

AMS

Aerosol Mass Spectrometer Systems

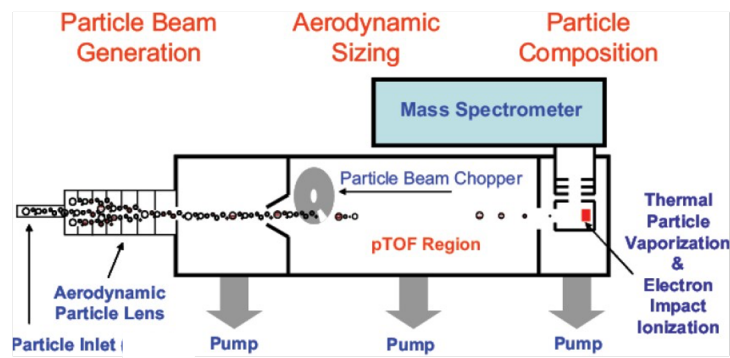
Measure real-time, non-refractory, size-resolved particulate chemical composition and mass.

Applications

- Air quality and climate change research
- Elemental composition (O:C, H:C)
- Mobile measurements from ship, truck and aircraft platforms
- Fast response plume studies up to 5 Hz
- Aerosol chamber studies
- Combustion exhaust monitoring and source characterization

Advantages

- Aerodynamic particle lens for efficient gas-particle separation
- Linear universal detection of sulfate, nitrate, ammonium, chloride and organic aerosol species through two-step thermal vaporization (~600 C) and electron impact ionization process
- Single particle detection mode via event trigger
- Particle aerodynamic diameter determined from particle time-of-flight (velocity) measurements using a particle beam chopping technique
- Several mass spectrometers to choose from: mini, high-resolution (HR) and long (L) TOF systems (resolution ranges 600-7000 m/ Δ m)
- Separation and quantification of organic aerosol species, including primary and secondary organic aerosol



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Specifications

Nitrate Detection Limit dependent on mass spectrometer option:

Mass Spectrometer System	Detection Limit* ($\mu\text{g}/\text{m}^3$)	Mass Resolving Power ($m/\Delta m$)	Mass Range (m/z)
Mini-AMS	0.025	600	1-400
HTOF-AMS : (V-mode)	0.003	2500	1-1200
HTOF-AMS : (W-mode)	0.03	5000	1-1200
LTOF-AMS	0.04	7000	1-1000

*Detection limits are for 1-minute integration, 3σ . Detection limits depend on chemical species. Typical values for nitrate are listed (organic DL is $\sim 10\times$ higher, sulfate DL is $\sim 2\times$ higher and ammonium DL is $\sim 20\times$ higher).

Particle Size Range

- 70-700 nm vacuum aerodynamic diameter (standard lens)
- 110-3500 nm (PM2.5 lens)

Data Rate

- 1-5 minute typical data reporting interval
- Typical fast MS mode data rate 1 Hz

Data System

- High speed acquisition of 1.6 GHz with custom firmware for single particle (event trigger) mode

Size/Weight: (HTOF-AMS only)

- 41 in x 24 in x 50 in; 320 lbs
[104 cm x 61 cm x 127 cm; 145 kg]

Sample Flow

- 85 cc min^{-1} (volumetric flow)

Software

- Custom acquisition and analysis routines
- Specialized routines for PMF analysis of the organic fraction

Electrical

- 600 Watts max, 90-260 VAC, 50-60 Hz

Available Options

- PM 2.5 inlet for extended size-range
- Capture vaporizer for improved mass accuracy
- Laser vaporizer for black carbon and metal particle measurements

*Specifications depend on instrument settings and are subject to change without notice.

