

UNIT III - AIR AND NOISE POLLUTION

3.2 AIR POLLUTANTS CONTROL EQUIPMENT'S

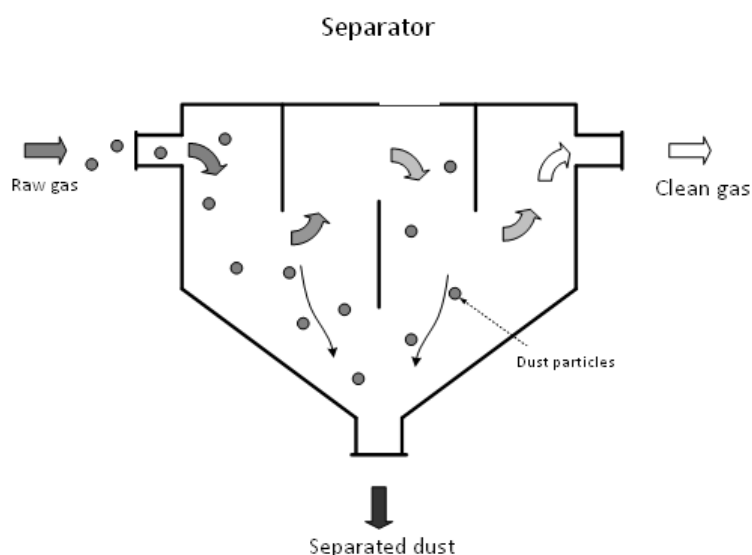
(Gravity Separator-Centrifugal separator-fabric filter-Electrostatic separator, Catalytic convertors)

1. GRAVITY SEPARATOR

Definition: A gravity separator uses gravitational forces to remove larger particulate matter from the air.

How It Works:

- Principle: Heavier particles fall to the bottom due to gravity, while cleaner air moves upward.
- Design: Typically consists of a chamber or duct where the airflow velocity is reduced.



Applications:

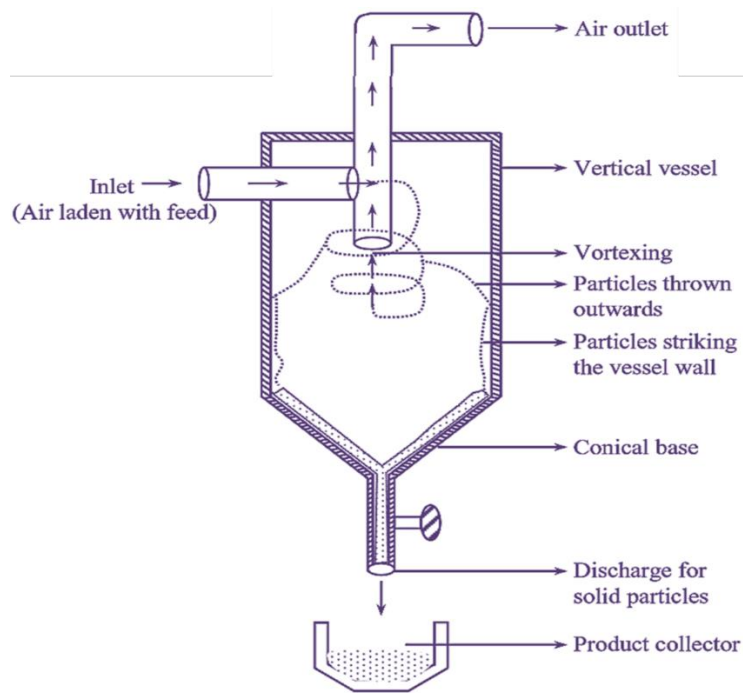
- Used in industries to reduce dust emissions from processes such as wood milling or mining.

2. CENTRIFUGAL SEPARATOR

Definition: A centrifugal separator removes particulate matter and aerosols from the air by using centrifugal forces.

How It Works:

- Principle: Air is forced to flow in a circular motion, causing heavier particles to move outward due to centrifugal force.
- Design: Usually features an inlet, a spinning chamber, and an outlet.



Applications:

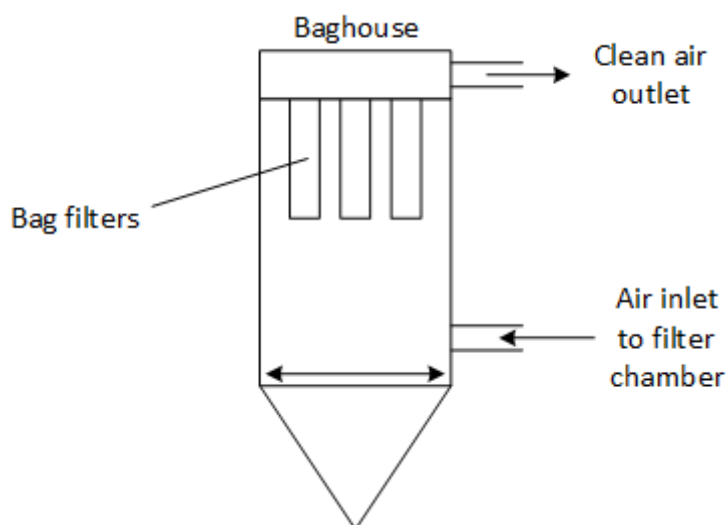
- Commonly used in industries to clean air from dust, fog, and oil mist, especially in ventilation systems and exhaust applications.

3. FABRIC FILTER (BAGHOUSE)

Definition: A fabric filter collects particulate matter by passing air through fabric bags that trap dust and other particles.

How It Works:

- Principle: As air enters the filter, particles are trapped on the surface of the fabric.
- Maintenance: Periodic cleaning of the bags (via shaking or pulsing air jets) is required to remove accumulated dust.



Applications:

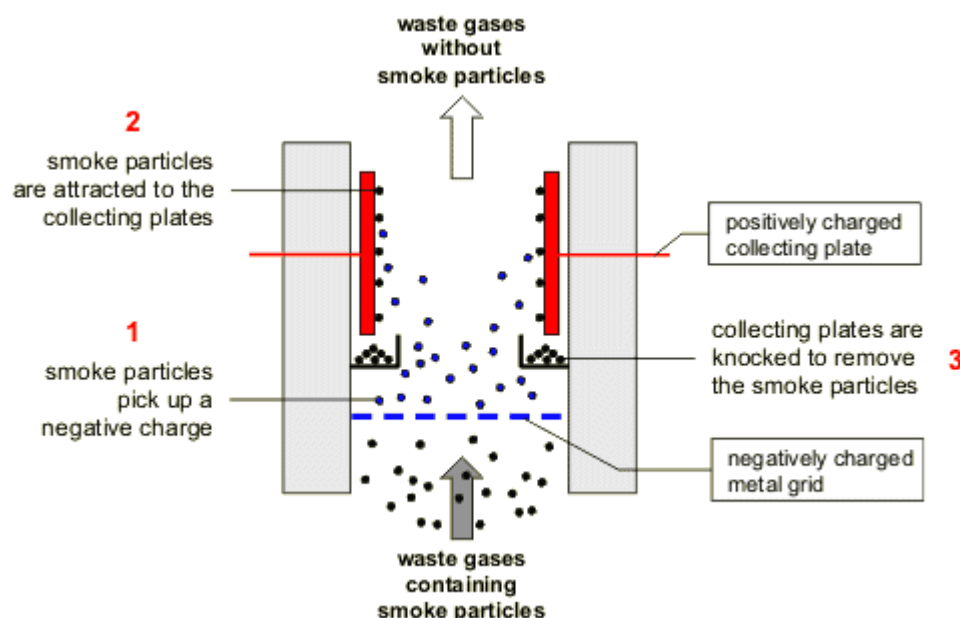
- Widely used in industrial processes, such as cement production, power plants, and metal manufacturing, for controlling emissions.

4. ELECTROSTATIC SEPARATOR (ELECTROSTATIC PRECIPITATOR)

Definition: An electrostatic separator uses electrical charges to remove particles from the air.

How It Works:

- Principle: Particles are charged as they pass through an electric field and are collected on charged plates or surfaces.
- Process: The air stream is ionized, causing negatively charged particles to move towards positively charged plates.

**Applications:**

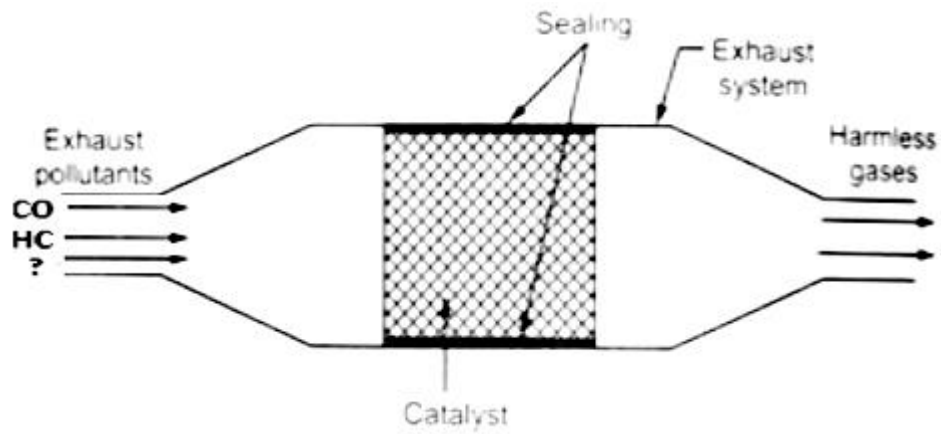
- Commonly used in power plants, waste incinerators, and manufacturing facilities to control fine particulate emissions.

5. CATALYTIC CONVERTERS

Definition: A catalytic converter is a device that reduces harmful emissions from internal combustion engines.

How It Works:

- Components: Contains a catalyst (usually made of platinum, palladium, and rhodium) that facilitates chemical reactions without being consumed.
- Process: Converts harmful gases (e.g., carbon monoxide, nitrogen oxides, and unburned hydrocarbons) into less harmful emissions (e.g., carbon dioxide and nitrogen).

**Applications:**

- Found in automobiles and some industrial applications to reduce vehicle emissions and comply with environmental regulations.

