Particle Number Concentration – Portable instruments	**Category:** **D. Particle Exposure Assessment** **Institute: VITO** **Location: Boeretang 200, 2400 Mol, Belgium** **Contact Details of Technology Expert:** **Evelien Frijns** **Phone: +32 (0)14 335367** **Fax: + 32 (0)14 321183** **E-mail: evelien.frijns@vito.be**

Short technology description/Overview *(approx 300 words)*:

The **P-trak** instrument detects and counts particles in the size range 20 nm to < 1 µm (particles/cm^3). The measurement principle is based on the condensation particle counting (CPC) technique using isopropyl alcohol. Small particles are enlarged by means of a condensation technique to form droplets that are large enough to be detected optically.

NanoTracer measures airborne particles in the 10–300 nm size range. The monitor provides real time information about their number concentration (particles/cm^3) and average size (average particle diameter nm). The monitor's functionality relies on electrical charging of airborne particles and subsequent measurements of the total particle charge concentration.

The **Mini-DiSC** monitor measures particle number concentration (particles/cm^3) and the average particle diameter (nm). In the miniDiSC, aerosol is charged in a unipolar diffusion charger, and subsequently detected in two electrometer stages. The first stage consists of a stack of stainless steel grids, where particles are deposited by diffusion and a current D is measured. The second stage contains a HEPA filter and captures all particles penetrating the diffusion stage, and a current F is measured. By comparing the currents in the filter and the diffusion stage, the average particle size can be determined. The total current and the particle size are then combined to compute the number of particles.

Main Features (Equipment Capabilities):

- Concentration range: 0 to 5 × 10^5 particles/cm^3 (P-trak) / 0-10^6 particles/cm3 (NanoTracer) / 10^3 – 10^6 particles/cm^3 (Mini-Disc)
- Particle Size Range: 0,02 to 1 micrometer (P-trak) / 10-300 nm (NanoTracer) / 10-300 nm (Mini-Disc)
- Power requirement 6 * AA alkaline (P-trak) / Rechargeable internal lithium-ion battery (Nanotracer) / internal rechargeable Li-ion battery (Mini-Disc)
- Alcohol requirement: isopropyl (P-trak) / no fluids required (NanoTracer) / no fluids required (Mini-Disc)
- Run-time: 6 hrs (P-trak) / > 8 hrs (Nanotracer) / ~ 8 hrs (Mini-Disc)
- Measuring interval: min. 1 sec (P-trak) / min. 3 sec (NanoTracer) / min. 1 sec (Mini-Disc)

Typical Samples & Images:

Any further Information: