

Air Pollution Control Technology

Air Pollution control : Gases and Vapors

by

Nurud Suria Suhaimi

Norhidayah Abdull

Faculty of Engineering Technology

email: nurud@ump.edu.my

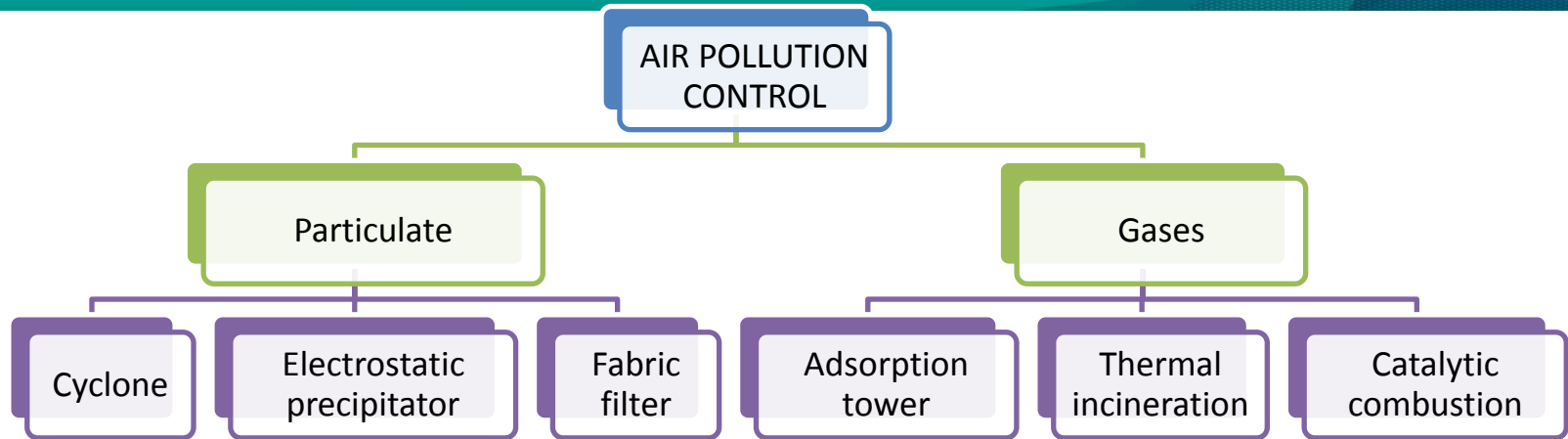


Introduction

- Aim
 - This chapter discuss a methods used to control air pollution from gas stream
- Outcome
 - Students are able to discuss common methods for air pollution control in gases stream



Introduction



- Units of measure:
 - 1) *Micrograms per cubic meter* ($\mu\text{g}/\text{m}^3$)
 - 2) Parts per million (ppm)
 - 3) Micron (μ) / micrometer (μm)
- ppm in water and wastewater, mass-to-mass ratio
- ppm in air, volume-to-volume ratio

$$\text{ppm} = \left[\left(\frac{M_p}{\text{GMW}} \right) \times 22.414 \times \left(\frac{T_2}{273\text{K}} \right) \times \left(\frac{101.325 \text{ kPa}}{P_2} \right) \right] / \left[V_a \times 1000 \text{ L}/\text{m}^3 \right]$$



- **Example :**

A one-cubic-metre sample of air was found to contain $80 \mu\text{g}/\text{m}^3$ of SO_2 . The temperature and pressure were 25°C and 103.193 kPa when the air sample was taken. What was the SO_2 concentration in ppm

$$\text{GMW of } \text{SO}_2 = 32.06 + 2 (15.99994) = 64.06$$

Answer : 0.0300 ppm of SO_2



Regulation

- Performance monitoring
- Maintenance record
- Opacity
- Limit values and technical standard
- Hazardous substance
- Periodic monitoring
- CEM
- Emission declaration



- Techniques without using emissions control devices
 - Process change
 - Wind, geothermal, hydroelectric or solar unit
 - Change in fuel
 - Good operating practices
 - Good house keeping
 - Maintenance
 - Plant shutdown



Gases pollution and control

Flue gas desulfurization

- Reduce energy consumption, increase efficiency of energy conversion
- Use less carbon fuels and renewable source



- Fuel de nitrogenation
- Combustion of modification
- Modification of operating conditions

Control at the stationary sources and process industry

Gases pollutants



- Flue gas desulfurizing process
 - Limestone scrubbing
 - Lime scrubbing
 - Dual alkali processes
 - Lie spray drying
 - Wellman-lord process



NURUD SURIA SUHAIMI
NORHIDAYAH ABDULL

LECTURER OF OSH PROGRAM
UNIVERSITY MALAYSIA PAHANG
(UMP)

