

## Collecting Radioactive Aerosols with the SASS Air Samplers

The SASS 3100 and 4100 air samplers have significant advantages when it comes to monitoring radioactive aerosols. First, there is no substantive difference between the aerosol characteristics of particles that have radionuclides attached to them and ordinary atmospheric particles. Elemental cesium will rapidly oxidize and hydrate in air, and will be very sticky in terms of attaching to atmospheric dust. In addition, the decay rates of fission product radioisotopes such as iodine-133 and cesium-137 are not so rapid that the attachment of dust particles to an electret filter would be affected, and micro-particles of plutonium and uranium oxides will very readily create an induced charge condition that draws the particles to the electret fibers. Radon is a common naturally-occurring radioactive atmospheric contaminant and it and its daughter products also attach to aerosol particles.

Figure 1 on the following page presents test results for RI's electret filters when used with either the SASS 3100 or SASS 4100: This data was gathered by an independent third party. Filters included in the comparison were:

- A standard SASS electret filter;
- Research International's high-efficiency electret filter for radioactive aerosols; and
- The Whatman 41 cellulose filter commonly used in older radiological aerosol air sampling protocols.

From this you can see that the standard SASS filter on either the SASS 3100 or the SASS 4100 body will collect many more radioactive particles per unit time than the Whatman filter. The radiological electret filter material is about 99% efficient at collecting particles of 0.3 microns size or larger, but it has such a large pressure drop that the actual number of particles collected per unit time is about 1/6 of that possible with the standard RI biological aerosol filter. Many radiological aerosol sampling protocols based on portable equipment use sampling rates of 2 to 100 liters/minute, and it is apparent that the SASS product combinations, the SASS electret filter with either the SASS 3100 or SASS 4100 sampler, will provide much higher filter count rates due to the faster collection rates.

This is significant because methods for eliminating the naturally-occurring radon background are much more effective if you have large count rates from collected aerosols, that is, have collected for a long time or have a high collection rate. The high collection rates of the SASS products and the comparatively small filter area can both help to provide more accurate background subtractions, fewer false positives, and much better statistics when used with either, simple hand-held gamma, beta and alpha detectors, or laboratory-grade scintillation detectors.

However, if sampling protocols require >95% collection of all radioactive aerosols greater than 0.3 microns in diameter (as most current standards do), then the new electret radiological aerosol filter is a good choice to replace current Whatman paper filter-based protocols.



17161 Beaton Road SE  
Monroe, Washington 98272-1034  
Tel: 360-805-4930 • Fax: 360-863-0439  
E-mail: [info@resrchintl.com](mailto:info@resrchintl.com)  
[www.resrchintl.com](http://www.resrchintl.com)

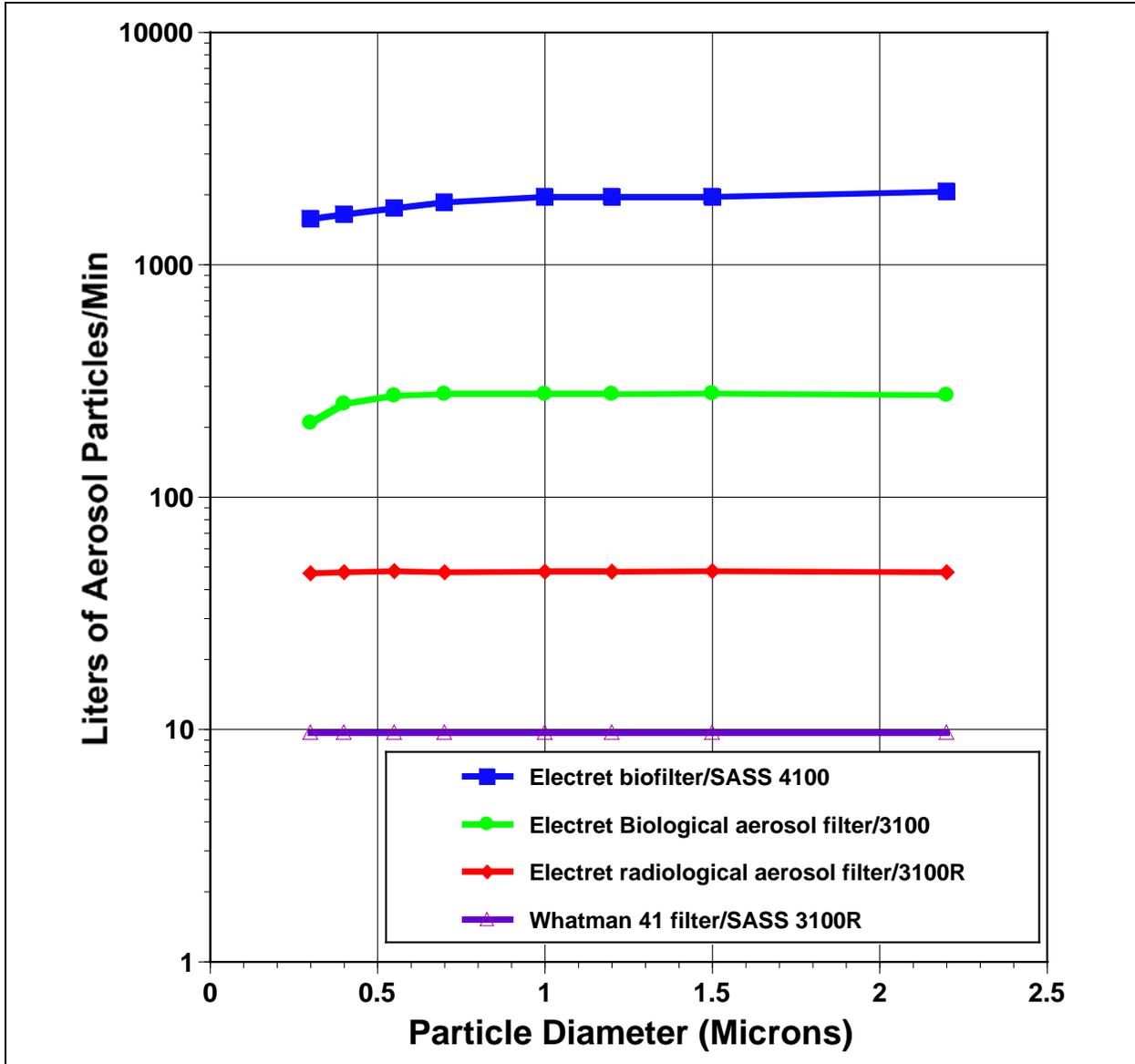


Figure 1: Aerosol collection rates for various filter and sampler combinations.