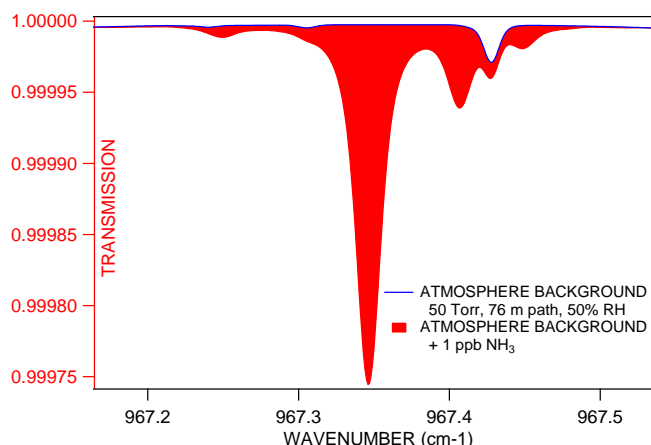
Inertial inlet for particle separation with fast time response (see below)

Multiple valve control for calibration/zeroing at inertial inlet

Active passivation to improve time response to <1 s



## High-resolution spectrum of NH<sub>3</sub>



## Installation

19" rack mountable or benchtop

## Sampling Conditions

Sample temperature: -20 to 50 °C  
 Sample pressure: 1 to 100 Torr  
 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, ethernet

## Size, Weight, Power

Dimensions: 440 mm x 660 mm x 6U (267mm) (W x D x H)  
 Weight: 35 kg (core instrument) + 15 kg (chiller) + pump weight  
 Electrical Power: 250 W, 120/240 V, 50/60 Hz (without pump)

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

## REFERENCES:

Ellis, R. A., et al. "Characterizing a Quantum Cascade Tunable Infrared Laser Differential Absorption Spectrometer (QC-TILDAS) for measurements of atmospheric ammonia", *Atmos. Meas. Tech.*, 3 (2010), 397-406.

Herndon, S. C., et al. "Characterization of urban pollutant emission fluxes and ambient concentration distributions using a mobile laboratory with rapid response instrumentation", *Faraday Discuss.*, 130 (2005), 327-339

Roscioli, J. R., et al. "New Approaches to Measuring Sticky Molecules: Improvement of Instrumental Response Times Using Active Passivation", *J. Phys. Chem. A*, 120 (2016), 1347-1357