

# Series 110A Spot Sampler™ aerosol particle collector

Instruments designed for efficient, concentrated collection  
of nanometer to micrometer-sized aerosol particles



## Advantages

- High particle collection efficiency with no particle bounce
- >95% from 5 nm to 2.5  $\mu\text{m}$  for dry collection; >90% up to 10  $\mu\text{m}$  for liquid collection
- Minimal heating of the airflow minimizes loss of volatile constituents, reduces thermal decomposition, and maintains microorganism viability
- Uninterrupted, time-resolved sampling from minutes to hours
- Concentrated sample deposition improves analysis sensitivity (LOD/LOQ)
- Automation of sample handling eliminates tedious and time consuming sample prep

## Applications

- Air Quality
- Health Effects
- Aerosol chemistry and physics
- Bioaerosol collection
- Infectious disease transmission
- Biomass burning
- Climate studies
- Nano-particle processes
- Occupational health
- Semiconductor micro-particle contamination

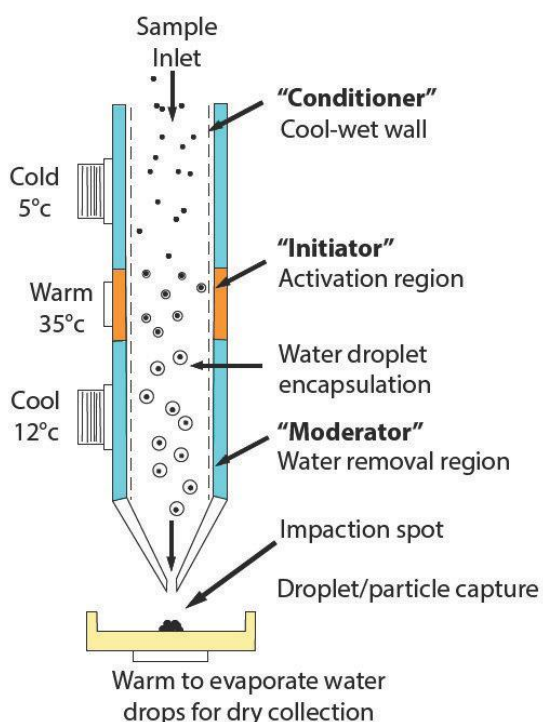
*And more!*



## Collection Modules

1. Universal Spot Sampler (SS110A)- both dry collection and liquid collection
2. Sequential Spot Sampler (SSS110A)- dry collection
3. Liquid Spot Sampler (LSS110A)- liquid collection

## How does it work?



The Spot Sampler collector uses a patented, three-stage "moderated" condensational system to enlarge aerosol particles, and then gently deposit them by inertial impaction.

The initial cold "conditioner" establishes a controlled vapor saturated aerosol stream largely independent of the incoming sample flow conditions. The warm walls of the "initiator" provide a region high of partial pressure of water vapor.

Supersaturation occurs in the second region as a result of the difference in the diffusive rates of water vapor and heat transport.

The final cool "moderator" region allows continued droplet growth while reducing the flow temperature and water vapor content.

Samples may be concentrated as a  $\sim 1$  mm "spot" deposit on a solid substrate, or captured directly into liquid. Droplet growth occurs at temperatures close to ambient (25-30°C) providing robust collection for volatile constituents and microorganisms as small as 5 nm in diameter.

## Sequential Spot Collection Module: time-resolved collection onto dry, solid substrate

With collection onto a solid substrate, sequential samples can be collected in a multi-well plate, in accordance with the user-selected sampling interval. Laboratory-based analysis of the samples, for example by ion chromatography or HPLC, is fully automated with an autosampler handling the solvent and standards addition, extraction, and sample injection without requiring any user manipulation.



PAL700 Autosampler facilitates automated chemical analysis without requiring user extraction or manipulation of the particle sample



Sample plate options available in PEEK® or Aluminum (other materials and configurations possible)

- 33 well plate, 5.6 mm in diameter circular wells that can hold up to 70 µL
- 33 well plate with teardrop shape well that is 5.6 mm in diameter and can hold up to 125 µL

## Liquid Spot Collection Module: collection into liquid media

Particle collections can also be directly into liquid with collection volumes ranging from 0.5-0.7 mL.

Polycarbonate vials are available in both flat bottom and conical configurations, ported and non-ported.

Ported options allow a user to draw sample or add liquid media into the vial while actively sampling.



## Specification Overview

Particle Size Range	5 nm to > 2.5 µm dry collection; 5 nm to > 10 µm wet collection
Collection Efficiency	>95% for dry collection; >90% for wet collection
Condensing Fluid	Water, distilled or cleaner
Sample Flow Rate	1.0 – 1.5 L/min (user adjustable)
Sampled Aerosol Conditions	Non-corrosive 0 – 40 degrees C
Communications	USB communications output for sampling parameters and instrument status
Environmental Operating Conditions	10 – 35 degrees C 10 – 95% RH
Dimensions	50 cm (H) x 31 cm (W) x 26 cm (D) (19.5 x 12 x 10 inches)
Weight	6.8 Kg (15 lb) Growth Tube unit; add 1.1 Kg (2.5 lb) for Sequential Spot Collector module; add 0.1 Kg (0.22 lb) for Liquid Spot Collector module
Power Requirements	Power 90-264 VAC/47-63 Hz: output voltage is 12.0 VDC and output current is 15A (maximum)

For a complete listing of the Spot Sampler particle collector specifications visit our website at <https://aerosoldevices.com/products/specifications-spot-sampler/>. PEEK® is a registered trademark of Vitrex Manufacturing Limited. Specifications are subject to change without notice.

Aerosol particle collector technology is licensed from Aerosol Dynamics Inc. with US Patents 6,712,881; 7,736,421; 8,801,838; 9,658,139; 9,821,263; German Patent 10392241; Chinese Patent 201180052428.5 and Japanese Patent 5908475. Other patents pending. A grant from the National Institutes of Health (1 RC3 ES019081-01) funded the collector development.

## Who We Are

A team of engineers and scientists passionate for revolutionizing the science of airborne particle counting and collection for physical, chemical and biological analysis. Aerosol Devices Inc. was formed in 2014 by Ms. Pat Keady and Dr. Susanne Hering, both past Presidents of the American Association for Aerosol Research (AAAR) and leaders in the field with numerous aerosol measurement patents and publications.

Copyright © Aerosol Devices Inc. 2018 All rights reserved.

**Contact Information:**  
**Aerosol Devices Inc.**  
**Fort Collins, CO USA**  
**Phone: +1-970-744-3244**  
**Email: [Info@aerosoldevices.com](mailto:Info@aerosoldevices.com)**  
**Website: [aerosoldevices.com](http://aerosoldevices.com)**