

Integrated system incorporating the dual column droplet activation chamber with Particle separator, Bio-aerosol sensor and Single Particle Soot Spectrometer.

a) Droplet Activation Chamber with Particle Separator
 Dual CCN growth columns with one optical particle spectrometer and one particle separator.

6,000 particles/sec at supersaturations < 0.2%

20,000 particles/sec at supersaturations > 0.3%

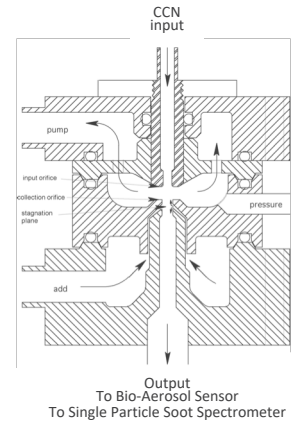
0.75 – 10 μm (from column 1 OPC)

Number of Particle Size Bins: 20

Sampling Frequency: 1 Hz / 1 Second

Supersaturation Range: 0.07 - 2.0 %

Particle separation (from column 2)



Cross-section of the Particle Separator. Interstitial aerosol and CCN particles are present in the input flow. Inertial separation is achieved by directing a counterflow opposite the particle velocity vector. The output flow are high inertia particles typical of CCN.

b) Bio-aerosol Sensor

Single-particle scattering & fluorescent particle number distribution as a function of particle size

Three separate fluorescence measurements (F1, F2, F3)

Fluorescence Excitation: Dual wavelength, 280 and 370 nm

Fluorescence Emission : Dual wavelength, 310-400 nm and 420 - 650 nm

Particle Asymmetry Factor (AF)

c) Single Particle Soot Spectrometer

Single-particle scattering & incandescent particle number distribution as a function of particle size

Scattering Channel: 100-500 nm diameter

Lasers Nd: YAG Laser: 1064 nm

Sample Flow : 30-120 standard cm³/min

Minimum Black Carbon Detection Limit: 10 ng/m³

Black carbon mass distribution as function of particle diameter

Incandescent Channel: 50-800 nm diameter