

Summary and Overview of the Non-Specific Real-Time Particle-in-Air Monitor for Beryllium

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The response time of the non-specific real-time particle-in-air monitor for beryllium could be less than a minute. The TSI Aerotrak Model 9110 particle-sizing equipment is small, portable and commercially available at ~\$23K. The measurement is based on the laser-light scattering by particles in air. The total mass of beryllium would be calculated by the volumes, density and composition of particles that are assumed to be BeO spheres at their measured diameters and particle-size populations. Particles in the measured air could be collected on a filter at the air vent of the monitor. An average $\mu\text{g Be/m}^3$ for an air filter could be determined by subsequent chemical analysis with the measured air volume pumped through the filter.

The more-expensive part of this proposal is that the particle monitor must operate within an ISO-6 (or ISO-5) clean room so that the background concentration of particles in air is low enough so that the remaining particles can be calculated below $\sim 0.2 \mu\text{g Be/m}^3$. Within a clean room, air is continuously filtered at a high turnover rate. Any BeO particles introduced into the air by work activities would be filtered effectively to reduce the beryllium concentrations. Therefore, in addition to enabling the particle-size analyzer to function as a near-real-time beryllium monitor, the clean-room filters would actively reduce the concentration of beryllium in air to a lower value than would otherwise be present if work activities introduce BeO particles into the air.