Particle Surface Area and Particle Electrometer	**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 AEROTRAK 9000 **nanoparticle aerosol monitor** indicates the human lung-deposited surface area of particles in units of micrometers squared per cubic centimetre (μm^2/cc), corresponding to tracheobronchial (TB) and alveolar (A) regions of the lung. It is based on diffusion charging of sampled particles, followed by detection of the charged aerosol using an electrometer.

The **diffusion charger DC 2000CE aerosol sensor** uses a corona discharge for diffusion charging. The corona discharge produces a negative oxygen ions by applying a voltage to a thin metallic wire. The negative oxygen ions (more precisely cluster ions with oxygen ion in the center) diffuse in the gas carrying the particles and when they come in contact with the particles they transfer the electrical charge. This is called “diffusion charging“ and depends solely upon the active particle surface area). The remaining oxygen cluster ions are removed and the current is measured by a Farady cup electrometer

The **Aerosol Electrometer** (TSI model 3068a) measures the ion concentration of the sampled airstream. The Aerosol Electrometer consists of an Electrometer current sensor which collects the particles by filtration and measures the total electrical current with an Electrometer.

Main Features (Equipment Capabilities):

- **Power**: 6600 mAH Li Ion Battery (6,25 hrs) and external power supply (Aerotrak), External power supply (DC 2000CE), External power supply (Electrometer)
- **Range:** TB 1 to 2,500 μm^2/cc, A 1 to 10,000 μm^2/cc (Aerotrak), 0 to 1000 mm^2 / m^3 (DC 2000CE),
- **Sensitivity:** 10-1000 nm (Aerotrak), ~ 10 mm^2 / m^3 (DC 2000CE), 0.002–5 μm (Electrometer)
- **Response time:** 1-60 sec (Aerotrak), min. 10 seconds (adjustable) (DC 2000CE)

Typical Samples & Images:

Any further Information: