Atmospheric Particle Counters

Scanning Mobility Particle Sizers (SMPS)

The SMPS system consists of an Electrostatic Classifier linked to a Condensation Particle Counter. The department has two Electrostatic Classifiers and four Condensation Particle Counters (CPC's).The SMPS system measures the size distribution of aerosols between 5nm and1000nm.

Particles are classified with an electrostatic classifier and the concentration of these particles measured using a condensation particle counter.

The system uses a bipolar charger in the electrostatic classifier to charge the particles to a known charge distribution. These are then classified according to their ability to traverse an electrical field and the CPC counts the numbers of particles. The system allows for adjustments to the flow rate.

Atmospheric Particle Counters and Size Fractionating Devices

Partisol Plus Sequential Air Samplers

The School has three Dichotomous Partisol Plus Sequential Air Samplers.

These instruments split a PM-10 sample stream into fine (<2.5µm) and course particles (2.5-10µm) with the use of a virtual impactor to achieve the 2.5 micron cutpoint. The system collects particulate matter on two 47mm diameter filters simultaneously. They have a filter storage and an automatic filter changing system with a capacity of up to 16 filters between site visits.

High Volume PM10 Air Samplers

These instruments are used to sample particles of less than 10 µm from air drawn through an inlet at a constant flow rate. This is achieved using a mass flow controller or volumetric flow controller.

The particles are collected on a micro-quartz fiber filter. With this equipment you can measure the concentration of PM10 in air in µg /m3.

Ambient Particulate Monitors

Series 1400a TEOM Ambient Particulate (PM-10) Monitor

We have two TEOM instruments which are used for measurement of the particle mass concentration in ambient air on a "real time" basis. They are capable of measuring particulates smaller than 10 µm diameter in outdoor and indoor ambient air.

They operate at a flow rate of 3L /min and the temperature of the sample stream is constant at 50ºC.They contain patented micro weighing technology called the Tapered Element Oscillating Microbalance –TEOM.

Series 8500 Filter Dynamics Measurement System (FDMS) PM Monitor

This particulate monitor uses a Series 1400a TEOM Ambient Particulate (PM-10) Monitor attached to a Series 8500 FDMS unit. This is the only system which provides information about the nature and concentartion of particulate matter in the air and is now used in the UK's National Air Quality Network.

They are capable of measuring the non volatile and volatile PM components and reports the combination as a mass concentration measurement.

The instrument achieves this by measuring the volatile portions in the air separately from the total sample and uses this measurement in calculating the total PM 10 mass conc. It can be to sample PM-10, PM-2.5 and PM-1 and can give average results over 1 to 24 hour time periods.