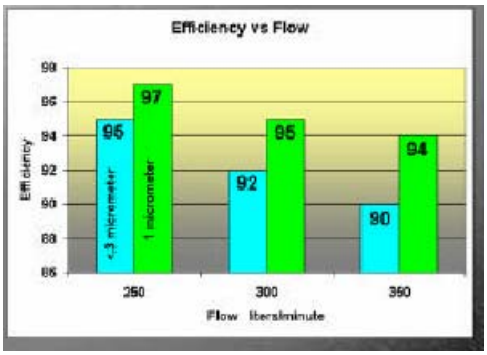
Aerosol-to-Liquid Particle eXtraction System (ALPXS)*

A new device developed at Savannah River National Laboratory collects ***and concentrates*** airborne metals into a liquid sample for onsite/real time or laboratory analysis. Useful as a tool for coupling ICPMS/OES to airborne particle analysis, the ALPXS can offer near real time sampling and analysis of welding fumes, workplace exposure measurement, or environmental metal particle monitoring. The device is portable and consumes only 12 watts of power.

- Uses wet electrostatic precipitation to separate particles from air.
- Collection efficiency is greater than 90% for particles less than 0.3 micrometers in diameter.
- Particles in air are drawn through the ionization chamber at a flow rate of between 200 and 300 LPM.
- Ionization chamber charges particles at 8000 volts.
- Particles are collected in a liquid reservoir with a volume of 10 - 200 mL.
- Liquid continuously washes collection electrode to gather particles during the measurement.



Collection Efficiency versus sampling air flow rate.

Now, for the first time, you can potentially measure metal concentrations approaching picogram per cubic meter levels, or lower.

Comparison with OSHA PEM for Lead (Pb) Exposure

Device	Sampling Time, hr	Total Air Volume, m^3	Pb ug/m^3
ALPXS	0.8	14.4	4.8
OSHA PEM	2.5	0.3	2.7

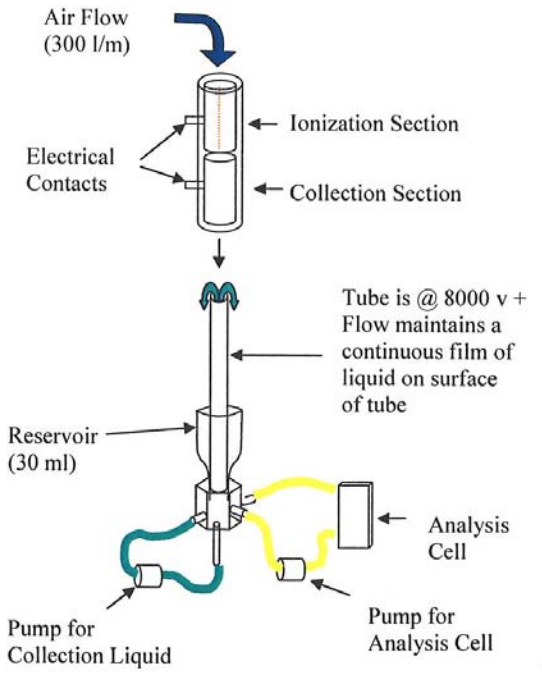
* Analysis for Pb by ICPOES

*U.S. Patent 6955075, Washington Savannah River Company LLC

Aerosol-to-Liquid Particle eXtraction System - ALPXS

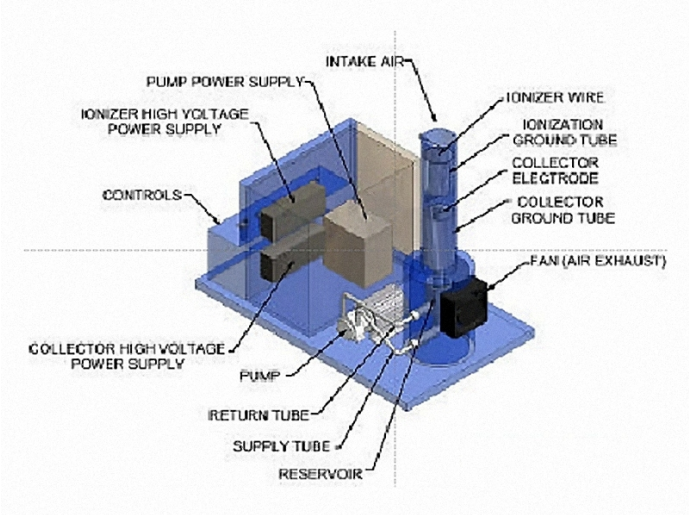
Principle of Operation

- Air is drawn into the ionization chamber.
- Particles assume a negative charge.
- Collection electrode is maintained at positive high voltage and particles are attracted to it.
- As the particles migrate towards the collection electrode they are trapped by the liquid layer that continuously washes the surface of the collection electrode and accumulate.
- An auxiliary pump transports a very small fraction of the reservoir volume to an ICPMS, ICP-OES or AA for determination of metal species in the liquid.



Technical Specifications

- Footprint: 8” x 8” with chimney height 23” (approx).
- Power requirements: 12vdc @ 1.25A, battery or converter.
- Air intake flow rate: 200-300 LPM
- Ionization voltage: 0-10kV, adjustable.
- Liquid reservoir volume: 20-100 mLs.
- Duty cycle: Continuous



ALPXS is a 2003 R&D 100 Award Winner

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