

# URG 9000 Series Ambient Ion Monitor

Time Resolved  
Direct Measurements of:

Nitrate  
Sulfate  
Ammonium  
HCl  
HNO<sub>3</sub>  
HNO<sub>2</sub>  
SO<sub>2</sub>  
NH<sub>3</sub>



**URG**  
Better Air. Better Lives.

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ISO  
9001:2000  
Registered

## Measurement Capabilities

The 9000 Series Ambient Ion Monitors consist of four configurations. The **URG-9000A Ambient Ion Monitor (AIM)** provides time-resolved direct measurements of anion particulate Nitrate, Sulfate, Nitrite, Phosphate and Chloride found in PM-2.5. Nitrite and Sulfate aerosols are produced as a result of the interaction of ammonia ( $\text{NH}_3$ ),  $\text{NO}_x$ ,  $\text{SO}_2$  and other gaseous constituents. These ions can represent a significant portion of the PM-2.5 and are important in understanding visibility degradation, atmospheric chemistry and inputs into various ecosystems. The **URG-9000B Ambient Ion Monitor (AIM)** has an additional Ion Detector to allow for time-resolved direct measurements of cation particulate Ammonium, Sodium, Calcium, Potassium and Magnesium in addition to the anion particulate. The **URG-9000C Ambient Ion Monitor (AIM)** provides time-resolved direct measurements of anion gases Hydrogen Chloride, Nitric Acid, Nitrous Acid and Sulfur Dioxide in addition to the anion particulate. The **URG-9000D Ambient Ion Monitor (AIM)** provides time-resolved measurements of ammonia in addition to the anion gases, anion particulate and cation particulate.



URG-9000C with Reagent Free Ion Chromatograph

## Sample Collection



Enlarged View of Liquid Diffusion Denuder

The AIM Monitor incorporates several state-of-the-art components for sample collection. It draws air in through a PM-2.5 sharp-cut cyclone at a volumetric-flow controlled rate of 3Lpm to remove the large particles from the air stream. The sample is then drawn through a **Liquid Diffusion Denuder** where interfacing acid gases are removed. In order to achieve high collection efficiencies, the particles-laden air stream next enters the **Aerosol Super-Saturation Chamber** to enhance particle growth. An **Inertial Particle Separator** collects these enlarged particles, which are then injected into the Ion Chromatograph. Both particles and gases are collected and injected using syringe pumps, PEEK valves, Teflon® tubing and PEEK tubing.

The sampler can collect and analyze up to 10 days unattended. This period can be extended, if necessary, by using larger solution reservoirs.

# Analysis Method

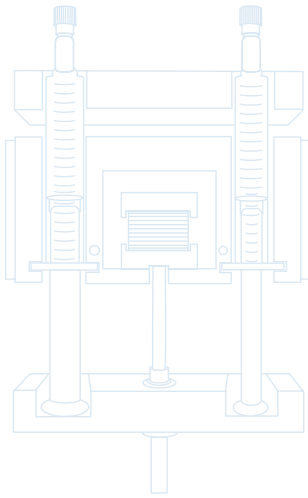
The analysis method for the **AIM Monitor** is Ion Chromatography. An **AIM Monitor** requires as little as 4 liters of deionized water for 10 sampling days. The detection limit is 0.05ug per cubic meter and can be less depending on which ion is being measured.

The Ion Chromatography separates the nitrate and sulfate ions, so that the measurements are not affected by other nitrogen-containing compounds. Losses due to volatilization are eliminated because the particles are collected in a solution and then analyzed by Ion Chromatography.

All the **AIM Monitors** include chemical suppression Ion Chromatographs (IC). The ICs on any of the **AIM Monitors** can be upgraded to the options below:

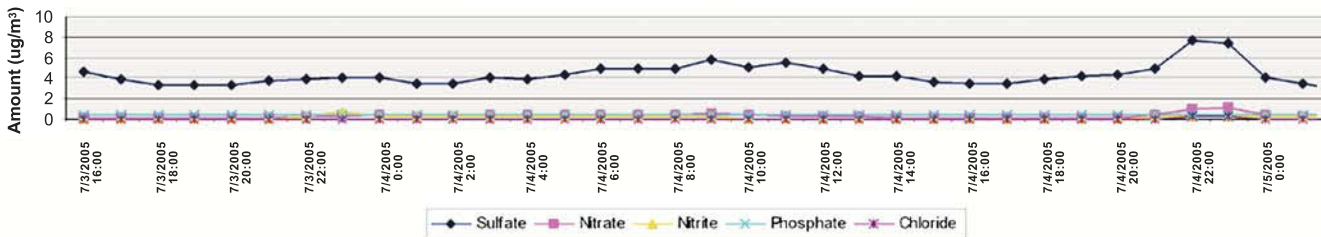
### IC Options:

- Electrolytic Suppression IC
- Reagent Free IC



URG-9000D with Reagent Free Ion Chromatograph

## URG Ambient Ion Monitor



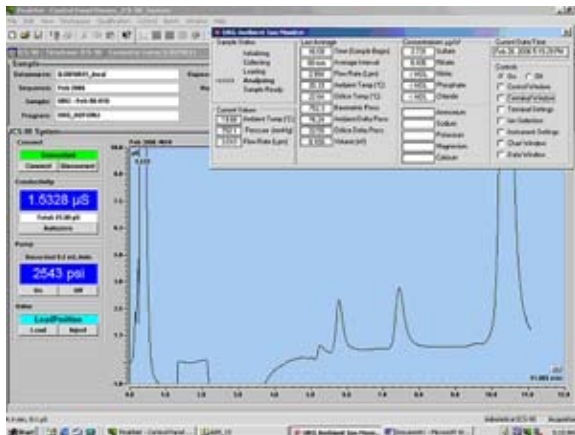
How Analysis Data is Displayed on Ambient Ion Monitor  
(Data Collected in Chapel Hill, North Carolina)

## Ambient Ion Monitor Specifications

Power:	115VAC or 220VAC
Dimensions:	19" x 16" x 36"
Weight:	65-85 lbs.
Measures:	Nitrate, Sulfate, Nitrite, Phosphate, Chloride, Ammonium, Sodium, Calcium, Potassium, Magnesium, Ammonia Hydrogen Chloride, Nitric Acid, Nitrous Acid and Sulfur Dioxide
Detection Limit:	0.05 ug/m <sup>3</sup> Every Hour (Optional 15-30 Minutes)
Installation:	Requires Installation in an Environmentally-Controlled Shelter Where The Temperature is Maintained Between 20-30 Degrees Celsius
Configurations:	Stand-Alone or Rack Mountable Unit Available



**Ambient Ion Monitor with Laptop**  
(Comes Standard with PC Computer)



The Ambient Ion Monitor uses a Windows-based program to display and store the data. The analyte data is displayed in micrograms per cubic meter. The ambient temperature and barometric pressure are also displayed and recorded.

## Ordering Information

**URG-9000A** - Time-Resolved Direct Measurements of Nitrate, Sulfate, Nitrite, Phosphate and Chloride

**URG-9000B** - Time-Resolved Direct Measurements of Nitrate, Sulfate, Nitrite, Phosphate, Chloride, Ammonium, Sodium, Calcium, Potassium and Magnesium

**URG-9000C** - Time-Resolved Direct Measurements of Nitrate, Sulfate, Nitrite, Phosphate, Chloride, Hydrogen Chloride, Nitric Acid, Nitrous Acid and Sulfur Dioxide

**URG-9000D** - Time-Resolved Direct Measurements of Nitrate, Sulfate, Nitrite, Phosphate and Chloride, Ammonium, Sodium, Calcium, Potassium, Magnesium, Hydrogen Chloride, Nitric Acid, Sulfur Dioxide and Ammonia