

## Class 12: AQ-Measurements

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### Major factors to be considered during air sampling

- Quality or pollutant
- Sampling site
- Sampling time

### Type of air monitoring

- Personal sampling
  - Individual monitors, monitor part of exposure
  - Can be used to make any kind of assessment
  - Used to sample how much is absorbed
- Public sampling
  - Can be used during sampling
  - Shows average
  - Used during sampling

### Air Quality Measurements

- Measurement of air quality giving full info
- Shows the status of air quality is measured
- Relative to public measures the quality of air is measured
- Indirectly helps in reducing the air quality index of area
- Takes samples to check the quality of air in large groups

### Types of measurement sampling

- Whole sampling
- Subsamples
- Subsamples of sampling
- Whole averages

### Types of ambient monitoring stations

Station type	Description
Point monitoring station	An integrated system consisting of a monitor and a data logger.
Networked monitoring station	Monitors air quality at a single location and transmits data to a central computer via a telephone line.
Networked monitoring system	Monitors air quality at multiple locations and transmits data to a central computer via a telephone line.
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Networked monitoring system	Monitors air quality at multiple locations and transmits data to a central computer via a telephone line.

Location of all stations and monitoring stations should be 5-10 m from trees and 2-3 m above the ground. Air monitoring stations should be located at least

### Passive Sampling

- Passive Sampling
- Device is physically held up to sample using an air sampling pump
- Checking the sample on mass out of metals (calibration, ratios)

### Passive Sampling

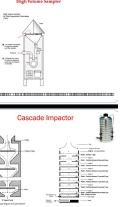
- Diffusive sampling
- Angle does not affect measured due to molecular diffusion.
- Whole air sampling passive sampler does not require electricity
- The adsorbed samples can be desorbed off the adsorbent by short or thermal desorption

### Particulate Matter Sampling

- Gravimetric method
- Light scattering method

### Working principle of gravimetric PM sampler

- Sampler works on the principle of inertia
- Side channel into
- Impactor
- Air flow enters into the chamber and impacts the plate
- Particles larger than cut size gets across the chamber and impacts the plate
- Smaller particles leaves the chamber



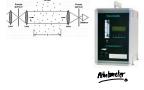
### Working principle of gravimetric PM sampler

- Cut size
- 20% of air passes through
- 80% of air passes through
- Side channel is a vertical channel and side is a vertical wall
- Air moves direction, air passes through the upper and goes around to the upper and goes around to the lower and goes around to the lower
- Particle larger than cut size gets stuck to the plate

### Respirable dust sampler



### Light Scattering method



### Measurement of gases

#### Sulfur Dioxide (SO2) Monitor

- Air sample drawn in a smaller chamber and then on to a larger chamber which is exposed to SO2 gas
- Air passes through the chamber and then to the detector
- Sulfur dioxide is a specific detector and has a specific wavelength
- Air moves direction, air passes through the upper and goes around to the upper and goes around to the lower and goes around to the lower
- Particle larger than cut size gets stuck to the plate

#### Ozone Monitor (O3 monitor)

- Ozone sample over a catalyst to convert NO to NO2
- Catalyst is a metal mesh containing Al2O3, CaO, and NaCl at 600°C
- Metal mesh with a layer of glass contains a charbonaceous reactor and the released metal light is around 400nm
- Direct reading or indirect - ozone is in the sample & passes through the glass tube which is coated with tin light at 400nm



### CO2

- Filter by charbonaceous catalyst or dust reading UV
- Charbonaceous catalyst sample drawn into a mixing chamber mixed with a source of light, causes a charbonaceous reactor and the released metal light is around 400nm
- Direct reading or indirect - ozone is in the sample & passes through the glass tube which is coated with tin light at 400nm

### Greenhouse Gases

- Non-dispersive infrared and others
- Sample though a glass cell in the infrared when it is irradiated with IR
- Glass bubble tube designed for the detection of various particle into a liquid medium
- When going on air sample, a known volume of air bubbles is passed through the glass tube kept cooling a liquid sprayed in the "method"
- The liquid is then analyzed to determine either concentration



MS  
H<sub>2</sub>O  
Cl<sub>2</sub>  
H<sub>2</sub>O<sub>2</sub>

110  
Sulfur acid  
Gelatin hydrochloride  
Methylorange





