AERODYNE RESEARCH, Inc.

Aerodyne Mini-TILDAS Nitric Acid Monitor

Fast, accurate HNO_3 measurements in a compact, field-deployable package.

FEATURES:

- <150 ppt 1-s precision.
- <40 ppt long term precision.
- Fast time response (3 Hz).
- Option to correct for water dilution.
- Inertial inlet provides filter-less particle separation.
- Built-in valving functions for calibrations and zeroing.

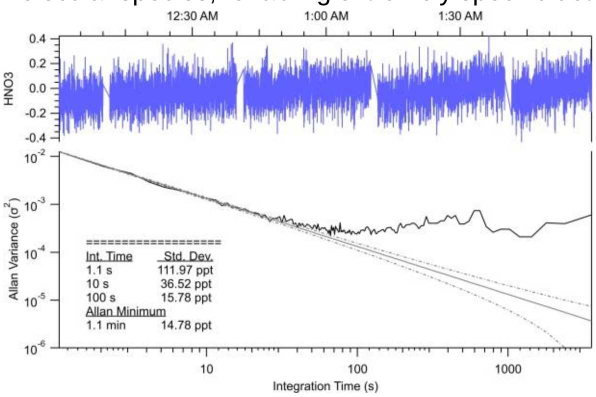
Rugged, field-ready instruments

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 relatively free of measurement interference from other molecular species, enabling extremely specific detection.



APPLICATIONS

- Determination of ambient atmospheric nitric acid sources, sinks, and transport.
- Correlating with particulate loadings for particle formation/growth estimates.
- Measurements aboard aircraft, marine, and ground-based platforms.
- Long-term unattended operation in remote field sites.
- Eddy covariance flux measurements for understanding atmospheric deposition.

AERODYNE NITRIC ACID ADVANTAGES

- Aerodyne inertial inlet provides particle separation with <1 s time response.
- 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.
- Active passivation enables fast eddy covariance methods
- Can be combined with HONO, N2O, or other trace gases in dual-laser TILDAS.

Aerodyne Mini-TILDAS Nitric Acid Monitor

SPECIFICATIONS

Precision

Time	HNO_3 noise
1 seconds	<150 ppt
10 seconds	<100 ppt
100 seconds	<40 ppt

Time response

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

Dynamic Range (air)

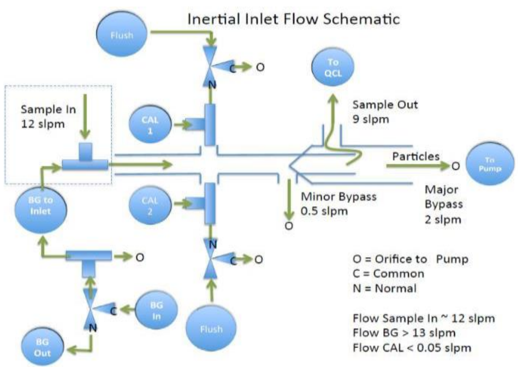
	min	max
HNO_3	0 ppb	50 ppm

Enhanced Measurement Options

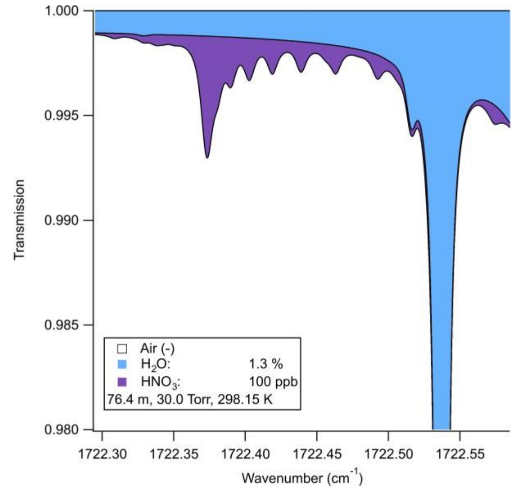
Inertial inlet for particle separation with fast time response (see below)

Multiple valve control for calibration/zeroing at inertial inlet

Active passivation to improve time response to <1 s



High-resolution spectrum of nitric acid



Installation

19” rack mountable or benchtop

Instrument Operating Conditions

Operating temperature: 10 to 35 ^oC
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:430mm x 660mm x 270mm
Weight: 35 kg (core instrument) + 15 kg (chiller) + pump weight
Max power: 125 W, 120/240 V, 50/60 Hz (core instrument)
+ 300 W (chiller) + pump power

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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AERODYNE RESEARCH, Inc.
45 MANNING ROAD, BILLERICA, MA 01821
www.aerodyne.com
(978) 663-9500